Functional impairment in South African children with Obsessive-Compulsive Disorder and Attention-Deficit/Hyperactive Disorder

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COMPULSORY DECLARATION This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

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ABSTRACT

This study investigated the differences in functional impairment as experienced by school-aged South African children diagnosed with Obsessive-Compulsive Disorder (OCD) and those diagnosed with Attention Deficit Hyperactive Disorder (ADHD). OCD and ADHD often occur co-morbidly and are frequently confused by teachers and parents. Therefore this study aimed to contribute to disentangling the two by identifying the specific functional impairments associated with each. Furthermore, participants in the ADHD group were divided into those meeting criteria for ADHD-Inattentive subtype and ADHD-Combined subtype. The specific functional impairments associated with each of these subgroups were also investigated. The *Mini International Neuropsychiatric Interview for Children and Adolescents (M.I.N.I Kid)* was used as diagnostic tool. Measures of functional impairment included the *Child-Behaviour Checklist* (*CBCL)*, the *Strengths and Difficulties Questionnaire* (*SDQ),* and the *Schreiner Disability Scale (SDS).* All participants were also rated on the *Children's Global Assessment Scale (CGAS).* Results indicated that children and adolescents who meet diagnostic criteria for ADHD experience most functional impairment in the school domain, while those who meet criteria for OCD experience most functional impairment in the social and school domains. Those diagnosed with ADHD also tended to have more conduct-related problems, whereas those diagnosed with OCD tended to experience more internalizing problem behaviours and emotional difficulty. There were no statistically significant differences between the ADHD-CT and ADHD-PI groups on any of the measures of functional impairment. The presence of co-morbid disorders may have a mediating effect on the classification of subtypes, as well as on performance in various functional domains. Studying functional impairment in this way is of great importance because helps to understand and improve procedures of diagnosis, treatment and prognosis for children diagnosed with these disorders. The elimination of misdiagnoses, as well as effective treatment planning will have a positive impact on the mental health of these children and adolescents in the future.

Keywords: functional impairment; ADHD; OCD; children; adolescents; South Africa.

INTRODUCTION

Individuals diagnosed with psychiatric disorders often struggle to function in social, family, school, and work settings. As a result, their academic and professional achievement, interpersonal relationships and self esteem are likely to suffer. These individuals are also more likely to engage in harmful antisocial behaviour, such as substance abuse, while their lack of achievement and hampered productivity has a negative on the economy. These difficulties can be ascribed to specific symptoms of these disorders, how they manifest and also to lifelong unhealthy coping mechanisms that have been developed by the individual.

In the context of the current study, the term 'functional impairment' refers to ways in which a psychiatric disorder impacts on functioning in various domains of an individual's life (e.g., school, home, social environment, family relationships, etc.). The particular psychiatric disorders under consideration here are attention-deficit/hyperactivity disorder (ADHD) and obsessive-compulsive disorder (OCD). Despite their prevalence and frequent co-morbidity in children and adolescents, there is a lack of literature comparing functional impairment in children with OCD and ADHD.

Important reasons to investigate functional impairment in general are that such investigation (a) adds to the understanding and prediction of treatment need and outcome, and (b) helps to identify the need for specific services. For instance, if one discovered that a 14-year-old child with depression was functionally impaired by the disorder in terms of making friends at school, then one might adapt a social skills program to suit the specific needs of that child. Studying functional impairment is also important because it describes symptoms of a disorder in practical terms, making available information that is not provided by diagnostic tests. So, for instance, the parents and teachers of the 14-year-old depressed child could have symptoms explained in terms that are understandable to them, and so the functional consequences of them could be clearer.

It is important to conduct comparative studies of functional impairment, since different disorders contribute to overall functional impairment in unique and specific ways. An important reason for a comparative investigation of pediatric OCD and ADHD is that these two disorders are often misdiagnosed and mistaken for one another. For example, a child who struggles to pay attention in class might be wrongly diagnosed as having ADHD, while in reality his inattention

is due to intrusive obsessions, i.e. a symptom of OCD. Misdiagnoses can lead to incorrect treatment and medication, which may in fact exaggerate the child's symptoms and difficulties.

In the following paragraphs, background literature on both ADHD and OCD will be presented and reviewed. First, the epidemiology and clinical presentation of ADHD will be discussed, followed by a discussion of functional impairment associated with ADHD as well as issues of co-morbidity [1]. Secondly, the epidemiology and clinical presentation of OCD will be presented, also followed by a discussion of functional impairment associated with this disorder. Finally, co-morbidity will be discussed, alongside a comparison of functional impairment typically associated with ADHD and OCD.

Attention-Deficit/Hyperactivity Disorder (ADHD)

Epidemiology and clinical presentation. ADHD is a highly prevalent, clinically heterogeneous disorder, which often results in financial liabilities and other stressors for families and adverse academic and vocational outcomes for the diagnosed individual (Carrol et al., 2006). According the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000), the three primary symptoms of ADHD are poor sustained attention, impulsiveness, and hyperactivity. Behavioural deficits in line with these three criteria arise relatively early in childhood (typically before the age of 7 years), and remain persistent throughout the lifetime.

ADHD is one of the most common neuro-behavioral disorders of childhood; the DSM-IV-TR (APA, 2000) estimates that 3-7% of children will, at some point in their lives, be diagnosed with ADHD. Some studies have reported even higher prevalence rates in community samples. ADHD is diagnosed approximately three times more often in boys than in girls, and can persist through adolescence and into adulthood. A complete description of the DSM-IV-TR diagnostic criteria for ADHD is presented in Appendix A.

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[1] Co-morbidity refers to the presence of another psychiatric disorder, different from the current and primary ADHD or OCD diagnosis. In other words, the child displays symptoms of, and meets criteria for other behavioural, mood and/or anxiety disorders.

The DSM-IV-TR recognizes three subtypes of ADHD: Predominantly Inattentive Type (ADHD-PI), Predominantly Hyperactive/Impulsive Type (ADHD-HI), and Combined Type (ADHD-CT). Individuals with the ADHD-PI subtype can be characterized as having difficulties in organizing or finishing tasks, executing daily routines, paying attention to details, and following instructions or conversations.

Individuals with the ADHD-HI subtype typically show the following hyperactive behaviour patterns: fidgeting, talking excessively, and being unable to sit still (e.g., for a meal or while doing homework; younger children may run, jump or climb constantly). Individuals with this subtype also typically show the following characteristics related to impulsivity: interrupting others, grabbing objects, and making inappropriate verbal outbursts. For instance, the child may find it difficult to wait his turn or to listen to directions, and impulsive behaviour may also lead to him sustaining more injuries and accidents than others.

Individuals with the ADHD-CT subtype are characterized by symptoms of both ADHD-HI and ADHD-PI, with symptoms of both types equally predominant in the diagnosed individual. Since the DSM-IV (1994) first acknowledged the three subtypes of the disorder, a number of epidemiological studies have investigated the prevalence of ADHD subtypes in children and adolescents of different countries (see, e.g., Nolan, Gadow, & Sprafkin, 2001; Pineda et al., 1999; and Gomez, Harvey, Quick, Scharer & Harris, 1999). Data on the prevalence of each subtype is quite limited and depends on the nature of the sample population and method used for subtype classification. Overall, it was found that North American and Australian studies tended to identify ADHD-PI subtype most frequently for boys and girls, while South American studies found that most children meet criteria for the ADHD-HI subtype (Romano, Baillargeon, & Tremblay, 2002). To date, no study has measured the prevalence or etiology of the three subtypes in any African country.

Unfortunately, most research to date has failed to discriminate between subtypes (see, e.g., Whalen et al., 2006; Conner et al., 2006 & Power et al., 2006). Usually the subtypes are collapsed, rather having three samples representing the three ADHD subtypes. In functional impairment studies this approach is problematic given that each subtype might contribute to functional impairment in a unique way. A child diagnosed with ADHD-HI will experience difficulties of a very different kind, from a child diagnosed with ADHD-PI. To illustrate, a child diagnosed with ADHD-HI subtype will typically be disciplined by his teacher for climbing on

chairs and tables during lessons, while a child diagnosed with ADHD-PI will have no trouble remaining seated, but will typically be disciplined for daydreaming.

For example, Barkley, DuPaul and McMurray (1990) compared 48 children with Attention Deficit Disorder (ADD) with symptoms of hyperactivity, to 42 children who were also diagnosed with ADD, but who displayed no symptoms of hyperactivity. It is important to note that during this time, the DSM-III-R (1987) was in use, and no subtype differentiation was yet included in this manual. Their results indicated that the ADD group with hyperactivity was rated by parents and teachers as having more externalizing and internalizing symptoms than the ADD group without hyperactivity. Furthermore it was found that the children diagnosed with ADD without symptoms of hyperactivity was described as engaging in more daydreaming and lethargic behaviour, with more impaired perceptual- and motor-speed, while also exhibiting more anxious behaviour. The researchers concluded that these two types of ADD should be separate and distinct childhood disorders, rather subtypes of one common attention deficit.

One reason that some studies have collapsed across ADHD subtypes rather than investigating them separately is that there is some controversy surrounding the validity of the three subtypes. Some authors (e.g., Milich, Balentine & Lynam, 2001; Hinshaw, 2001) even argue that the ADHD-PI subtype should be classified as a completely separate diagnostic disorder. They argue that the current symptom-count method of diagnosis, as prescribed by the DSM-IV-TR, is insufficient to diagnose ADHD-PI subtype, because the symptom list fails to include certain items pertinent to the domain of inattention and disorganization.

Geurts, Verté, Oosterlaan, Roeyers, and Sergeant (2004) set out to investigate the distinctiveness of ADHD subtypes, as well as specific neuropsychological profiles of each subtype. They based their work on a model hypothesizing that deficits in executive functioning[2] (EF) are associated with ADHD-CT and ADHD-HI, but not with ADHD-PI. The reasoning behind this model is that, based on the standard diagnostic criteria and clinical observations of their behaviour, children diagnosed with the ADHD-PI subtype should have no difficulty with inhibitory control.

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[2]Executive functioning is used as an umbrella term to encompass different meta-cognitive domains commonly described as mental control, and processes that enable self control such as: planning, cognitive flexibility and working memory

Results indicated that, contrary to what was expected, participants diagnosed with ADHD-CT showed no general executive dysfunction when compared to a psychiatrically and neurologically normal age-matched control group. Another unexpected finding was that those in the ADHD-CT and ADHD-PI groups were not statistically significantly different on any of the EF measures. The authors noted that even though they found no grounds to differentiate between the combined subtype and inattentive subtype of ADHD, it is important to remember that their measures only included ratings of EF domains and not other cognitive measures.

The instability of the three ADHD subtypes has also come under scrutiny from researchers. Lahey, Pelham, Loney, Lee and Wilcut (2005) investigated whether ADHD subtypes' diagnosis is stable enough over time to be valid. The number of participants in each of their ADHD subtype groups was representative of how the disorder manifests in the general population, with most participants meeting criteria for combined subtype, and the fewest number of participants met criteria for the hyperactive/impulsive subtype upon first assessment. Upon subsequent assessments, 37% of the ADHD-CT participants and 50% of the ADHD-PI participants met criteria for a different subtype at least twice in the next 6 assessments (conducted over 8 years). Children in the ADHD-HI subtype group were even more likely to shift to a different subtype over time, and most of them were diagnosed as ADHD-CT in later assessments. Overall, it became evident that the initial subtype differences related to inattentive versus hyperactive symptoms diminished over the 8-year follow-up period; specifically, very few children remain classified as ADHD-HI over time. The authors urged researchers to take these findings into account when drawing conclusions about impairment associated with each subtype, and warned clinicians that continuous rating of hyperactivity and impulsivity should be an important part of treatment planning.

Functional impairment associated with ADHD. Despite the relative prevalence of ADHD and the costs of this disorder to the diagnosed individual and his/her family, very few studies have focused on specific functional impairments associated with, or arising from, childhood and adolescent ADHD. Overall, these studies have found that a child or adolescent diagnosed with ADHD and who struggles with impulsive hyperactivity and/or who has difficulty paying attention will be functionally impaired in both the school and home domains.

For instance, Whalen et al. (2006) noted that families of children and adolescents diagnosed with ADHD have to confront daily challenges across various domains of functioning. Usually problematic behaviours wax and wane throughout a regular day, and parents are able to identify specific triggers for certain behaviours. The researchers investigated the affective, cognitive, behavioural and social dimensions of provocation ecologies (situational or temporal contexts in which the child's behavioural symptoms of ADHD are exacerbated). They focused specifically on one aspect of daily living that has been repeatedly identified as challenging by parents and children: "preparing for an upcoming activity or making the transition from the one task to the next" (Whalen et al., 2006, p. 167), which is often simply described as behaviour in the "getting ready" domain.

The focus was on affective and behavioural differences between getting ready and other activities, as reported independently by children diagnosed with ADHD and their mothers in comparison to normal peers and their mothers. The researchers equipped all participants with an Electronic Diary (ED) which generated individual randomized prompts. They were required to complete a diary entry rating their location, social context, current activity, the child's behaviour and mood, the parent's mood as well as the interaction quality between parent and child. Monitoring occurred for 7 consecutive days, during non-school hours.

Results supported the notion that preparatory activities pose special challenges for children diagnosed with ADHD and their families. Mothers of ADHD participants spent more time assisting their children in preparatory activities, reported more symptomatic behaviour in their children (e.g., jumping on beds, being distracted by something outside, having difficulty locating lost toys and clothes, and struggling to remember a list of tasks), and were more likely to feel stressed and angry; they were also less likely to report positive affect during these activities. Children with ADHD also reported more negative mood states (e.g., anger and stress) while getting ready than did their peers in the comparison group. Another interesting finding was that the ADHD mother-child dyads reported more contentious interaction patterns during the execution of preparatory activities, whereas the control group dyads reported becoming more task-oriented in these situations.

In contrast to Whalen and colleagues, who specifically excluded functioning in the school environment from their study, Carroll et al. (2006) investigated how children diagnosed with ADHD respond to interpersonal and physically provoking situations in the classroom. They

based their hypotheses on a model proposing that children who are able to self-regulate are thus also able to execute socially appropriate responses to various situations, whereas those with low levels of self-regulation ability are likely to respond to intensely stressful situations with high levels of negative affect. Given that children with ADHD are more likely to be unable to withhold their initial emotional responses, the researchers predicted that these children would experience highly negative affective states in provoking situations.

Carroll et al. (2006) employed independent researchers to observe 35 children diagnosed with ADHD, and 35 control children, in their school classrooms. The Responses to Interpersonal and Physically Provoking Situations (RIPPS; Houghton et al., 2005), a standardized classroom observation schedule, was employed to provide a comparison of the frequency and severity of particular student responses, as well as the triggers that elicited the behaviours of interest.

The researchers found statistically significant between-group differences in classroom-based behavioural responses. For example, children with ADHD exhibited more than twice as many solitary off-task behaviours (e.g., drawing or swinging in their chairs) as children in the comparison group. The perceived intensity of the responses produced by ADHD children was also rated as significantly greater than those of children in the control group. Another important finding saw differences in classroom responses between older and younger children within the ADHD group. While contextual triggers remained the same across the developmental range, differences were found in the behaviour with which the ADHD child/adolescent responded to the situation. For example, older children were less likely to exhibit hyperactive symptoms, such as climbing on desks and running around, while these behaviours were common amongst the younger children diagnosed with ADHD. In other words, ADHD children of all ages were triggered by the same kind of classroom situations, but the way in which their ADHD symptoms manifested were dependent on their age.

Power et al. (2006) investigated functional impairment in the merged domains of academic performance and the home environment. Specifically, their study investigated patterns of homework problems, as assessed by parent reports on the Homework Problem Checklist (HPC; Anesko, Achoiock, Ramirez, & Levine, 1987). Two distinct dimensions of homework-related problems were identified by parents of children with an ADHD diagnosis. One dimension encompassed problems related to paying attention, working efficiently, and working independently. The other dimension centered on problems of poor productivity, and included

knowing which assignments to complete and understanding what was expected from the task at hand.

Greene et al. (2001) specifically investigated functional impairment in the social lives of boys and girls, diagnosed with ADHD. They were interested in whether there were sex differences in ADHD-related social impairment, as well as how co-morbidity may impact on this realm of functioning. With regards to their first aim, researchers found that girls with ADHD exhibited significantly greater social impairment than girls without an ADHD diagnosis, but that girls and boys with ADHD were no different in terms of their social functioning. The only statistically significant differences between boys and girls with ADHD were that boys were more impaired in terms of behaviour at school, whereas girls experienced more difficulty when participating in leisure activities and hobbies. Furthermore, boys and girls showed no statistically significant differences on any of the CBCL subscales.

Co-morbidity in ADHD. A few groups of researchers have started to recognize the importance of understanding the role of co-morbid disorders in the severity, daily functioning, treatment and prognosis of childhood and adolescent ADHD. For example, doctors and researchers at the Mount Sinai School of Medicine in New York set out to measure the number and severity of ADHD symptoms in children with and without co-morbid conditions (Newcorn et al., 2001). They aimed to establish whether co-morbid disorders can be associated with more severe symptom profiles in children with ADHD, and whether these profiles would also differ as a function of gender.

Co-morbidity was determined by the use of the *Diagnostic Interview Schedule for Children (DISC)*, which assesses the presence of disorders over the last 6 months. Using this instrument, four discrete groups were identified: ADHD-only, ADHD plus anxiety disorders, ADHD plus oppositional/conduct problems, and ADHD plus anxiety disorders and oppositional/conduct problems. All children were then measured on the *Continuous Performance Test (CPT;* Conners & MHS Staff, 2000*),* to determine tendencies toward impulsivity, inattention, and dyscontrol (the random answering of questions due to fidgeting).

Results of this study indicated that children diagnosed with both ADHD plus oppositional/ conduct problems were rated as more impulsive by both parents and teachers. In the group of children with ADHD plus anxiety disorders, symptoms of inattention were

significantly more prominent than those of hyperactivity and impulsivity. The researchers also found that the group of children with ADHD and both co-morbid anxiety disorders and oppositional/conduct problems, had virtually similar ratings on all CPT indices. This pattern of data suggests that ADHD children with co-morbid oppositional and conduct disorders have high levels of hyperactive and impulsive symptoms regardless of whether any anxiety disorders are also present, and this "provides evidence that anxiety does not always mitigate hyperactive/impulsive symptoms in children with ADHD" (Newcorn et al., 2001, p.145).

The most important finding of this study, however, was that co-morbid ADHD subgroups had significantly higher error rates on tasks of the CPT, in all measured domains, when compared to the ADHD-only group. Effect sizes ranged from moderately high (impulsivity) to very robust (for inattention and dyscontrol), and thus researchers concluded that core ADHD symptoms are elevated in children who meet criteria for co-morbid psychiatric disorders. This finding is vital regarding the comparability of ADHD-subtypes because the presence of co-morbidity is likely to increase either symptoms of inattention or hyperactivity/impulsivity, which would lead to inaccurate subtype classification.

Connor et al. (2003) decided to pay specific attention to the relationships between estimated age of onset of ADHD symptomatology, symptom severity and co-morbid externalizing and internalizing psychopathology. The Parent and Teacher *Child Behaviour Check List (CBCL;* Achenbach & Rescorla, 2001*)* were administered to 300 children, all of who were patients at a tertiary care academic hospital and research centre. To determine the age of onset, parents had to report on when ADHD symptoms first impaired their child's life. Because parents often struggle to recall a specific year-of-age of the child, the researchers asked for estimated age of onset to fall into one of the following categories: 0-2 years, 3-4 years, 5-6 years and > 6 years of age.

A hierarchical regression model of correlates for both co-morbid internalizing and externalizing psychopathology was developed on the basis of previous research results. The model encompassed variables related to both the child and parents, and researchers were careful to enter variables in developmental and chronological order. Specifically, those variables known to be associated with childhood psychopathology (e.g., parental substance abuse, parental antisocial behaviour, parental educational level, child's verbal IQ, gender of child being male) were entered as the first block. The second block of variables entered into the regression model

included age of ADHD onset in child, CBCL Attention Problem score, and estimated ADHD duration. The third block of variables entered into the model included delinquency, aggression, and anxiety/depression symptoms (on the assumption that these occur after the onset of childhood ADHD). Lastly, the total number of external family stressors that occurred in the previous year was entered.

Results indicated that the severity of ADHD at time of referral and estimated age of onset of the child's first ADHD symptoms were associated with a significant degree of co-morbidity. Another important finding was that the severity of the child's ADHD symptoms was strongly associated with aggressive, delinquent, and anxious/depressive psychopathology across both parent and teacher reports. This suggests that symptom severity in both home and school domains is strongly associated with the presence of both internalizing and externalizing co-morbid disorders. Researchers also found that earlier age of onset of ADHD symptoms can be correlated with increased externalizing psychopathology, while a later onset of ADHD symptoms is associated with more anxious/depressive (internalizing) problems.

The study by Greene et al. (2001) as discussed in the functional impairment section above, also had a secondary aim apart from investigating the social performance of children with ADHD, namely to explore the effect of co-morbid mood, anxiety and behaviour disorders on the social functional impairment. Children with non-comorbid ADHD exhibited significantly greater social impairment compared to those without an ADHD diagnosis, while children with ADHD plus one or more co-morbid disorders showed significantly greater social impairment than did those with non-comorbid ADHD. The researchers were careful to control for behaviours associated with co-morbid disorders, and even then ADHD-related symptoms and behaviours accounted for most of the reported negative impact on participants' social functioning.

Levy, Hay, Bennett, and McStephen (2004) investigated the different co-morbidity patterns in each of the three ADHD subtypes. They found that co-morbidity profiles differed among the subtypes; for example, individuals diagnosed with inattentive or combined subtypes had significantly more reading problems than those diagnosed with the hyperactive subtype. Furthermore, those diagnosed with the hyperactive subtype had significantly more problems related to conduct disorder, while those diagnosed with the combined subtype had significantly more externalizing co-morbid disorders.

All the researchers of these studies emphasize the clinical importance of their findings, since early recognition and treatment of ADHD can reduce co-morbid externalizing problems such as aggression and even juvenile delinquency, as well as co-morbid disorders of an internalizing kind, such as depression and low self esteem.

Obsessive-Compulsive Disorder (OCD)

Epidemiology and clinical presentation. OCD is a primary anxiety disorder characterized by persistent, time-consuming, recurrent, and uncontrollable obsessions and compulsions (Lewin et al., 2005). These cause marked distress or impairment in daily functioning. Obsessions are intrusive, recurrent and persistent thoughts, images or impulses that are unacceptable, upsetting and uncontrollable for the individual experiencing them. Compulsions are repetitive, intentional behavioural or mental responses experienced as an urge to act; they are performed according to certain rules and are intended to reduce anxiety. A complete description of the DSM-IV-TR diagnostic criteria for OCD is presented in Appendix B.

OCD is diagnosed relatively frequently in children and adolescents, with a prevalence of 1-2% (Piacentini, Bergman, Keller, & McCracken, 2003). The DSM-IV-TR (2004) estimates a lifetime prevalence for childhood OCD of between 1% and 2.3%, and a one year prevalence of 0.7%. It is estimated that more than 80% of individuals with OCD experience the first onset of the disorder before the age of 18 years. If untreated, pediatric OCD tends to persist into adulthood and is associated with long-term negative outcomes, such as social isolation, academic and professional underachievement and other problems more specifically related to the patient's obsessions and compulsions, for example a chronic hand washer might suffer from skin rashes. It is typically characterized by a chronic yet fluctuating course, while also presenting as symptomatically heterogeneous.

In adults the disorder is diagnosed equally in males in females, but in childhood OCD is more common in boys than in girls. Children have fewer checking compulsions and less pathological doubting, as well as reporting less aggressive obsessions and mental rituals than adolescents and adults. Adolescents with OCD differ from children and adults in that they describe more contamination obsessions and washing compulsions. Compared to adults, children more frequently have co-morbid diagnoses of ADHD and other behavioural disorders, as well as specific phobias and tics, while adults have more co-morbid mood and substance

abuse. Piacentini et al. (2003) found that, in their sample of 151 children and adolescents diagnosed with OCD, 68.2% of the sample met DSM criteria for another Axis I disorder and 33.8% met criteria for two additional disorders. Anxiety disorders, such as specific phobias and separation anxiety, were found to be the most common co-morbid conditions in that study (*n* = 58; 38.4%), followed by disruptive disorders such as ADHD and ODD (*n* = 29; 19.2%).

Functional impairment associated with OCD. OCD-related functional impairment may, from a developmental perspective, have dire consequences for a child or adolescent, because mastery and completion of critical developmental tasks can be affected negatively by the disorder (Canino et al., 1999). Despite the obvious negative impact that the disorder can have on social, familial, academic and vocational functioning, only three studies have dealt explicitly with the functional impairment associated with, or arising from, childhood and adolescent OCD. Together, these studies have found that OCD-related impairments occur in the social, home/family and school domains.

Piacentini et al. (2003) set out to describe the range and frequency of OCD-related functional problems across a broad range of relevant psychosocial contexts. They assessed the impact of reporting source by comparing parent and child reports, while also examining the effects of age and gender on the prevalence of specific OCD-related functional problems. Their sample consisted of 151 children and adolescents, ranging in age from 5 to 17 years, with a primary DSM-IV-TR diagnosis of OCD.

Both the child/adolescent diagnosed with OCD and a parent completed the Child OCD Impact Scale (COIS; Piacentini & Jaffer, 1999, as cited in Piacentini et al., 2003). Results showed that specific impairments were more prevalent in the home/family and school/academic domains than in the social domain. Almost all participants reported a significant problem in at least one functional domain, and almost half of the sample reported at least one significant problem in each of the three functional domains. With regard to specific problems, both parents and children reported concentrating on schoolwork, doing homework, getting ready for bed at night and doing household chores to be the most difficult.

The Piacentini study was replicated using a Scandinavian sample by Valderhaug and Ivarsson (2005). Results indicated that, unlike in the previous study, functional impairments in Norwegian and Swedish children/adolescents with OCD mostly occurred at home, while also

occurring regularly in school and social domains. The COIS items that revealed the highest levels of functional impairment were those focused on situations related to bedtime, activities that required concentration, and building or maintaining social relations. Whereas Piacentini et al. (2003) had reported the frequency of OCD-related problems to be relatively consistent across age and gender, Valderhaug and Ivarsson (2005) found that (a) girls reported more areas of functional impairment than did boys, (b) adolescents (ages 13-17 years) reported more areas of functional impairment than did children (ages 8-12 years), and (c) parent reports suggested a positive association between age and number of impaired areas in girls, but a negative association between age and number of impaired areas in boys.

Hoppe (2009) replicated the above procedures in the first study aimed at describing functional impairments of South African children/adolescents diagnosed with OCD. Participants in her sample reported that they experienced most difficulty in the school and social domains, while parents reported that their children were most impaired in the school domain. Whereas both Piacentini et al. (2003) and Valderhaug and Ivarsson (2005) found a consistent trend towards parents reporting more severe impairments than their children, and generally low to moderate parent-child rating agreement, the South African study found the opposite pattern: Children reported higher rates of significant functional problems than did their parents on almost all items common to both the parent and child versions of the measure.

The fact that these findings are inconsistent with the two previous studies in this area might be attributed to the fact that the South African study used a community sample, while the other two used clinic referred sample. Another important reason for the inconsistency in findings may be related to cultural differences across the three samples. Hoppe (2009) emphasizes the importance of culture in studies of functional impairment, and makes specific mention of the role of education in terms of cultural differences among samples. In First World, resource-wealthy countries, class sizes tend to be smaller and children receive more individual attention compared to pupils of developing countries like South Africa. This added support may help to reduce OCD-symptoms and difficulties in the school domain, which in turn may affect the severity of symptoms reported by participants of studies conducted in developed countries.

Comparing Functional Impairment in ADHD and OCD

Even though co-morbidity with ADHD has frequently been reported among children and adolescents diagnosed with OCD, questions remain as to whether the inattention, distractibility and restlessness found in the latter group may in fact represent internal distraction from obsessional ideation or anxiety and not true ADHD at all. In a bid to answer this question, Geller et al. (2004) examined the co-morbidity between OCD and ADHD in children and adolescents, while also paying specific attention to the functional impairment associated with each disorder, as measured by the CBCL.

The results of that study supported the idea of a true co-morbidity model: Participants diagnosed with both disorders had CBCL scores consistent with both disorders, reflecting additive degrees of impairment from each individual disorder. OCD and ADHD are both common disorders, and each are associated with unique and specific symptoms, therefore children and adolescents who are diagnosed with both disorders experience a great deal of functional impairment. The authors suggest further research comparing the functional impairment in ADHD and OCD.

Masi et al. (2005) also aimed to explore the clinical implications of ADHD co-morbidity in a sample of children and adolescents diagnosed with OCD. Slightly more than 25% of their OCD sample had co-morbid ADHD, and in all cases the onset of ADHD preceded the onset of OCD. Findings were consistent with those of Geller et al. (2004) in that they indicated that children and adolescents diagnosed with both OCD and ADHD presented with more social and attention problems, as well as higher scores on scales measuring delinquency and aggression. The researchers of this study also mention the important patterns of comorbidity among ADHD, OCD and conduct-related disorders such as Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD), as well as among ADHD, OCD and bipolar disorder, and ADHD, OCD and tic disorders. In all three instances, co-morbidity of this nature was associated with an increase in disruptive and aggressive behaviour.

Ivarsson, Melin, and Wallin (2008) examined ADHD co-morbidity in 113 children and adolescents with OCD, and found that only 9% of their sample was diagnosed with co-morbid ADHD. This result stands in stark contrast to that of Geller et al. (2004), who found that diagnosed 44% of their OCD sample could be diagnosed with co-morbid ADHD. Ivarsson and colleagues propose that the reason for this discrepancy is the fact that they conducted their

research without assistants and interns, and therefore relied heavily on their own expert knowledge and experience (as senior psychiatrists) during diagnostic interviewing; they may, therefore, have used stricter diagnostic criteria and thus yielded more reliable estimates than those presented in previous studies.

Another important reason to investigate and compare ADHD and OCD to each other is the fact that co-morbidity is believed to interfere with response to therapy and treatment plans. Storch et al. (2007) emphasize the idea that co-morbidity with conditions such as depression and ADHD tend to be the rule rather than the exception in pediatric OCD, and that this co-morbidity affects functional impairment above and beyond the OCD diagnosis. Cognitive behavioural therapy is identified as one of two treatment modalities that demonstrates efficacy in treating OCD in children, the other being pharmacotherapy. Storch et al. (2007) aimed to investigate the influence of the patients' number of comorbid diagnoses on response to CBT, as well as remission rates.

Of the 96 children that comprised the sample used by Storch et al. (2007), 71 (74%) met criteria for a co-morbid psychiatric disorder, with 26% qualifying for an ADHD diagnosis. The researchers found that each co-morbid disorder affected "the integrity with which CBT is provided, albeit in somewhat different manners" (Storch et al., 2007, p 589). ADHD diagnosis was associated with decreased focus during therapy sessions; for example, children were unable to concentrate on anxiety-producing stimuli and as a result were not able to engage fully in cognitive restructuring exercises. The researchers also observed that ADHD-specific deficits in functional impairment made it more difficult for children to independently plan and execute exposures to stimuli, as prescribed by CBT tasks.

RATIONALE AND SPECIFIC AIMS OF THE CURRENT RESEARCH

It is important to investigate the unique functional impairment associated with the childhood psychiatric disorders of OCD and ADHD, because a better understanding of these domains of difficulty will lead to fewer misdiagnoses and better treatment outcomes. Similarly, an examination of the variability in functional impairment associated with each of the subtypes of ADHD will also lead to a better understanding of how the core symptoms of this disorder are

manifested, and subsequently influence different domains of functioning. Therefore, the first aim of this study was to investigate, in a sample of school-aged South African children, the differences between the functional impairments experienced by those diagnosed with OCD and those diagnosed with ADHD. Following on this, the second aim of this study was to investigate differences in functional impairment among the three subtypes of ADHD.

It is important to consider the effect of co-morbidity in all of this, since symptoms related to secondary diagnoses may influence choice and outcome of treatment plans. This in turn has an effect on prognosis and ultimately the child's quality of life. Therefore, the third aim of this study was to investigate co-morbidity among the current ADHD and OCD samples, and whether this has any effect on functional impairment.

Currently, there is a lack of research in this field, and this study is the first of its kind in South Africa. It is important to conduct research that is specific to our own country and culture, and subsequently educate parents and caregivers on how to diagnose and treat children affected by these psychiatric disorders.

DESIGN AND METHODS

Research Design

Following the taxonomy of research types presented by Rosenthal and Rosnow (2008), the current research was of a descriptive nature (i.e., with an aim of describing characteristics about the population or phenomenon being studied through factual and accurate data). The study was cross-sectional in design. Quantitative measures were used, including two semi-structured interviews and self-report questionnaires.

Participants

Recruitment consisted of posters that advertised the study in private psychology practices, doctors' rooms, social workers' offices and public notice boards. Private school principals were contacted about recruitment in their schools, and school psychologists and counselors were also informed of the study. Two interactive South African parenting websites advertised the study, with a direct email link to the researchers. The South African Attention-Deficit/Hyperactivity National support group (ADHASA) offered their support for the project

by advertising the study on their website, as well as in a monthly newsletter that went out to all regular users. ADHASA also invited the principal investigator to present information about the study at their annual conference. The study was also advertised in print media, in a local Western Cape parenting magazine, as well as a national ADHD quarterly (*Living with ADD*). The study was also advertised on a local talk radio station.

Ultimately, two distinct groups of participants were recruited. One group (n = 24; 7 females) consisted of children and adolescents who currently meet criteria for a diagnosis of OCD. The other group (n = 35; 12 females) consisted of children and adolescents with a current primary diagnosis of ADHD. Within this ADHD group, the three subtypes of the disorder were represented as follows: ADHD-HI (n = 1; 0 females), ADHD-PI (n = 12; 6 females) and ADHD-CT (n = 23; 6 females). It was decided to delete the ADHD-HI participant's data from the overall analysis, since it would not make sense to draw conclusions about that specific subtype from the single participant's scores. Participants were recruited from four major South African cities (Cape Town, Durban, Johannesburg and Pretoria).

The number of participants in each of the ADHD subtype groups is comparable to how the three subtypes are represented in the population (i.e., most children diagnosed with ADHD meet criteria for the combined subtype, whereas the smallest number of children diagnosed with ADHD meet criteria for the purely hyperactive subtype).

Demographic Characteristics of the Sample

The participants were all Afrikaans or English speaking. The age range of the participants was limited to between 6 and 18 years, since the instruments used in the study were specifically designed for this age group. Table 1 presents a complete demographic description of the sample. As the table shows, the OCD sample was relatively homogenous in terms of race, education, and neighbourhood, although there were differences with regard to religious orientation and income bracket. The ADHD sample was a lot more heterogeneous with regard to all demographic characteristics.

Furthermore, T- tests were also performed on the demographic data of all the participants, to determine whether there were any significant differences between the participant groups on any of the demographic variables. These results are also displayed in Table 1, and it is important to note that the only two significant differences between the groups were both related

to the age of the participants; i.e. the children who met criteria for OCD were significantly older than those children who met criteria for ADHD. This is also related to their mean years of education (successfully completed grades). This trend is comparable to how these disorders manifest in the population, since OCD is usually first diagnosed in early adolescence, while ADHD is mostly diagnosed in younger children.

Table 1
Demographic Characteristics of the Current Sample

Variable	ADHD (n = 35)	OCD (n = 24)	p
Age (years)			0.0007*
Range	6-15	7-18	
Mean (SD)	9.69 (2.41)	13.42 (3.39)	
Sex (Females:Males)	12:23	7: 17	0.685
Education:			
Mean years (SD)	3.02 (2.51)	6.58 (3.43)	0.002*
Never repeated a grade:	28:7	16:8	0.255
Repeated			
Race:			
Black African: Coloured:	2:6:27	3:1:20	0.569
White			
Neighbourhood:			
Suburban: Urban :Rural	33:1:1	22:0:2	0.230
Religion:			
Christian: Jewish: Muslim:	29:3:2:2	14:2:3:5	0.240
None			
Family Income Bracket: (per annum)			
Children's Home	3	0	
0 – 35000	0	0	
36000 – 75000	1	0	
76000 – 125000	1	0	
126000 – 175000	3	2	
176000 – 225000	0	1	
226000 – 275000	4	0	
276000 – 325000	4	5	
326000 – 375000	5	1	
376000 – 425000	3	5	
426000 – 475000	3	1	
476000 – 525000	2	1	
> 526000	6	8	

Note. * $p < .05$

Table 2 presents a demographic description of the two ADHD subtype groups (ADHD-CT and ADHD-PI). As the table shows, there were no great differences between groups on any of the demographic variables. It should be noted that the ADHD-PI group has an equal amount of male and female participants, while the ADHD-CT group has more than double the amount of male to female participants. This trend is representative of how the subtypes manifest in the population, i.e. most male children diagnosed with ADHD meet criteria for the combined subtype, whereas equal numbers of boys and girls diagnosed with ADHD meet criteria for the predominantly inattentive subtype.

Table 2
Demographic Characteristics of ADHD subtype groups

Variable	ADHD – Combined (*n* = 23)	ADHD - Predominantly Inattentive (*n* = 12)
Age (years)		
Range	6-15	6-13
Mean (SD)	9.43 (2.52)	10.71 (2.21)
Sex (Females:Males)	6:17	6:6
Education:		
Mean years (SD)	2.82 (2.66)	3.42 (2.27)
Never repeated a grade: Repeated	18:5	10:2
Race:		
Black African: Coloured: White	2:5:16	0:1:11
Neighbourhood:		
Suburban: Urban :Rural	21:1:1	12:0:0
Religion:		
Christian: Jewish: Muslim: None	18:2:2:1	11:1:0:0
Family Income Bracket: (per annum)		
Children's Home	3	0
0 – 35000	0	0
36000 – 75000	0	0
76000 – 125000	1	1
126000 – 175000	2	1
176000 – 225000	0	0
226000 – 275000	1	3
276000 – 325000	4	0
326000 – 375000	3	2
376000 – 425000	1	2
426000 – 475000	3	0
476000 – 525000	2	0
> 526000	3	3

Co-morbidity in the current sample

Children with disorders co-morbid to the primary diagnosis were included in the study unless those co-morbid disorders were of a psychotic nature. Most of the children and adolescents who took part in this study presented with at least one co-morbid disorder (see Figure 1). As the figure shows, participants diagnosed with OCD tended to be diagnosed with more co-morbid mood disorders. Since ADHD is classified as a behavioural disorder, it would make sense that participants in the ADHD group have more such co-morbid disorders than participants in the OCD group; it is interesting to note that in the current sample, however, there is only a small difference between the ADHD and OCD groups with regard to co-morbid behavioural disorders. Similarly, because OCD is classified as an anxiety disorder, it would therefore make sense that participants in the OCD group would have more co-morbid anxiety disorders than those in the ADHD group; this trend is reflected in the current sample.

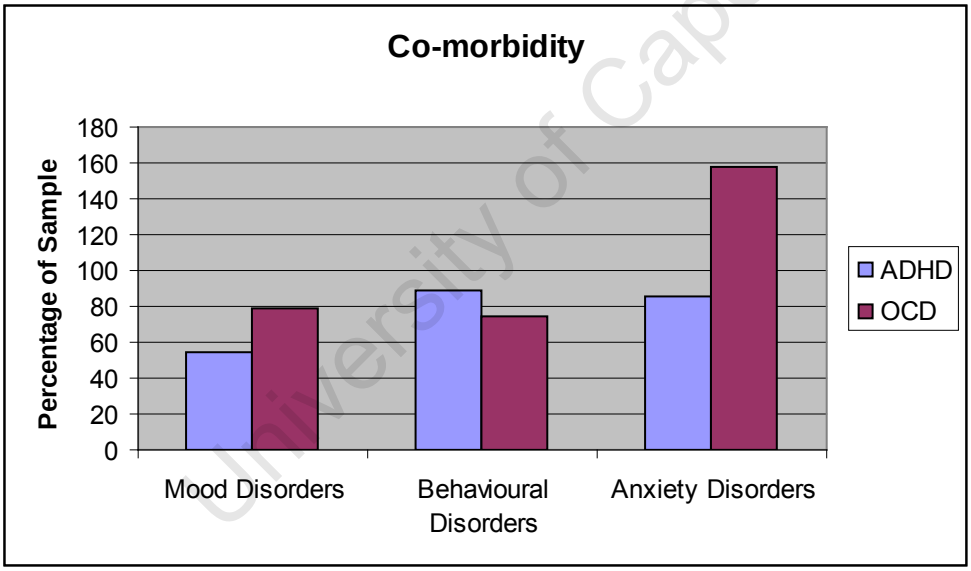

Figure 1. Co-morbidity data for the current sample. The data are expressed as percentages due to differing sample sizes in the OCD and ADHD groups. The percentages in some categories exceed 100%, since each participant can have more than one type of, for example, anxiety disorder.

It is also important to consider co-morbidity within the two ADHD subtype groups. Figure 2 indicates that there is a vast difference between the ADHD-PI and ADHD-CT groups in terms of co-morbid behavioural disorders. This makes sense because participants in the ADHD-CT group, by definition, have symptoms of hyperactivity and impulsivity, whereas participants in the ADHD-PI group are, by definition, neither hyperactive nor impulsive.

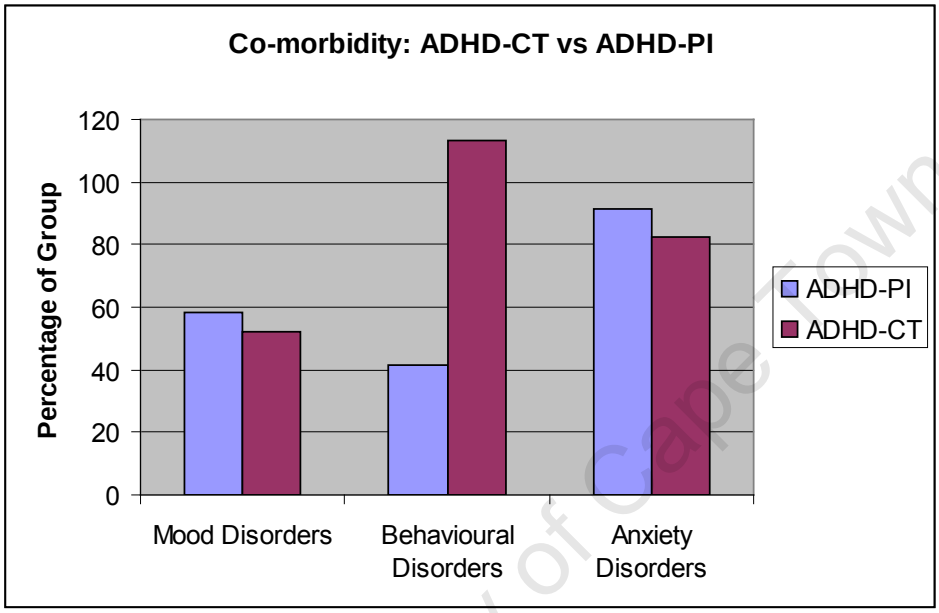

Figure 2. Co-morbidity data for the ADHD subtypes in the current sample. The data are expressed as percentages due to differing sample sizes in the ADHD-PI and ADHD-CT groups.

For the aims of this study, it is also important to pay detailed attention to the specific co-morbid disorders diagnosed in both the ADHD and OCD groups, as well as in the ADHD-CT and ADHD-PI sub-groups. The reason for this is that we are interested in investigating how certain co-morbid disorders interact with functional impairment. Figure 3 clearly shows that almost half of participants in the ADHD group meet diagnostic criteria for co-morbid Oppositional Deviant Disorder (ODD), with more than 30% meeting criteria for Conduct Disorder (CD). This makes sense given that ADHD, ODD and CD are all classified as behavioural disorders. Figure 4 shows that almost half of participants in the OCD group meet criteria for a co-morbid specific phobia, with 34% meeting criteria for ODD, almost 30%

meeting criteria for Agoraphobia a manic episode. It is interesting that such a big percentage of participants in this clinical group met criteria for ODD, which is a behavioural disorder.

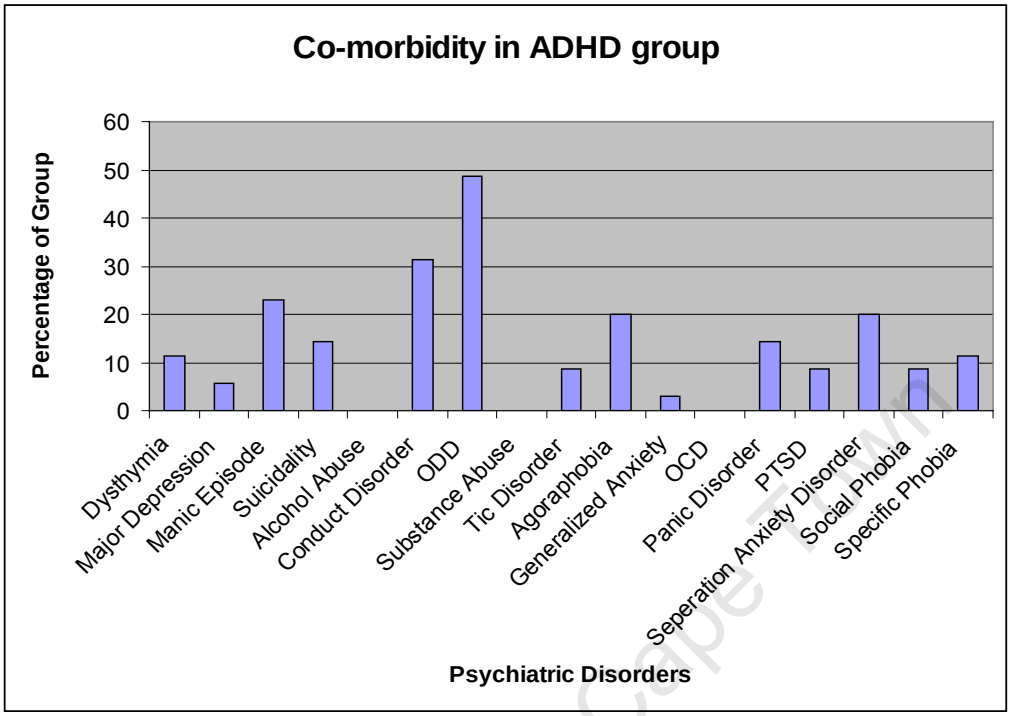

Figure 3. Detailed co-morbidity data for the ADHD group.

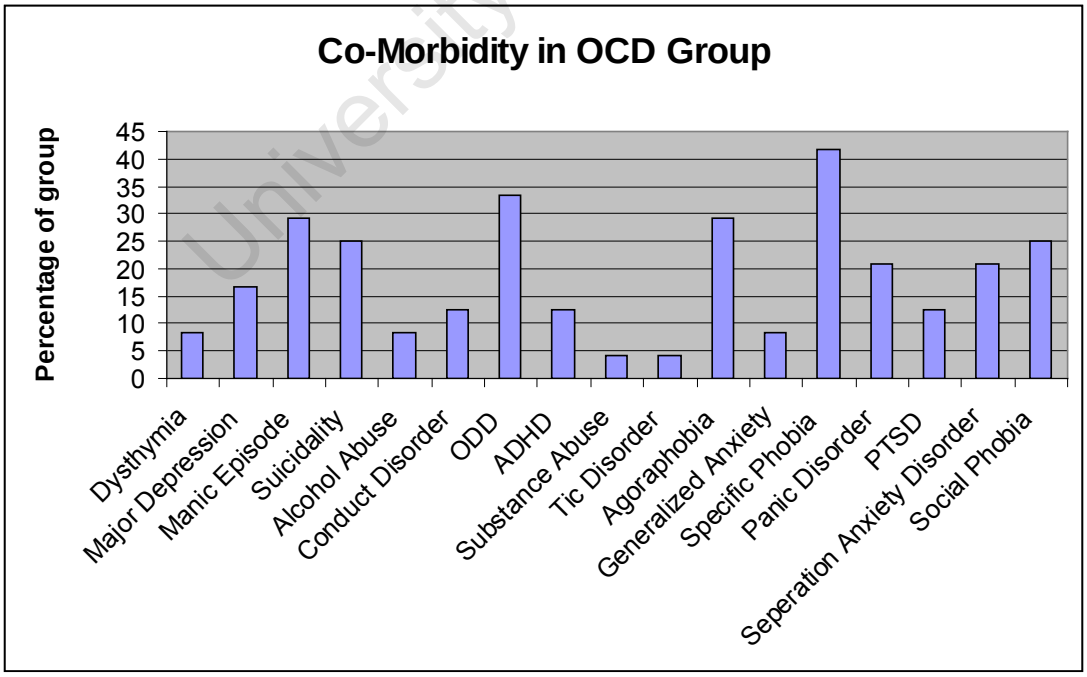

Figure 4. Detailed co-morbidity data for the OCD group.

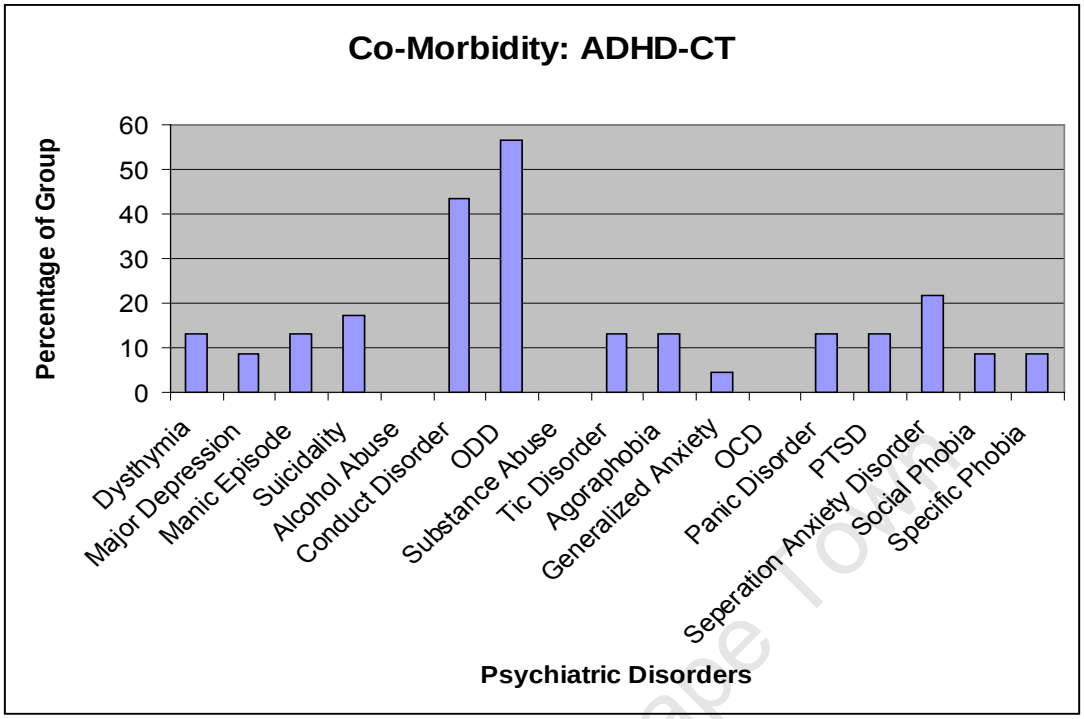

Figure 5. Detailed co-morbidity data for the ADHD-CT sub-group

When considering the detailed co-morbidity of the ADHD-CT group, Figure 5 indicates that the pattern is very similar to that of the overall ADHD group. This time, most participants (almost 60%) meet diagnostic criteria for co-morbid ODD, with more than 40% meeting criteria for CD. This makes sense given that ADHD-CT by definition includes symptoms of hyperactivity and impulsiveness, which are closely associated with the symptom profile shown by individuals diagnosed with ODD and CD.

In contrast, co-morbidity in the ADHD-PI group is very different from the pattern shown by the other participant groups. Figure 6 shows that the most prevalent co-morbid disorder found in this group is a manic episode, followed by agoraphobia. This is interesting given that these two disorders are classified as a mood and anxiety disorder respectively. Since ADHD is classified as a behavioural disorder, one would expect other behavioural disorders to be the most prevalent co-morbid conditions, as is the case with the ADHD-CT group. This might be an indication that the symptom patterns of ADHD-PI type are associated with a symptom profile which includes affective problems and anxiety related difficulties.

Another important observation here is that even though very few participants in the ADHD-PI group met diagnostic criteria for CD, there were still many who met criteria for co-morbid ODD. One possible reason for this pattern of data is that CD is associated with overt behavioural problems that can be associated with hyperactivity (e.g., breaking things, running around uncontrollably, and climbing on things). The ODD symptom profile, in contrast, features a hot temper and irritability (i.e. symptoms that are not necessarily overtly expressed in actions).

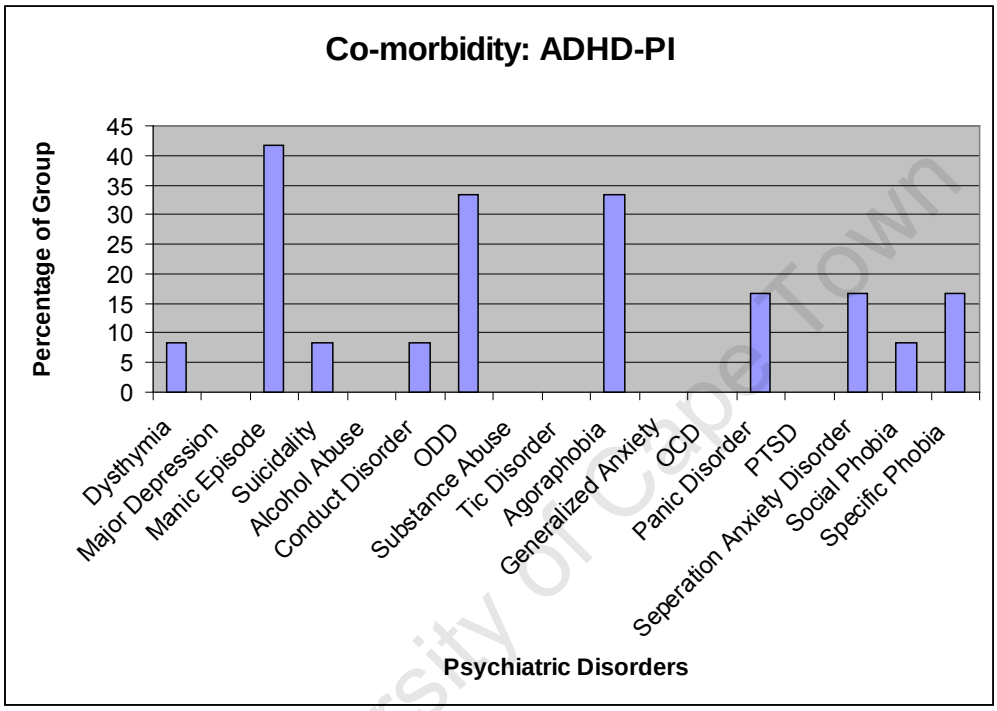

Figure 6. Detailed co-morbidity data for current ADHD-PI group

Measures

Table 3 presents a list of the measures used in the current study, along with their times of administration. Each of the instruments is discussed in more detail below.

Table 3
Instruments Used in the Current Study

Measure	Time for Administration
M.I.N.I Kid	Up to 90 minutes
CBCL	
Parent Report	Approximately 20 minutes
SDS	
Parent Version	Approximately 10 minutes
Self-Report Version	Approximately 10 minutes
SDQ (UK Version)	
Ages 4-16 Parent Report	Approximately 10 minutes
Ages 11-16 Self Report	Approximately 10 minutes

Note. M.I.N.I Kid = Mini International Neuropsychiatric Interview for Children and Adolescents; CBCL = Child Behaviour Checklist; SDS = Schneier Disability Scale; SDQ = Strengths and Difficulties Questionnaire

Demographic questionnaire

The demographic questionnaire, which was completed by the participant's parent, was used to capture data related to certain domains of the participants' lives, including information on race, socio-economic status, religion, and education (see Appendix C).

Diagnostic tools

The *Mini International Neuropsychiatric Interview for Children and Adolescents (M.I.N.I Kid*; English version 5/6; Sheehan, Shytle, & Milo, 1998) was used to screen for the presence of DSM-IV-TR Axis I disorders. Most importantly, this measure determined whether the child/adolescent did indeed qualify for the study by having a primary diagnosis of OCD or ADHD and no co-morbid psychotic disorders. This measure was also used to determine the subtype of ADHD for which the participant met criteria. The M.I.N.I Kid has been successfully

employed in previous studies of child psychiatric disorders (see, e.g., Bastiaens & Dello Stritto, 2005).

Although studies documenting the psychometric properties of the M.I.N.I. Kid are still underway (Sheehan, personal communication, 21 April 2008), the reliability and validity of the adult version of the M.I.N.I are well established. For instance, Sheehan et al. (1997) showed that the instrument had convergent validity with the Structured Clinical Interview for DSM-III-R Patients (SCID-P; Spitzer, Forman, & Nee, 1979) and with the Composite International Diagnostic Interview (CIDI; World Health Organization, 1990) for International Statistical Classification of Disease (ICD-10). The authors found the M.I.N.I to have a very high inter-rater reliability (0.88-1.0) as well as very good test-retest reliability (0.76-0.93). Sheehan and colleagues underlined the value of short structured interviews in clinical and research settings, noting that administration of the M.I.N.I. took half as long as administration of corresponding sections of the SCID-P.

Measures of Functional impairment

The *Child-Behaviour Checklist* (*CBCL*; Achenbach & Rescorla, 2001) obtains reports from parents/guardians regarding children's competencies and behavioral/emotional problems. Parents initially provide information for 20 competence items covering their child's activities, social relations, and school performance. The CBCL then has 118 items that describe specific behavioral and emotional problems, plus two open-ended items for reporting additional problems. Parents rate their child for how true each item is now or within the past 6 months using the following scale: 0 = *not true (as far as you know)*; 1 = *somewhat or sometimes true*; 2 = *very true or often true*. Raw scores, *T* scores, and percentiles are obtained for three competence scales (Activities, Social and School), Total Competence, eight cross-informant syndromes, and Internalizing, Externalizing, and Total Problems. The cross-informant syndromes scored on the CBCL are Aggressive Behavior; Anxious/Depressed; Attention Problems; Rule-Breaking Behavior; Social Problems; Somatic Complaints; Thought Problems; and Withdrawn/Depressed.

One can also derive scores for six DSM-oriented scales: Affective Problems; Anxiety Problems; Somatic Problems; Attention Deficit/Hyperactivity Problems; Oppositional Defiant Problems; and Conduct Problems. These scales are based on new factor analyses of parents'

ratings of 4,994 clinically referred children, and are normed on 1,753 children aged 6 to 18 years (www.aseba.org/products/cbcl6-18.html).

The CBCL was chosen as the primary measure of functional impairment in this study because it was used successfully in previous studies of ADHD and OCD comorbidity (see Geller et al., 2004; Ivarsson et al., 2007; and Masi et al., 2005). The CBCL was also previously used in a South African study by Van Gelder and Kraakman (2007) who investigated the psycho-social problems of children living with HIV/AIDS and receive anti-retroviral medication. They successfully used the CBCL as a measure of depression, anxiety, withdrawal and social problems in their sample of South African children and adolescents living with HIV/AIDS, and in a healthy control group.

Psychometric properties of the CBCL are reported as follows: test-retest reliability ranges from 0.95 to 1.00; inter-rater reliability ranges from 0.93 to 0.96; internal consistency ranges from 0.78 to 0.97 (www.aseba.org/products/cbcl6-18.html). The distributors also assessed criterion validity and found this to be acceptable.

The *Strengths and Difficulties Questionnaire* (*SDQ*; Goodman, 1997) is a brief screening questionnaire about the behaviour of 3-16 year olds. It exists in several versions to meet the needs of researchers, clinicians and educationalists; in the current study the original English (UK) version was used. This version consists of a self report form for 11-16 year olds, as well as a parent report version (see Appendix D and Appendix E).

All versions of the SDQ provide information on 25 attributes, some positive and others negative. These 25 items are divided between 5 scales: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and pro-social behaviour. The scores on the 5 scales are added to generate a Total Difficulties score. The same 25 items are included in the parent and the child self-report questionnaires, though the wording is slightly different from one to the other. Goodman and Scott (1999) compared the SDQ and CBCL in terms of their ability to describe functional impairment across different domains. Mothers completed the SDQ and the CBCL on 132 children aged 4 through 7 years, who were drawn either from psychiatric or dental clinics. Scores on the two instruments were highly correlated and equally able to discriminate the psychiatric from the dental cases.

Goodman (2001) further conducted a study to describe the psychometric properties of the SDQ and found that the predicted five-factor structure (emotional, conduct, hyperactivity-inattention, peer and pro-social scales) was confirmed, while internalizing and externalizing scales were relatively uncontaminated by one another. Reliability was found to be satisfactory, whether judged by internal consistency (mean Cronbach α: .73), cross-informant correlation (mean: 0.34), or retest stability after 4 to 6 months (mean: 0.62). He concluded that the SDQ is a very useful, brief measure of psychopathology in children and adolescents.

The SDQ was previously successfully used in South Africa, alongside the CBCL, in the Van Gelder and Kraakman study (2007) to investigate the psycho-social problems of children living with HIV/AIDS. The SDQ has been translated in many languages, including Afrikaans and Xhosa, which is also an indication of the SDQ's ability to be used in African countries.

The *Schneier Disability Scale* (SDS; Schneier et al., 1994) assesses current and lifetime impairment in 7 domains of functioning (see Appendix F). Each of the seven items is rated separately for current and most severe lifetime disability on a 5-point, descriptively anchored scale ranging from 0 (*no impairment*) to 4 (*severe impairment*). The item scores may be totaled to obtain 2 summary scores, one rating overall current disability and the other most severe lifetime disability. Alternatively, item scores may be considered individually to provide descriptive information on the pattern of impairment across domains.

The SDS has been successfully employed in studies investigating functional impairment. For example, Schneier et al. (1994) used it to establish levels of functional impairment in individuals diagnosed with social phobia. The same study investigated the psychometric properties of the SDS by comparing it to the established Liebowitz's Self-Rated Disability Scale. The SDS was found to be internally consistent, with coefficients ranging between 0.87 and 0.92.

Clinician/researcher-rated measure of impairment

The *Children's Global Assessment Scale* (CGAS; Shaffer et al., 1983) is designed to measure the overall severity of functional impairment in children aged 4-16 years. The instrument requires the clinician or researcher to rate the child's global functioning on a 0-100 scale, where 0 indicates acute functional impairment and 100 no serious functional impairment.

Individuals who score above 70 are deemed healthy. Schaffer et al. (1983) evaluated the psychometric properties of the CGAS and found it to be an accurate and useful measure of overall severity of a child's difficulties. The measure was found to demonstrate good inter-rater reliability, while also demonstrating discriminant and concurrent validity. The developers and researchers recommend the measure as a complement to other disorder-specific scales.

Procedure

After successful recruitment, children and parents were invited to schedule an appointment at a time and venue convenient for them. The interview sessions took place in the UCT Department of Psychology or at the participants' home or at another convenient venue.

Separate interviews were conducted with the child and his/her parent or legal guardian, and therefore two researchers were involved in data collection. Both researchers were present in the same room to administer the necessary assent and consent forms (see Appendixes G and H), while the parent completed the demographic questionnaire. The parent and child were permitted to ask the researchers any questions they might have arisen while they completed these forms.

The M.I.N.I Kid was then administered to the child and parent. The researcher asked the questions of the child, while the parent was also encouraged to comment. After the completion of this interview, one of the researchers took the child to a separate room for further interviewing. The SDS was administered in the form of an interview in which the child had to rate the severity of impact that his/her ADHD or OCD had on various life domains. The SDQ was then completed in self-report form by those participants older than 11 years. In the case of younger participants, the researcher assisted the child in completing the questionnaire. While the first researcher assessed the child, the second researcher administered, in a separate room, the SDS, SDQ, and CBCL to the parent.

After the completion of all the measures, the researchers deliberated and agreed upon a CGAS rating for the participant. When in doubt, the supervisor was consulted and the case discussed with him, before a final score was decided on.

STATISTICAL ANALYSIS

Descriptive statistics were obtained for all parent and child ratings (where appropriate), of all subscales of each measure used (i.e., the means and standard deviations for the three competence scales, the DSM-oriented scale and the Total Problems scale of the CBCL; for the 5 scales of the SDQ; for the 7 domains of the SDS). Means and standard deviations were also calculated for the clinician-rated CGAS score of each participant group (i.e., ADHD, OCD, ADHD-PI and ADHD-CT).

Ratings of agreement between the parent and child informant were then evaluated, using the McNemar test of disagreement. As stated earlier, only some of the child participants were old enough to complete certain age-restricted self-report measures.

Parametric statistical analyses (*t*-tests with pooled or separate variance estimates, depending on what was most appropriate given results of the assumption tests) were used to analyse the data to compare ADHD and OCD participants' level of functional impairment on all of the subscales, of all the measures. A non-parametric statistical test (the Mann-Whitney *U* test) was used in the following cases, where data was not normally distributed: the Total Competence *School* subscale of the CBCL, the DSM-Oriented *Anxiety Problems* subscale of the CBCL, and the *Hyperactivity* scale of the SDQ.

Parametric statistical analyses (*t*-tests with pooled or separate variance estimates, depending on what was most appropriate given results of the assumption tests) were also used to analyse the data to compare ADHD-CT and ADHD-PI participants' level of functional impairment on all of the subscales, of all the measures. A non-parametric statistical test (the Mann-Whitney *U* test) was used to compare ratings on the Total Competence *School* subscale of the CBCL, where data was not normally distributed.

6 Functional Domains (Relationships, Depression & Anxiety, Conduct Problems, ADHD Problems, Total Competence, and Total Problems) were compiled by grouping relevant subscales of all the measures together, with Cronbach's alpha (α) used as an estimator of internal consistency. *Z* scores were then generated for all participants, on all measures and subscales, to allow for comparison of data from different distributions. Two separate sets of *Z* scores were generated, to be able to compare ADHD and OCD functional impairment, and ADHD-CT and ADHD-PI functional impairment respectively in terms of the 6 domains. Again

parametric statistical analyses (*t*-tests with pooled or separate variance estimates, depending on what was most appropriate given results of the assumption tests) and non-parametric statistical tests (the Mann-Whitney *U* test) were used where appropriate.

For all tests an alpha level of $p < 0.05$ was used, unless otherwise specified. Cronbach's alpha of 0.60 was assumed as the acceptable level of internal consistency.

RESULTS

The first part of the Results will present the comparison between the functional impairment associated with OCD and ADHD in South African children and adolescents. The second part will present the comparison between the functional impairment of children meeting criteria for the ADHD-CT subtype and that of children who meet criteria for the ADHD-PI subtype. Thirdly, an analysis of how each participant group (ADHD vs OCD and ADHD-CT vs ADHD-PI) performed on a list of 6 functional domains will be presented. These domains were formed to control for error associated with multiple comparisons, and were made up of subscales from all the measures of functional impairment.

ADHD-Associated Functional Impairment versus OCD-Associated Functional Impairment

CBCL Scores

Three independent index scores can be derived from the CBCL Parent Reports: Total Competence, Total Problems and a DSM-oriented Clinical Scale. According to the CBCL manual (Achenbach & Rescorla, 2001), a score of less than 35 on the *Total Competence* scale indicates a clinically problematic level of competence (e.g., the individual requires special assistance at school or at home to complete what should be age-appropriate activities). Within the Total Competence scale, a score of less than 30 on any of the subscales (Activities, School and Social) indicates a clinically problematic level of competence in these domains.

Again according to the CBCL manual, a score of more than 60 on the *Total Problems* scale indicates that the individual is experiencing clinically significant problems on either (or both) of the subscales (Internalizing problems or Externalizing problems) comprising that scale. The Internalizing subscale measures to what degree the individual deals with problems in an

internal manner (e.g., by becoming more withdrawn), whereas the Externalizing subscale measures to what degree the individual deals with problems in an acting-out manner (e.g., by destroying property or personal belongings).

Again according to the CBCL manual, a score of more than 70 on the DSM-oriented Clinical Scale indicates that the individual falls into the clinical range for a specific disorder subtype (e.g., Affective problems and/or anxiety problems).

The Kolmogorov-Smirnov test (K-S statistic) was performed to determine whether the data on each of the three major scales, and the subscales within them, were normally distributed. The results of these analyses are presented in Table 4. The K-S statistic was significant in two cases (the *School* subscale of the Total Competence scale, as well as the *Anxiety* subscale of the DSM-Oriented scale), which implies that the data for these two subscales are not normally distributed and thereby violates an assumption of parametric statistical analysis.

Table 4
Assessment of Normality of the Distribution for CBCL scores

CBCL Index	K-S Statistic	*p*
Total Competence Scale	0.219	> 0.10
Activities	0.384	> 0.10
Social	0.841	> 0.10
School	0.320	< 0.025*
Total Problems Scale	1.545	> 0.10
Externalizing	0.00	> 0.10
Internalizing	1.683	> 0.10
DSM-Oriented Clinical Scale		
Affective Problems	0.832	> 0.10
Anxiety Problems	-1.445	< 0.05*
Somatic Problems	2.725	> 0.10
Attention-Deficit Hyperactivity Problems	1.426	> 0.10
Oppositional Defiant Problems	1.491	> 0.10
Conduct Disorder Problems	0.00	> 0.10

Note. In each case, the degrees of freedom on which the statistic was evaluated was 59.
*p < 0.05

Before conducting between-group comparisons, Levene's test was used to assess for homogeneity of variance. Together, the results from the K-S statistic and Levene's tests showed that a non-parametric statistical test (the Mann-Whitney *U* test) would be appropriate to use for the analysis of data from one Total Competence subscale (*School*) and from one DSM-Oriented Clinical Scale subscale (*Anxiety Problems*). Parametric statistical analyses (*t*-tests with pooled or separate variance estimates, depending on what was most appropriate given results of the assumption tests) were used to analyse the data from all three major scales and from all of the rest of the subscales.

Table 5 presents descriptive statistics for the CBCL outcome variables for both the OCD and ADHD samples, as well as the results of between-group comparisons generated from *t*-tests. Table 6 presents the results for the between-group comparisons generated from non-parametric tests for the *School* and *Anxiety Problems* subscales.

Table 5
CBCL: Between-Group Comparisons (parametric test results)

	ADHD *n* = 35	OCD *n* = 24	*t*	*p*	Cohen's *d*
Total Competence Scale	39.20 (10.08)	40.96 (9.58)	-0.671	0.505	-0.178
Activities	42.80 (9.09)	44.50 (9.96)	-0.679	0.500	-0.178
Social	42.51 (9.80)	41.58 (10.21)	0.352	0.726	0.093
Total Problems Scale	62. 28 (9.00)	63.58 (10.64)	-0.505	0.615	-0.132
Externalizing	60.77 (9.22)	56.67 (12.44)	1.456	0.150	0.374
Internalizing	60.03 (10.31)	65.71 (9.97)	-2.107	0.040*	-0.560
DSM-Oriented Clinical Scale					
Affective Problems	63.60 (7.20)	64.58 (9.86)	-0.443	0.659	-0.114
Somatic Problems	57.62 (7.36)	60.67 (9.66)	-1.370	0.176	-0.355
Attention/Deficit Hyperactivity Problems	67.26 (9.47)	60.42 (9.69)	2.688	0.009**	0.714
Oppositional Defiant Problems	60.89 (8.31)	58.88 (8.73)	0.895	0.374	0.236
Conduct Disorder Problems	59.45 (9.12)	58.00 (9.06)	0.604	0.548	0.160

Note. Means are presented with standard deviations in parentheses. The *t*-statistic is reported for 59 degrees of freedom in each case.
*$p < .05$, **$p < .01$

Table 6
CBCL: Between-Group Comparisons (non-parametric test results)

	ADHD $n = 35$	OCD $n = 24$	U	Adjusted Z	p
Total Competence Scale					
School	37.62 (8.69)	58.37 (8.21)	208	-3.274	0.001**
DSM-Oriented Clinical Scale					
Anxiety Problems	58.37 (8.21)	66.33 (9.04)	241	-2.761	0.006**

Note. Means are presented with standard deviations in parentheses.
*$p < .05$, **$p < .01$

The tables show that there were statistically significant between-group differences on the following CBCL subscales: School Competence (the ADHD group was more impaired in this domain), Internalizing Problems (the OCD group was more impaired in this domain), Anxiety Problems (the OCD group was more impaired in this domain), and ADHD Problems (the ADHD group was more impaired in this domain). Cohen's *d* indicates a large effect size for each of the statistically significant results.

SDQ Scores

The SDQ consists of five different subscales: Emotional Problems, Conduct Problems, Hyperactivity, Peer Problems and Pro-Social (a measure of positive functioning in the social domain). The Emotional Problems, Conduct Problems, Hyperactivity and Peer Problems scales are summed to produce a Total Difficulties score. According to the SDQ developer (Goodman, 1997), abnormal scores are those above 5 on the Emotional Problems subscale, above 4 on the Conduct Problems subscale, above 7 on the Hyperactivity subscale, above 4 on the Peer Problems subscale and below 5 on the Pro-Social subscale. A Total Difficulties score above 17 indicates abnormality.

The SDQ Parent form was completed for all participants, while the SDQ Child self-report form was only completed by those participants 11 years and older. Descriptive statistics for the Parent and Child versions of the SDQ, for both the OCD and ADHD samples, are presented in Table 7.

Table 7
SDQ Parent and Child Reports: Descriptive Statistics

	ADHD		OCD	
	n = 35		*n* = 24	
SDQ Subscale	Parent report	Child report	Parent report	Child report
Emotional Problems	3.31 (2.48)	3.80 (2.62)	5.00 (2.78)	5.69 (2.77)
Conduct Problems	2.94 (2.36)	4.40 (2.12)	1.79 (1.72)	3.31 (2.06)
Hyperactivity	7.11 (2.34)	6.90 (2.77)	4.58 (3.63)	4.75 (2.49)
Peer Problems	2.54 (2.05)	3.20 (2.97)	2.92 (2.73)	2.00 (1.55)
Pro-Social Scale	8.03 (1.71)	8.70 (1.16)	7.67 (2.22)	7.75 (1.57)
Total Difficulties	15.63 (6.49)	18.30 (7.89)	14.29 (7.67)	15.75 (5.54)

Note. Means are presented with standard deviations in parentheses.

As can be seen, there were no great differences between parent and child reports for any of the SDQ subscales; for example, parents and children in the ADHD were very similar in their ratings of Emotional Problems and of Hyperactivity symptoms. Similarly, in the OCD group, the parent and child reports were very similar with regard to the Pro-Social scale and to Hyperactivity symptoms.

To confirm that no statistically significant differences existed between the parent- and self-reports, the McNemar test of disagreement was employed to assess the degree of difference between the two. Results of this analysis are reported in Table 8. Because there were no statistically significant differences found between the parent and child report versions of the SDQ, only the parent reports were used to analyse between-group differences on this measure.

Table 8

McNemar Test: Parent-Child Disagreement (parent > child) on the SDQ

SDQ Subscale	ADHD *n* = 35				OCD *n* = 24			
	χ^2	*p*	Odds Ratio	95% CI	χ^2	*p*	Odds Ratio	95% CI
Emotional Problems	0.250	0.617	3.000	0.24 - 157.49	0.800	0.3711	4.000	0.39 – 196.99
Conduct Problems	0.500	0.479	1.000	0.013 – 78.50	0.000	1.000	0.857	0.238 to 2.98
Hyperactivity	1.333	0.248	0.000	0.000 – 2.420	0.000	1.000	0.500	0.008 – 9.605
Peer Problems	0.500	0.479	1.000	0.013 – 78.500	0.000	1.000	0.000	0.000 – 39.00
Pro-Social Scale	0.000	1.000	0.000	0.000 – 39.00	0.000	1.000	0.000	0.000 – 39.00
Total Difficulties	0.500	0.479	1.000	0.013 – 78.500	0.500	0.479	1.000	0.013 – 78.500

Note. χ^2 value is with one degree of freedom; *p*-values are two-tailed; 95% CI = 95% confidence interval.

Before conducting between-group comparisons of the SDQ data from the ADHD individuals versus that of the OCD individuals, the Kolmogorov-Smirnov test was performed to determine whether the data were normally distributed. The results of this analysis are presented in Table 9. As can be seen, the results of the K-S statistic suggested that the data from the *Hyperactivity* subscale were not normally distributed. The next step was to use Levene's test to assess for homogeneity of variance between the two samples. Together, the results from the K-S statistic and Levene's tests showed that a non-parametric statistical test (the Mann-Whitney *U* test) would be appropriate to use for the analysis of data from the *Hyperactivity* subscale. Parametric statistical analyses (*t*-tests with pooled or separate variance estimates, depending on what was most appropriate given results of the assumption tests) were used to analyse the data from all the other subscales. Tables 10 and 11 present the results of between-group comparisons on the SDQ.

Table 9
Assessment of Normality of the Distribution for SDQ scores

SDQ Subscale	K-S Statistic	*p*
Emotional Problems	0.000	> 0.10
Conduct Problems	1.362	> 0.10
Hyperactivity	2.862	< 0.05*
Peer Problems	0.567	> 0.10
Pro-Social Scale	1.244	> 0.10
Total Difficulties	1.582	> 0.10

Note. In each case, the degrees of freedom on which the statistic was evaluated was 59. *p < 0.05

Table 10
SDQ: Between-Group Comparisons (parametric test results)

	t	*p*	Cohen's *d*
Emotional Problems	-2.439	0.018*	-0.646
Conduct Problems	2.042	0.046*	0.541
Peer Problems	-0.600	0.551	-0.159
Pro-Social Scale	-0.708	0.472	-0.188
Total Difficulties	0.722	0.473	0.191

Note. The *t*-statistic is presented for 57 degrees of freedom in each case.
*$p < .05$, **$p < .01$

Table 11
SDQ: Between-Group Comparisons (non-parametric test results)

	U	Adjusted *Z*	*p*
Hyperactivity Scale	231.5	2.920	0.003**

Note. *$p < .05$, **$p < .01$

As shown in the tables, there were statistically significant between-group differences on the following SDQ subscales: Emotional Problems (parents of OCD participants reported their children experienced more difficulties in this domain than did parents of ADHD participants); Conduct Problems (parents of ADHD participants reported their children experienced more difficulties in this domain than did parents of OCD participants), and Hyperactivity (parents of ADHD participants reported their children experienced more difficulties in this domain than did parents of OCD participants). The effect sizes, as indicated by Cohen's *d*, were large for each of the statistically significant results.

SDS Scores

The SDS is divided into 7 subscales, each of which is rated on a scale from 0-4. A score of 0 indicates no impairment in a domain; a score of 1 indicates functioning with a mild, non-impairing level of anxiety; and scores ranging from 2-4 indicate an increasing level of dysfunction (Schneier et al., 1994). This measure was completed by all children and parents who participated in the study. Table 12 presents descriptive statistics for both the parent- and self-report versions of the SDS.

Table 12
SDS Parent and Child Reports: Descriptive Statistics

	ADHD *n* =35		OCD *n* = 24	
SDS Subscale	Parent report	Child report	Parent report	Child report
School	1.97 (0.62)	1.97 (0.62)	1.54 (1.10)	1.42 (1.18)
Work	1.51 (0.78)	1.51 (0.85)	0.96 (0.95)	0.79 (0.88)
Family	0.97 (0.86)	1.11 (0.80)	1.21 (0.83)	1.63 (1.10)
Dating	0.26 (0.78)	0.26 (0.85)	0.83 (1.27)	1.13 (1.54)
Friendships	1.34 (1.14)	1.43 (1.14)	1.25 (1.15)	1.71 (1.33)
Interests	0.80 (0.76)	0.89 (0.80)	1.21 (1.06)	0.96 (1.04)
ADLS	1.49 (0.92)	1.63 (1.00)	1.54 (1.14)	1.92 (1.38)

Note. Means are presented with standard deviations in parentheses. ADLs = activities of daily living.

As can be seen, there were no great differences between parent and child reports for any of the SDS subscales; for example, the ADHD group's parent and child reports were very similar on all of the subscales. Similarly, in the OCD group, the parent and child reports were very similar with regards to the School and Work domain.

To confirm that no statistically significant differences existed among the parent- and self-reports, the McNemar test of disagreement was employed to assess the degree of difference between the two. Results of this analysis are reported in Table 13. As can be seen, there were no statistically significant differences found between the parent and child report versions of the SDS; therefore, similar to the SDQ data, only the parent reports were used to analyse between-group differences on this measure.

Table 13

McNemar Test: Parent-Child Disagreement (parent > child) on the SDS

SDS Domain	ADHD *n* = 35				OCD *n* = 24			
	χ^2	*p*	Odds Ratio	95% CI	χ^2	*p*	Odds Ratio	95% CI
School	0.500	0.479	1.000	0.013 – 78.50	0.500	0.480	1.000	0.013 – 78.50
Work	0.125	0.724	1.000	0.186 – 5.369	0.167	0.683	2.000	0.287 – 22.11
Family	0.000	1.000	1.500	0.172 – 17.959	0.444	0.505	0.500	0.081 – 2.341
Dating	0.500	0.479	1.000	0.013 – 78.500	0.250	0.617	0.333	0.006 – 4.151
Friendships	0.000	1.000	0.667	0.056 – 5.820	1.500	0.221	0.200	0.004 – 1.788
Interests	2.250	0.1336	0.000	0.000 – 1.515	0.125	0.723	1.667	0.324 – 10.73
ADL	0.000	1.000	1.333	0.226 – 9.102	0.000	1.000	0.500	0.008 – 9.61

Note. χ^2 value is with one degree of freedom; *p*-values are two-tailed; 95% CI = 95% confidence interval. ADL = activities of daily living.

Before conducting between-group comparisons of the SDS data from the ADHD individuals to that of the OCD individuals, the Kolmogorov-Smirnov test was performed to determine whether the data were normally distributed. The results of this analysis are presented in Table 14, and as can be seen, the K-S statistic indicates that all data were normally distributed. Levene's test was used to assess for homogeneity of variance between the two samples. Parametric statistical tests (*t*-tests) could be performed on data from all the subscales, with separate variance estimates performed where appropriate. Table 15 presents the results of between-group comparisons on the SDS.

Table 14
Assessment of Normality of the Distribution for SDS scores

SDS Domain	K-S Statistic	*p*
School	2.304	> 0.10
Work	2.643	> 0.10
Family	0.000	> 0.10
Dating	0.000	> 0.10
Friendships	0.165	> 0.10
Interests	0.375	> 0.10
ADL	0.823	> 0.10

Note. In each case, the degrees of freedom on which the statistic was evaluated was 59.
*p < 0.05; ADL = activities of daily living.

Table 15
SDS: Between-Group Comparisons

Subscale	*t*	*p*	Cohen's *d*
School	1.914	0.061	0.507
Work	2.453	0.017*	0.650
Family	-1.055	0.296	-0.279
Dating	-2.155	0.035*	-0.571
Friendships	0.307	0.760	0.081
Interests	-1.723	0.090	-0.456
ADL	-0.208	0.836	-0.055

Note. The *t*-statistic is presented for 57 degrees of freedom in each case. *$p < .05$, **$p < .01$

As shown in the table above, there were statistically significant between-group differences on the following SDS domains: Work (parents of ADHD participants reported their children experienced more difficulties in this domain than did parents of OCD participants) and Dating (parents of OCD participants reported their children experienced more difficulties in this domain than did parents of ADHD participants). The effect sizes for each significant result were large, as indicated by Cohen's *d* statistic.

It is important to note, that results for the *School* subscale of the SDS almost reached statistical significance, and also had a large effect size. This implies that if larger participant groups were to be assessed, a significant difference might be found between the ADHD group and OCD group on this subscale (with the ADHD group having more difficulty in the *School* domain).

CGAS Scores

The single CGAS score, rated independently by the researcher/clinician, measures the overall current severity of functional impairment in children aged 4-16 years. Participants in the OCD group had a mean CGAS score of 62.125 (*SD* = 10.04), whereas those in the ADHD group had a mean CGAS score of 64.69 (*SD* = 10.10). Both these scores fall into the range described by Kaufman et al. (1997, p. 57) as:

> Some difficulty in a single area, but generally functioning pretty well (e.g. sporadic or isolated antisocial acts, such as occasionally playing hooky or petty theft; consistent minor difficulties with school work; mood changes of brief duration; fears and anxieties which do not lead to gross avoidance behaviour; self-doubts); has some meaningful interpersonal relationships; most people who do not know the child well would not consider him/her deviant but those who do know him/her well might express concern.

Otherwise stated, most participants in the current study did not, according to clinician ratings, show severe functional impairment across multiple domains, but rather displayed specific functional impairments in isolated domains.

Before conducting between-group comparisons on the CGAS data, the Kolmogorov-Smirnov test was performed to determine whether those data was normally distributed. Results

were as follows: K-S statistic = 1.97 and $p > 0.10$, which indicates normality. Levene's test was not significant, and so no adjustments were made to control for homogeneity of variance. Therefore, a *t*-test could be used to compare CGAS scores across groups. The comparison showed there was no statistically significant between-group difference, $t(57) = 0.959$, $p = 0.341$, Cohen's $d = 0.254$

ADHD-CT-Associated Functional Impairment versus ADHD-PI-Associated Functional Impairment

CBCL Scores

The Kolmogorov-Smirnov test was performed to determine whether the data were normally distributed. The results of this analysis are presented in Table 16.

Table 16
Assessment of Normality of the Distribution for CBCL scores

CBCL Index	K-S Statistic	*p*
Total Competence Scale	0.922	> 0.10
Activities	1.436	> 0.10
Social	0.300	> 0.10
School	0.000	< 0.025*
Total Problems Scale	1.865	> 0.10
Externalizing	0.472	> 0.10
Internalizing	0.857	> 0.10
DSM-Oriented Scales		
Affective Problems	0.900	> 0.10
Anxiety Problems	1.865	>0.10
Somatic Problems	1.865	> 0.10
Attention Deficit Hyperactivity Problems	1.308	> 0.10
Oppositional Defiant Problems	0.579	> 0.10
Conduct Disorder Problems	0.643	> 0.10

Note. In each case, the degrees of freedom on which the statistic was evaluated was 35. *p < 0.05

Table 17
CBCL: Between-Group Comparisons (parametric test results)

	ADHD-CT *n* = 23	ADHD-PI *n* = 12	*t*	*p*	Cohen's *d*
Total Competence Scale	38.87 (9.96)	39.83 (10.74)	-0.265	0.793	-0.092
Activities	43.35 (8.73)	41.75 (10.07)	0.488	0.629	0.170
Social	41.47 (10.25)	44.33 (9.01)	-0.789	0.436	-0.274
Total Problems Scale	62.39 (9.52)	62.08 (8.30)	0.095	0.925	0.033
Externalizing	61.04 (9.60)	60.25 (8.82)	0.238	0.813	0.083
Internalizing	59.30 (9.73)	61.42 (11.64)	-0.570	0.573	-0.198
DSM-Oriented Clinical Scale					
Affective Problems	63.52 (6.81)	63.75 (8.19)	-0.088	0.931	-0.031
Anxiety Problems	58.04 (8.04)	59.00 (8.85)	-0.323	0.749	-0.112
Somatic Problems	58.70(7.35)	55.58 (7.25)	1.194	0.241	0.416
Attention/Deficit Hyperactivity Problems	67.55 (10.68)	66.75 (7.11)	0.231	0.819	0.080
Oppositional Defiant Problems	61.17 (9.57)	60.33 (5.47)	0.280	0.781	0.097
Conduct Disorder Problems	59.52 (9.39)	59.33 (8.99)	0.057	0.955	0.020

Note. Means are presented with standard deviations in parentheses. The *t*-statistic is reported for 33 degrees of freedom in each case.
*$p < .05$, **$p < .01$

Table 18
CBCL: Between-Group Comparisons (non-parametric test results)

	ADHD-CT $n = 23$	ADHD-PI $n = 12$	*U*	Adjusted *Z*	*p*
Total Competence Scale					
School	35.17 (7.96)	40.167 (8.39)	82	-1.941	0.054

Levene's test was used to assess for homogeneity of variance between the ADHD-CT and ADHD-PI samples, and *t*-tests with separate variance estimates were performed where appropriate. This analysis, together with the K-S statistic, suggested that a non-parametric statistical test (the Mann-Whitney *U* test) should be performed on one subscale of the Total Competence scale (*School*).

Table 17 presents descriptive statistics for the CBCL for both the ADHD-CT and ADHD-PI groups, as well as the results of between-group comparisons generated from *t*-tests. Table 18 presents descriptive statistics and results for the non-parametric test conducted on the *School* subscale data.

From the above tables it is clear that there were no statistically significant between-group differences on any of the subscales of the CBCL. In other words, the participants classified as ADHD-CT showed no difference in functional impairment when compared to those who met criteria for the ADHD-PI subtype. It is however important to note, that the results for the *School* Competence subscale of the CBCL almost reached statistical significance. This implies that if larger participant groups were to be assessed, a significant difference might be found between the ADHD-CT and ADHD-PI group on this subscale (with the ADHD-PI group rated as being more competent in the *School* domain). By definition, the ADHD-PI subtype does not display symptoms of hyperactivity or difficulty with inhibition, which may be why these children would be more competent in a classroom situation.

SDQ Scores

As noted in the previous section, the SDQ parent forms were completed for all participants, while the SDQ self-report forms were only completed by those participants 11 years and older. Furthermore, there were only 6 participants in the ADHD-CT group, and 8 participants in the ADHD-PI group who were old enough to complete the self-report form for this measure. For this

reason, the McNemar test of disagreement could not be used to evaluate parent-child levels of disagreement: the small numbers violate the assumptions of the test. However, it was previously illustrated that for the ADHD group as a whole, there were no significant differences between the parent- and child-report forms for this measure, and thus it is justified to continue between-group comparisons using only the parent form.

Before conducting the currently relevant between-group comparisons, the Kolmogorov-Smirnov test was performed to determine whether the data were normally distributed and Levene's test was used to assess for homogeneity of variance between the two samples. The results of these analyses (see Table 19 for K-S statistic) suggest that parametric statistical tests (*t*-tests) are appropriate for the comparison, with separate variance estimates performed where appropriate. Table 20 presents the descriptive statistics as well as the results of the currently relevant between-group comparisons on the SDQ.

Table 19
Assessment of Normality of the Distribution for SDQ scores

SDQ Subscale	K-S Statistic	*p*
Emotional Problems	1.394	> 0.10
Conduct Problems	1.072	> 0.10
Hyperactivity	1.544	> 0.10
Peer Problems	1.351	> 0.10
Pro-Social Scale	0.000	> 0.10
Total Difficulties	1.673	> 0.10

Note. In each case, the degrees of freedom on which the statistic was evaluated was 35.

Table 20
SDQ: Between Group Comparisons (parametric test results)

	ADHD-CT *n* = 23	ADHD-PI *n* = 12	*t*	*P*	Cohen's *d*
Emotional Scale	3.48 (2.12)	3.00 (3.02)	0.535	0.596	0.186
Conduct Problems	3.04 (2.64)	2.75 (1.82)	0.344	0.733	0.120
Hyperactivity	7.13 (2.53)	7.08 (2.02)	0.056	0.956	0.019
Peer Problems	2.65 (2.19)	2.33 (1.83)	0.432	0.669	0.150
Pro-Social Scale	7.87 (1.43)	8.33 (1.56)	-0.759	0.454	-0.264
Total Difficulties	15.87 (6.43)	15.17 (6.87)	0.300	0.766	0.020

Note. Means are presented with standard deviations in parentheses. The *t*-statistic is based on 33 degrees of freedom in each case.

Table 20 makes it clear that there were no statistically significant between-group differences on any of the SDQ subscales. Furthermore, none of the effect sizes associated with the magnitude of the between-group differences was in the range ordinarily described as large. In other words, those participants who met criteria for ADHD-CT showed no difference in SDQ parent-rated functional impairment when compared to those who met criteria for ADHD-PI subtype.

SDS Scores

As described earlier, the SDS interview is conducted with both the parent and child. Therefore it is necessary to look at the differences between parent- and child-report versions for the measure. Table 21 presents descriptive statistics for both those versions of the SDS. As can be seen, there were no great differences between parent and child reports for any of the SDS subscales; for example, the ADHD-CT group's parent and child reports were very similar in rating all of the subscales. Similarly, in the ADHD-PI group, the parent and child reports were very similar with particular regards to the Work, Dating and Friendships domain.

Table 21
SDS Descriptive Statistics: Parent and Child Reports

	ADHD-CT		ADHD-PI	
	n =23		*n* = 12	
SDS Subscale	Parent report	Child report	Parent report	Child report
School	2.04 (0.64)	2.00 (0.67)	1.83 (0.58)	1.92 (0.51)
Work	1.48 (0.79)	1.48 (0.59)	1.58 (1.00)	1.58 (1.08)
Family	1.22 (0.80)	1.09 (0.90)	0.92 (0.79)	0.75 (0.75)
Dating	0.17 (0.65)	0.17 (0.49)	0.42 (1.16)	0.42 (1.16)
Friendships	1.52 (1.12)	1.39 (1.12)	1.25 (1.22)	1.25 (1.22)
Interests	0.91 (0.79)	0.87 (0.81)	0.83 (0.83)	0.67 (0.65)
ADL	1.65 (0.91)	1.52 (0.73)	1.58 (1.16)	1.42 (1.24)

Note. Means are presented with standard deviations in parentheses. ADL = Activities of Daily Living.

Table 22

McNemar Test: Parent-Child Disagreement (parent > child) on the SDS

SDS Domain	ADHD-CT *n* = 23				ADHD-PI *n* = 12			
	χ^2	*p*	Odds Ratio	95% CI	χ^2	*p*	Odds Ratio	95% CI
School	0.000	1.000	0.000	0.000 – 39.00	0.000	1.000	0.000	0.000 – 39.00
Work	0.167	0.683	1.000	0.134 – 7.466	0.500	0.480	1.000	0.013 – 78.50
Family	0.259	0.671	3.000	0.241 – 157.49	0.000	1.000	0.000	0.000 – 39.00
Dating	0.500	0.479	1.000	0.013 – 78.50	0.500	0.479	1.000	0.013 – 78.50
Friendships	0.000	1.000	0.500	0.008 – 9.605	0.500	0.479	1.000	0.013 – 78.50
Interests	4.083	0.043	5.000	1.066 – 46.93	0.500	0.479	0.000	0.000– 5.33
ADL	0.000	1.000	1.333	0.226 – 9.102	0.000	1.000	1.333	0.226 – 9.102

Note. χ^2 value is with one degree of freedom; *p*-values are two-tailed; 95% CI = 95% confidence interval. ADL = Activities of Daily Living.

The McNemar test of disagreement was employed to confirm that no statistically significant differences existed between parent- and self-reports on any of the SDS subscales (Table 22). Therefore, only the parent reports were used to analyse between-group differences on this measure.

Before conducting between-group comparisons of the ADHD-CT and ADHD-PI data on this measure, the Kolmogorov-Smirnov test was performed to determine whether the data were normally distributed. The results of this analysis are presented in Table 23.

Table 23

Assessment of Normality of the Distribution for SDS scores

SDS Subscale	K-S Statistic	*p*
School	0.793	> 0.10
Work	0.472	> 0.10
Family	1.200	> 0.10
Dating	0.000	> 0.10
Friendships	0.943	> 0.10
Interests	0.965	> 0.10
ADL	0.407	> 0.10

Note. In each case, the degrees of freedom on which the statistic was evaluated was 35. ; ADL = activities of daily living.
*p < 0.05

The table suggests that parametric statistical tests (*t*-tests) could be conducted on the data from all SDS subscales. Levene's test was used to assess for homogeneity of variance between the two samples, and *t*-tests with separate variance estimates were performed where appropriate. Table 24, which presents the results of these between-group comparisons, makes it clear that there were no statistically significant between-group differences on any of the SDS subscales. Furthermore, none of the effect sizes associated with the magnitude of the between-group differences was in the range ordinarily described as large. In other words, the participants who met diagnostic criteria for ADHD-CT showed no difference in SDS parent-rated functional impairment, across all domains, when compared to those who met criteria for ADHD-PI.

Table 24
SDS: Between Group Comparisons (parametric test results)

SDS Subscale	*t*	*p*	Cohen's *d*
School	0.374	0.711	0.130
Work	-0.373	0.712	-0.130
Family	1.108	0.276	0.386
Dating	-0.871	0.391	-0.303
Friendships	0.345	0.733	0.120
Interests	0.746	0.461	0.260
ADL	0.317	0.754	0.110

Note. The *t*-statistic is presented for 33 degrees of freedom in each case.

CGAS Scores

Participants in the ADHD-CT group had a mean current CGAS score of 62.96 (*SD* = 10.47), whereas those in the ADHD-PI group had a mean current CGAS score of 68.83 (*SD* = 8.96). Both these scores fall into the range described by Kaufman et al. (1997, p. 57) as:

> Some difficulty in a single area, but generally functioning pretty well (e.g. sporadic or isolated antisocial acts, such as occasionally playing hooky or petty theft; consistent minor difficulties with school work; mood changes of brief duration; fears and anxieties which do not lead to gross avoidance behaviour; self-doubts); has some meaningful interpersonal relationships; most people who do not know the child well would not consider him/her deviant but those who do know him/her well might express concern.

Otherwise stated, participants in both the ADHD subtype groups did not, according to researcher/clinician ratings, show severe functional impairment across multiple domains, but rather displayed specific functional impairments in isolated domains.

Before conducting between-group comparisons to compare CGAS data from the ADHD-CT group to those from the ADHD-PI group, the Kolmogorov-Smirnov test was performed to determine whether those data was normally distributed. Results were as follows: K-S statistic = 0.065 and $p > 0.10$, which indicates normality. Therefore, a parametric statistical test

(a *t*-test) could be used to compare CGAS scores across groups. Levene's test was not significant, and so no adjustments were made to control for homogeneity of variance.

The comparison showed there was no statistically significant between-group difference, $t(33) = -1.651$, $p = 0.108$, Cohen's $d = -0.575$. The effect size, as indicated by Cohen's *d,* can be describes as large, however when it is converted to Pearson's $r = 0.276$, the effect size is only medium.

Functional Domains

The previous two parts of the Results section presented comparisons conducted on the current dataset of OCD and ADHD participants' responses to the measures of functional impairment, with each measure featuring a number of different subscales representing measures of more-or-less independent domains in which functional impairment might occur. This means that, for each measure, multiple comparisons were conducted; overall, in excess of 25 comparisons were made between the ADHD and OCD groups as well as between the ADHD-CT and ADHD-PI groups. This number of pair-wise comparisons can present difficulty in terms of interpretation of the statistical analyses.

The *familywise error rate* is a term that refers to the probability of making Type I errors[3] when conducting multiple pair-wise comparisons (Howell, 2004). This error rate increases with the number of comparisons/hypotheses tested on one data set; for the current study, this number is 27. To correct for this error, a Bonferroni correction should be conducted, in which the level of statistical significance for *p* is adjusted as follows: Bonferroni-corrected $p = 0.05$/number of comparisons; for this study, then, Bonferroni-corrected $p = 0.05/27 = 0.0019$.

If such a correction had been applied to the analyses of the current data, only one statistically significant result would have been reported: On the parent-rated CBCL *School* competence subscale, where the OCD participants were rated as having significantly more competence in this domain than were the ADHD participants ($p < 0.001$).

Type I errors[3] are also known as a false positive errors, and occur when a true null hypothesis is incorrectly rejected. The researcher observes a difference, when in truth none exists (Howell, 2004).

Additionally, even without the Bonferroni correction, there were no statistically significant results reported when comparing the two ADHD subtype groups. These concerns led me to compile a set of functional domains that would serve to (a) encompass as many as possible of the measures and their subscales, and (b) reduce the probability of a Type I error (because collapsing variables across measures would lead to fewer possible comparisons).

Functional Domains

The following steps were taken to create the set of functional domains. First, the various subscales of all the measures used in the study were grouped together on the basis of what they claim to measure; for example, all subscales that purported to measure the child or adolescent's functioning in the school domain were grouped together, while similarly all subscales that purported to measure the child's level of anxiety were grouped together, and so on.

Second, Cronbach's alpha (α) was used an estimator of internal consistency to confirm that the subscale groupings were statistically viable (i.e., it was used as a measure of reliability to ensure that all subscales grouped together to form a functional domain were indeed measuring the same phenomenon). Usually an α value of 0.70 or higher is used as the benchmark for adequate internal consistency, although exploratory research allow for values as low as 0.60 (Field, 2009).

As a third step, it was necessary to generate *Z* scores[4] for all participants in the current study, on all measures and subscales, to allow for comparison of data from different distributions. It was also important to generate a separate set of *Z* scores for comparisons done on the data comparing OCD to ADHD, and the data comparing ADHD-CT to ADHD-PI. The *Z* score for each participant on each subscale was calculated by subtracting the mean score (the average score of all participants on that particular subscale) from the individual participant's raw score, and then dividing the answer by the sample standard deviation. These Z scores were in other words representative of how each participant performed on various subscales, which in turn indicated the degree of difficulty they experience in the specific domain measured by those subscales.

Z scores[4] are dimensionless quantities, used in standardization procedures (Howell, 2004)

Ultimately, the 6 functional domains created were: Relationships, Depression & Anxiety, Conduct Problems, ADHD Problems, Total Competence, and Total Problems (see Table 25).

Table 25
Functional Domains

Functional Domain	Subscales Comprising the Domain	*M* (*SD*)	α
Relationships		0.004 (2.97)	0.729
	SDS Dating		
	SDS Family		
	SDS Friendships		
	SDQ Peer Problems		
Depression & Anxiety		0.001 (2.52)	0.790
	CBCL Affective Problems		
	CBCL Anxiety Problems		
	SDQ Emotional Scale		
Conduct Problems		0.007 (2.74)	0.901
	CBCL Conduct Problems		
	CBCL Oppositional Deviance		
	SDQ Conduct Problems		
ADHD Problems		0.008 (1.87)	0.850
	CBCL ADHD Problems		
	SDQ Hyperactivity		
Total Problems		0.001 (1.84)	0.819
	CBCL Total Problems		
	SDQ Total Difficulty		
Total Competence		0.000 (2.28)	0.637
	CBCL Social Scale		
	CBCL Total Competence		
	SDQ Pro-Social Scale		

Note. Mean *Z* scores are presented with standard deviations in parentheses.

OCD-Associated Functional Impairment Versus ADHD-Associated Functional Impairment

The average *Z* score for each participant was calculated for each domain, using the *Z* scores for the various subscales that comprised each created domain. These domain-wide average *Z* scores are the data used in the subsequent between-group comparisons.

Before launching into these comparisons, the Kolmogorov-Smirnov test was performed to determine whether the data for each domain were normally distributed. The results of this analysis are presented in Table 26. Levene's test was also used to assess for homogeneity of variance. These results, together with the K-S statistic, indicated that a non-parametric statistical test (the Mann-Whitney *U* test) was most appropriate for the between-groups analysis of the *Depression & Anxiety* data, while *t*-tests with separate variance estimates were otherwise performed where appropriate.

Table 26
Assessment of Normality of the Distribution for Functional Domain Scores

Functional Domain	K-S Statistic	*p*
Relationships	0.220	> 0.10
Depression & Anxiety	0.201	< 0.05*
Conduct Problems	1.582	> 0.10
ADHD Problems	2.724	> 0.10
Total Problems	1.463	> 0.10
Total Competence	1.161	> 0.10

Note. In each case, the degrees of freedom on which the statistic was evaluated was 59.
*$p < 0.05$

Table 27 presents descriptive statistics for the functional domains for both the OCD and ADHD groups, as well as the results of between-group comparisons generated from parametric *t*-tests. Table 28 presents descriptive statistics and the results of the between-group comparison for the *Depression & Anxiety* domain.

Table 27
Functional Domains: Between-Group Comparisons (Parametric Statistical Tests)

Functional Domain	ADHD $n = 35$	OCD $n = 24$	t	p	Cohen's d
Relationships	-0.164 (0.64)	0.240 (0.81)	-2.12	0.038*	-0.561
Conduct Problems	0.125 (0.12)	-0.183 (0.89)	1.28	0.205	0.339
ADHD Problems	0.302 (0.77)	-0.440 (0.98)	3.24	0.001**	0.858
Total Problems	0.011 (0.86)	0.017 (1.02)	0.12	0.907	0.032
Total Competence	0.014 (0.72)	-0.020 (0.84)	0.17	0.865	0.045

Note. Means are presented with standard deviations in parentheses. The *t*-statistic is reported for 57 degrees of freedom in each case.
*$p < .05$, **$p < .01$

Table 28
Functional Domains: Between-Group Comparison (Non-parametric Statistical Test)

Functional Domain	ADHD $n = 35$	OCD $n = 24$	U	Adjusted Z	p
Depression & Anxiety	-0.215 (0.67)	0.314 (0.97)	282	-2.12	0.034*

Note. Means are presented with standard deviations in parentheses.
*$p < .05$

The data presented in Tables 27 and 28 suggest that participants in the OCD group experience statistically significantly more difficulty in the Relationships domain (i.e., they have more trouble making friends and sustaining friendships) and in the Depression and Anxiety domain (i.e., they have more affective problems), whereas participants in the ADHD group, not surprisingly, experience statistically significantly more ADHD-related functional impairment (i.e., problems related to hyperactivity, inhibition and inattention). The effect sizes associated with each statistically significant result were large. It is also interesting to note the medium effect size for the Conduct problems domain, where the ADHD group experienced more difficulty.

ADHD-CT vs. ADHD-PI

As with the previous comparison, the average *Z* score was calculated for each domain, using the participants' Z scores for the various subscales that comprised each created domain. The Kolmogorov-Smirnov test was then performed to determine whether the data were normally

distributed, and Levene's test was used to assess homogeneity of variance. The results of the K-S statistic are presented in Table 29. As can be seen, there were no statistically significant results, and therefore one can assume the data were normally distributed. Consequently, *t*-tests with separate variance estimates were performed where appropriate. Table 30 presents descriptive statistics for the 6 functional domains for both the ADHD-CT and ADHD-PI samples, as well as the results of between-group comparisons. As the table shows, there were no statistically significant differences between the two ADHD subtype groups on any of the functional domains.

Table 29
Assessment of Normality of the Distribution for Functional Domain scores

Functional Domain	K-S Statistic	*p*
Relationships	1.469	> 0.10
Depression & Anxiety	1.645	> 0.10
Conduct Problems	1.342	> 0.10
ADHD Problems	1.581	> 0.10
Total Problems	0.934	> 0.10
Total Competence	1.433	> 0.10

Note. In each case, the degrees of freedom on which the statistic was evaluated was 35.

Table 30
Functional Domains: Between-Group Comparisons

Functional Domain	ADHD-CT *n* = 23	ADHD-PI *n* = 12	*t*	*p*	Cohen's *d*
Relationships	0.042 (0.74)	-0.079 (0.91)	0.428	0.671	0.150
Depression & Anxiety	0.005 (0.68)	-0.009 (0.92)	0.054	0.957	0.019
Conduct Problems	0.028 (1.01)	-0.053 (0.67)	0.252	0.802	0.088
ADHD Problems	0.009 (1.00)	-0.018 (0.73)	0.085	0.932	0.030
Total Problems	0.024 (0.95)	-0.046 (0.96)	0.214	0.831	0.075
Total Competence	-0.064 (0.96)	-0.046 (0.89)	-0.559	0.584	-0.195

Note. Means are presented with standard deviations in parentheses. The *t*-statistic is reported for 33 degrees of freedom in each case.

Co-Morbidity

Existing literature on the comparability of ADHD subtypes suggests that the presence of certain co-morbid disorders is likely to increase the presence of core symptoms of ADHD (inattention or hyperactivity/impulsivity, or both). For this reason, I decided to conduct a correlational analysis to examine the relationships between co-morbidity and functional impairment in the current ADHD sample. Results of this analysis are presented in Table 31.

As shown in the table, functioning in the Relationship domain was statistically significantly correlated with co-morbid social phobia; this relationship is moderately strong and positive. Additionally, functioning in the Conduct Problems domain was statistically significantly correlated with co-morbid depression, conduct disorder, and oppositional defiance, with (unsurprisingly) the strongest correlation existing between functioning in this domain and a diagnosis of conduct disorder. Furthermore, functioning in the Total Competence domain was statistically significantly correlated with a co-morbid diagnosis of depression and separation anxiety disorder; in each case the correlation was moderate and negative.

I then decided to conduct a further correlational analysis to examine the relationships between co-morbidity and the classification of subtypes in the current ADHD sample, i.e., to determine whether the presence of particular co-morbid disorders related to whether an individual was classified as ADHD-CT or ADHD-PI.. As Table 32 shows, the presence of a co-morbid manic episode had a significant, moderately strong, negative relationship with subtype (because ADHD-CT was coded as 1 and ADHD-PI as 0, this means that having had a manic episode tended to be more strongly present in the ADHD-PI group than in the ADHD-CT group). Similarly, the presence of a co-morbid conduct disorder had a significant, moderately strong, positive relationship with subtype (again, because ADHD-CT was coded as 1 and ADHD-PI as 0, this means that having a diagnosis of conduct disorder was more strongly associated with a diagnosis of ADHD-CT than with one of ADHD-PI).

Table 31
Correlation Matrix: Effect of Co-morbidity on Functioning

	Co-morbid Disorder							
Functional Domain	Depression	Manic Episode	Conduct Disorder	Oppositional Defiance	Separation Anxiety Disorder	Social Phobia	Generalized Anxiety Disorder	Agoraphobia
Relationships	0.2640 (0.307)	-0.1457 (0.404)	0.2681 (0.119)	0.1586 (0.363)	0.2370 (0.170)	0.4683 (0.005)**	-0.0656 (0.708)	0.1590 (0.362)
Conduct Problems	0.3561 (0.036)*	0.0488 (0.781)	0.5008 (0.002)**	0.3991 (0.018)*	0.3211 (0.060)	0.0458 (0.972)	-0.1110 (0.526)	-0.1692 (0.362)
ADHD Problems	0.2288 (0.186)	0.0880 (0.615)	0.0641 (0.751)	-0.1066 (0.542)	0.0944 (0.589)	-0.1175 (0.501)	-0.0749 (0.115)	-0.2345 (0.331)
Depression & Anxiety	-0.0162 (0.927)	0.1243 (0.477)	0.0049 (0.978)	0.1342 (0.442)	0.2435 (0.159)	0.1206 (0.409)	0.0057 (0.974)	-0.1014 (562)
Total Competence	-0.4386 (0.008)**	0.3176 (0.063)	-0.2965 (0.084)	0.1296 (0.458)	-0.4015 (0.017)*	-0.2689 (0.118)	0.1761 (0.311)	-0.1760 (0.312)
Total Problems	0.1689 (0.332)	0.0606 (0.729)	0.2269 (0.190)	0.2252 (0.193)	0.3216 (0.060)	0.1550 (0.374)	-0.0477 (0.785)	-0.1457 (0.404)

Note. Pearson's correlations are presented with *p*-values in parentheses.
*$p < .05$, **$p < .01$

Table 32
Correlation Matrix: Relationship between the Presence of Co-morbid Disorders and ADHD Subtype Classification

Co-Morbid Disorder	Correlation with Subtype Classification
Depression	0.1778 (0.307)
Manic Episode	-0.4759 (0.004)**
Conduct Disorder	0.3593 (0.003)**
Oppositional Defiance Disorder	0.2202 (0.204)
Separation Anxiety Disorder	0.0602 (0.731)
Social Phobia	0.0061 (0.972)
Generalized Anxiety Disorder	0.1239 (0.478)
Agoraphobia	-0.2408 (0.164)

Note. Pearson's correlations are presented with *p*-values in parentheses.
*$p < .05$, **$p < .01$

DISCUSSION

This study is the first to investigate, in a comparative manner, the functional impairment of South African children with Obsessive-Compulsive Disorder (OCD) and Attention-Deficit/Hyperactivity Disorder (ADHD). The two major aims of this research were: (a) to investigate the differences between the functional impairment experienced by children and adolescents who meet criteria for OCD and those who meet criteria for ADHD; and (b) to investigate the differences in functional impairment among those children and adolescents who meet criteria for the ADHD Combined subtype (ADHD-CT), and those who meet criteria for ADHD Predominantly Inattentive subtype (ADHD-PI). Additionally, a third aim emerged from the first two: the effect of co-morbidity on functional impairment associated with ADHD-CT and ADHD-PI was investigated.

The first section of the Discussion will present the results and themes that emerged from statistical analyses associated with the study's first major aim. Next, the results and themes associated with the second major aim will be discussed, followed by a discussion of the effect that co-morbidity had on the results. Lastly, the clinical importance of the current findings will be discussed, and important directions for future research in this field will be presented.

Functional Impairment Associated with ADHD

The children and adolescents in the current ADHD group did not show severe functional impairment across multiple domains, but rather displayed specific functional impairments in specific domains. Most difficulty was reported on the *School* subscale of the CBCL, as well as on the SDS subscale that measured functioning in the school domain. This difficulty in terms of functioning at school is consistent with previous research; for instance, Carroll et al. (2006) found that children with ADHD exhibited more than twice as many solitary off-task behaviours in the classroom (e.g., drawing or swinging in their chairs) when compared to children without ADHD. Additionally, Power et al. (2006) investigated the relationship between ADHD and academic performance, and found significant problems in paying attention, working efficiently, and working independently, as well as problems related to productivity and understanding the task at hand.

The current data (again, specifically from the CBCL and SDS) also showed that children in the ADHD group experienced a great deal of difficulty executing and participating in everyday activities (e.g., activities related to grooming and eating). These findings are consistent with those presented by Whalen et al. (2006), who found that children and adolescents diagnosed with ADHD experience specific difficulty when preparing for an activity, as well as when getting ready for daily life tasks.

The current data showed, as expected, that for children and adolescents in the ADHD group there were consistent reports across various measures of problems related to conduct, affect, and hyperactive behaviour. For instance, on the CBCL a score of more than 70 on the DSM-Oriented Scales indicates that a child falls into the clinical range of a particular measured disorder. The mean scores of the current ADHD group did not fall into the clinical range for any of the measured disorders, but can be classified in the *borderline* range for ADHD symptoms (67.26), Affective problems (63.6) and Oppositional Defiant problems (59.45). These findings were consistent with scores on the SDQ, where the most difficulty was reported on the hyperactivity problems scale, followed by the emotional problems and conduct problems scales.

This theme is further supported by data from the Total Problems scale of the CBCL, where there were no real differences between the amount of internalizing and externalizing problems experienced by the current ADHD participants; that is to say, children and adolescents in this group

exhibited their difficulties in both internalizing ways, such as by experiencing depressive mood and low self-esteem, as well as in externalizing ways, such as by displaying overt aggression and other behavioural problems.

The significance of conduct problems in childhood and adolescent ADHD has been illustrated by Satterfield et al. (2007), who compared the official arrest records for a large sample of boys who met criteria for ADHD to those of a matched control group. After controlling for IQ and socioeconomic status (SES), they found that participants who met criteria for ADHD, and who had not manifested conduct problems in childhood, did not show more adult antisocial behaviour than did control participants. However, those with a combination of ADHD and childhood conduct problems (i.e., those who were diagnosed with ADHD as well as Conduct Disorder) were at increased risk for adult criminality.

OCD-Specific Functional Impairment

The current CBCL data suggested that parents of children and adolescents in the OCD group reported most difficulty in the social domain of functioning (i.e., they reported problems related to playing with other children, forming and sustaining friendships, as well as dating) This impression was not confirmed by scores on any of the other measures, however; for example, ratings on the SDS suggested that children and adolescents in the OCD group experienced the most difficulty in functional domains associated with school and activities of daily living; difficulties associated with friendships (i.e., those in the social domain) were only rated as third most problematic.

Another theme that emerged from analyses of data from OCD participants was that most difficulties experienced by these children and adolescents could be classified as being of an internalizing nature, i.e., children were more likely to experience feelings of low self esteem, sadness and depression, than acting out in anger or rage. This theme is reflected in data from the Total Problems and DSM-Oriented scales of the CBCL, where these participants scored high on measures of Anxiety Problems and Affective Problems (both in the *borderline* range). Similarly, on the SDQ these participants reportedly experienced most difficulty on the Emotional Problems scale (5.00). These findings make sense when one considers that OCD is classified by the DSM as an anxiety disorder, and are also reflected in the finding that the functional domain most affected by the presence of OCD was found to be that of Depression and Anxiety.

ADHD vs. OCD Functional Impairment

Results on all the measures confirmed the expected statistically significant difference between the ADHD and OCD groups in terms of ADHD-related problems (ADHD participants reported more) and anxiety-related problems (OCD participants reported more). Findings also indicated a statistically significant difference between the two groups in terms of functioning in the School domain, with the ADHD group reporting more difficulty in this area. The OCD group also reported significantly more difficulties that can be classified as internalizing problems.

There are some notable differences between the findings reported by Geller et al. (2004) and those reported here, however. For instance, that study found more significant differences between ADHD and OCD groups in terms of the CBCL DSM-Oriented scale than did the current study (e.g., in the Geller study, ADHD participants had significantly more Oppositional Defiant Disorder-related symptoms and externalizing problems than in the current study). One reason for the disparity between the two studies may lie in the different sampling techniques employed. Although the total number of participants in each of the current study's clinical groups did not differ much from sample sizes in the Geller study, all participants in the current study were recruited from the community, whereas Geller and colleagues used a mix of clinically referred subjects and participants from previous research studies (OCD group: n = 33, including 15 clinic patients; ADHD group: n = 43, all of whom were previously involved in research ventures).

By definition, then, the participants in the Geller study included participants who were specifically seeking treatment (be it at an outpatient clinic or through participation in research ventures). This contrasts with participants in the current study, where treatment was not offered as a benefit of taking part, while all participants in the Geller study were receiving some form of treatment.

In the current study, OCD participants reported significantly more difficulty in the domain of dating and relationships than did ADHD participants. This finding might be explained by the fact that OCD is, by definition, an anxiety disorder; therefore, the anxiety and fear attendant to the disorder may inhibit social experiences of children and adolescents diagnosed with OCD (at least to a much greater degree than any attendant anxiety and fear might inhibit children diagnosed with ADHD). It is important to note, however, that the mean age of the OCD group (13.42 years) was significantly greater than that of the ADHD group (9.69 years); in other words, participants in the OCD group were mostly adolescents, whereas those in the ADHD group were mostly children.

One might argue, then, that the current comparative results with regard to the domain of data and relationships are crucially confounded by the different developmental stages of the participants, and more specifically by the fact that the developmental stage of adolescence is accompanied by more social anxiety, with the introduction of puberty, sex role development, and dating.

COMPARING ADHD-CT & ADHD-PI FUNCTIONAL IMPAIRMENT

There were no statistically significant differences found between the two current ADHD subtype groups on any of the subscales of any of the measures of functional impairment. These findings contrast with those of Levy, Hay, Bennett, and McStephen (2004), who found that co-morbidity and symptom profiles differed among the subtypes of the disorder. More specifically, they found that children classified as ADHD-CT were consistently diagnosed with more co-morbid pathologies, with equal amounts of internalizing and externalizing symptoms. Female participants diagnosed as ADHD-CT had significantly more instances of co-morbid generalized anxiety disorder, while female participants diagnosed with ADHD-PI had significantly more instances of co-morbid separation anxiety disorder. This indicates that the different subtypes of ADHD are associated with different manifestations of internalizing disorders.

The current study's findings of no statistically significant differences in functional impairment between ADHD-CT and ADHD-PI participants may be attributed to three factors: (a) The effect of co-morbid disorders on ADHD subtype classification and domains of functional impairment; (b) the (un)reliability of parent reports; and (c) the (un)reliability of the measures in classification of the subtypes. Each will be addressed in turn in the sections that follow.

The Effect of Co-morbid Disorders

Previous research has shown that the presence of co-morbid disorders may have a mediating effect on the classification of ADHD subtype. For example, Newcorn et al. (2001) found that the presence of co-morbid disorders can be associated with more severe symptom profiles in children diagnosed with ADHD. More specifically, children diagnosed with ADHD as well as oppositional defiant and/or conduct problems were rated as more impulsive than those who only met criteria for ADHD. Similarly, children diagnosed with ADHD as well as any co-morbid anxiety disorder had significantly more inattentive symptoms, but fewer symptoms of hyperactivity and impulsivity were found, compare to the other groups. Overall, their study found that core ADHD symptoms of

hyperactivity/impulsivity and inattention are elevated in the presence of co-morbid disorders. Because subtype classification depends wholly on the presence and/or absence of the core ADHD symptoms (hyperactivity/impulsivity and inattention), I decided to investigate the effect of co-morbid disorders on the current ADHD sample.

A correlational analysis was used to investigate the relationship between ADHD subtype and co-morbidity profile. The correlation matrix produced two findings of particular interest. First, it suggested that the presence of a co-morbid manic episode had a moderately strong relationship with the chances of an individual being classified as belonging to the ADHD-PI group. A second finding from this correlation analysis indicated a moderately strong, positive relationship between co-morbid conduct disorder had a moderately strong relationship with an individual's chances of being classified as belonging to the ADHD-CT group.

Taken together, these findings suggest that the presence of a secondary manic episode elevates the core ADHD symptom of inattention, and that the presence of secondary conduct disorder elevates the core ADHD symptoms of hyperactivity/impulsivity. This can lead to incorrect subtype classification, since symptoms belonging to a manic episode or conduct disorder might have been mistaken for "pure" ADHD symptoms. In other words, co-morbidity may account for the incorrect classification of ADHD subtype group, and when a child has been classified as belonging to the wrong subtype group, his or her functional impairment- and other data will be analyzed and compared in an incorrect way, which in turn may account for the fact that no significant differences were found between the subtype groups in the current sample.

I conducted a further correlational analysis to investigate the relationship between co-morbidity profile and functioning in each of the theoretically- and statistically-derived domains (i.e., Relationships, Depression & Anxiety, Conduct Problems, ADHD Problems, Total Competence, and Total Problems; a higher score within a domain means more functional impairment in that domain). Three major findings emerged from this analysis: A positive, moderately strong relationship between functioning in the Relationship domain and co-morbid social phobia; a significant positive correlation between the Conduct Problems domain and co-morbid depression, conduct disorder, and oppositional defiance disorder (with the strongest correlation between functioning in this domain and conduct disorder); and a negative, moderately strong relationship between functioning in the Total Competence domain and co-morbid depression and separation anxiety disorder.

Since a higher score on each of the functional domains indicate more difficulties in that specific area, a positive relationship between the Relationship domain and co-morbid social phobia means that the presence of a social phobia will significantly increase the problems related to performance on the Relationships functional domain for the current ADHD sample. Similarly, co-morbid depression, conduct disorder and oppositional defiance disorder significantly increased the difficulties related to performance on the Conduct Problems domain. Lastly then, it was found that co-morbid depression and separation anxiety significantly decreased Total Competence of the current sample.

These findings are important, since it may be deduced that the presence of certain co-morbid disorders may interfere with the performance of individuals with ADHD in certain functional domains, and this interference may be responsible for the fact that no significant differences were found between the subtype groups in the current sample.

The Reliability of Parent Reports

The second factor that might explain the failure of the current data to distinguish, in functional impairment terms, between participants diagnosed with ADHD-PI and those diagnosed with ADHD-CT is related to the reliability of parent reports on the measures of functional impairment. The M.I.N.I Kid interview was used as diagnostic tool to confirm and determine whether a child/adolescent met criteria for a whole range of disorders, and also to specify for which ADHD subtype he/she met criteria. During this interview, the child participant answered 'yes' or 'no' to a list of questions regarding current symptoms, and parents were present to comment on and confirm those answers. Given this situation, it may be that participants answered these questions in a way that reported an elevated number of core ADHD symptoms, because they knew that the current study was aiming to investigate elements of this specific disorder (i.e., it may be that respondents were trying to be "helpful" but by doing so distorted the data with incorrect subtype classifications). This tendency to provide answers that gain the favour or approval of the researcher can be seen as a type of social desirability bias (Howell, 2004).

The measures of functional impairment employed in the current study were of a self-report nature. As discussed above, the participants all knew what the goals of the current study were, and may have reported elevated levels of impairment for their information to be regarded as relevant or helpful to the researchers. Another aspect of the current self-report measures that may have created

a bias in the dataset is the use of the Likert-type scales. All three measures of functional impairment made use of this type of scale; for example, parents were asked to rate their children on a scale from 0 to 4 to indicate severity of impairment, or were asked to rate statements regarding the child's level of impairment as *certainly true*, *somewhat true*, *somewhat untrue*, or *certainly untrue*. The difficulty in this type of scale exist in that it is impossible to determine a baseline response for each category; that is, one parent might rate the applicability of a statement to their child's behaviour as "certainly true," while another parent may rate the statement as "somewhat true" when referring to the same behaviour in their child. All information supplied by respondents came from a completely individual and subjective perspective, which may also have created a bias in the dataset.

Another consideration when evaluating the validity of self-report data is how educated the respondents are in terms of the current topic. In the current study, some parents had no previous exposure to answering questions regarding their child's functioning. In fact, many participants used the study as a starting block in addressing their child's supposed ADHD problem. One can infer from this state of affairs that their knowledge of ADHD and its core symptoms may have been limited to personal research, which may be clouded with misinformation and popularized untruths.

Finally, even though the interviews were always conducted in the participants' home language (English or Afrikaans) the questionnaires were all in English, and some of the Afrikaans-speaking participants may have misunderstood some of the statements on the measures. This fact, together with a lack of reliable background knowledge, may also have influenced the reported results.

Validity of Diagnostic Measures

The third factor that might explain the failure of the current data to distinguish, in functional impairment terms, between participants diagnosed with ADHD-PI and those diagnosed with ADHD-CT is related to validity of the measure used in the current study to classify participants as belonging to either the combined or predominantly inattentive subtypes of ADHD. It might be that the current diagnostic measure, the M.I.N.I Kid interview, is sensitive in diagnosis of the disorder as a whole, but might not be as sensitive to diagnosis of ADHD subtypes. However, no evidence could be found of another diagnostic measure being more specific or sensitive in diagnosing ADHD subtypes.

LIMITATIONS & DIRECTIONS FOR FUTURE RESEARCH

Future studies in this field should consider gender differences and the effect that these may have on functional impairment in both ADHD and OCD, as well within ADHD. Graetz, Sawyer, and Baghurst (2005) found that boys and girls diagnosed with ADHD do not display different symptoms when the three subtypes are collapsed into a single group, with the exception that girls report more ADHD-related somatic complaints, while boys struggle more in the school domain as a result of their ADHD symptoms. Gender differences were more evident in the second part of the study, where results indicated that boys who are diagnosed with ADHD-CT or ADHD-HI subtype are rated as being more functionally impaired than girls with the same diagnoses. On the other hand, they found that boys diagnosed with ADHD-PI were rated as equally or less impaired than girls with the same diagnosis.

In future research, it might be useful to explore whether girls and boys experience the same amount of functional impairment, and in the same domains. It will also be useful to compare age of onset, and number of co-morbid disorders as reported by boys and girls.

A second limitation of the current study was that the mean age of the OCD group was significantly higher than the mean age of the ADHD group. Future studies should match the two groups on age, particularly because some domains of functional impairment (e.g., dating) may be more problematic as a result of certain developmental tasks rather than because of a true between-groups difference.

Thirdly, it will also be important to make a concerted effort to expand the number of participants in the ADHD-Hyperactive Impulsive subtype group to be able to include this group for comparison, since this subtype makes up a relatively small percentage of the ADHD population.

The current study included participants that were either English or Afrikaans speaking. We were unable to include Xhosa-speaking participants due to financial and logistical constraints associated with translating the instruments. In future, including Xhosa-speaking participants in both the OCD and ADHD samples will make the research results more generalizable to the overall OCD and ADHD populations of South Africa, especially that of the Western Cape. It would also be beneficial if diagnostic interviews can be conducted in the participants' first language, to ensure understanding and accuracy.

In future, it will also be useful to examine the effect of co-morbidity by recruiting a pure ADHD group (where no co-morbidity is present), an ADHD group with co-morbid anxiety disorders, an ADHD group with co-morbid behavioural disorders, and an ADHD group with co-morbid mood disorders for comparison. This recruitment procedure was followed in the study by Newcorn et al. (2001), where the effect of co-morbidity on symptom profiles was examined; no research of this kind has been done in South Africa to date.

The validity of ADHD subtypes should also be investigated further, and the best way to do this would be through a longitudinal study, similar to the one conducted by Lahey, Pelham, Loney, Lee and Wilcut (2005), where they investigated whether ADHD subtypes' diagnosis is stable enough over time to be valid. Children would have to be interviewed and diagnosed over a period of time, each time noting which subtype of ADHD they meet criteria for; i.e. a study of more longitudinal design should be employed. Again, even though research of this kind has been conducted in a First World context, it is important to conduct this research in a developing context, such as South Africa.

Another interesting future direction for the current study would be to include a comparison group, consisting of a normal peer group. The functional impairment experienced by this disorder-free comparison group can add more to the understanding of the specific functional impairment experienced by children and adolescents diagnosed with ADHD and OCD.

CLINICAL SIGNIFICANCE

The current study found that significant differences exist between the functional impairment experienced by South African children and adolescents diagnosed with ADHD compared to those diagnosed with OCD. This finding supports the idea that each disorder contributes to functional impairment in a unique way. The importance of these findings are linked to the fact that a better understanding of the unique contribution that each disorder adds to functional impairment of a child or adolescent will ultimately lead to fewer misdiagnoses and better treatment plans.

There were no statistically significant differences found between the functional impairment associated with ADHD Combined subtype compared to ADHD Predominantly Inattentive subtype. The suggestion here is that co-morbidity could have a mediating effect on the classification of participants, because the core symptoms of ADHD are often elevated by the presence of a co-

morbid disorder. These findings are important in that they emphasize the importance of considering co-morbidity in terms of treatment and diagnosis.

The findings of this study have provided preliminary steps towards a comprehensive understanding of childhood and adolescent OCD- and ADHD-related functional impairment. Research such as this will help to improve the procedures of diagnosis, treatment and prognosis for children diagnosed with these disorders. The elimination of misdiagnoses, as well as effective treatment planning, will have a positive impact on the mental health of these children and adolescents in the future.

For example, Connor et al. (2003) compiled a hierarchical regression model to analyse the effects of estimated age of onset (of ADHD), symptom severity and co-morbid externalizing and internalizing psychopathology. It was found that the severity of the child's ADHD symptoms at the time of referral, as well as the estimated age of onset of the disorder can significantly be associated with co-morbid disorders, while age of onset also played a role in whether participants exhibited more internalizing or externalizing pathology. It was discussed at length in the current study how the presence of co-morbid psychiatric disorders can elevate core symptoms of a primary diagnosed disorder, leading to incorrect psychiatric classification. This can ultimately lead to incorrect and ineffective treatment procedures.

Conclusion

The current study aimed to help parents, teachers, and other caregivers recognize the areas of impairment associated with specific psychiatric childhood disorders. Through doing this, an understanding home and classroom environment can be created and will ultimately aid the individual child through specifically targeted interventions. This type of research also strives to raise the awareness of parents, teachers and clinicians about how certain psychiatric disorders affect South African children specifically. There is a dearth of existing literature on this topic, while at the same time the media is fraught with popular untruths and myths. It is the responsibility of researchers to conduct sound and generalizable research and make the findings available to those individuals who care for and teach the children of South Africa.

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APPENDIX A

DSM-IV-TR DIAGNOSTIC CRITERIA FOR ADHD

I. Either A or B:

A. Six or more of the following symptoms of *inattention* have been present for at least 6 months to a point that is disruptive and inappropriate for developmental level:

Inattention

Often does not give close attention to details or makes careless mistakes in schoolwork, work, or other activities.

1. Often has trouble keeping attention on tasks or play activities.

2. Often does not seem to listen when spoken to directly.
3. Often does not follow instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions).
4. Often has trouble organizing activities.
5. Often avoids, dislikes, or doesn't want to do things that take a lot of mental effort for a long period of time (such as schoolwork or homework).
6. Often loses things needed for tasks and activities (e.g. toys, school assignments, pencils, books, or tools).
7. Is often easily distracted.
8. Is often forgetful in daily activities.

B. Six or more of the following symptoms of *hyperactivity-impulsivity* have been present for at least 6 months to an extent that is disruptive and inappropriate for developmental level:

Hyperactivity

1. Often fidgets with hands or feet or squirms in seat.
2. Often gets up from seat when remaining in seat is expected.
3. Often runs about or climbs when and where it is not appropriate (adolescents or adults may feel very restless).
4. Often has trouble playing or enjoying leisure activities quietly.
5. Is often "on the go" or often acts as if "driven by a motor".
6. Often talks excessively.

Impulsivity

1. Often blurts out answers before questions have been finished.
2. Often has trouble waiting one's turn.
3. Often interrupts or intrudes on others (e.g., butts into conversations or games).

II. Some symptoms that cause impairment were present before age 7 years.

III. Some impairment from the symptoms is present in two or more settings (e.g. at school/work and at home).

IV. There must be clear evidence of significant impairment in social, school, or work functioning.

V. The symptoms do not happen only during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder. The symptoms are not better accounted for by another mental disorder (e.g. Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

Based on these criteria, three types of ADHD are identified:

1. ADHD, Combined Type: if both criteria 1A and 1B are met for the past 6 months
2. ADHD, Predominantly Inattentive Type: if criterion 1A is met but criterion 1B is not met for the past six months
3. ADHD, Predominantly Hyperactive-Impulsive Type: if Criterion 1B is met but Criterion 1A is not met for the past six months.

APPENDIX B

DSM-IV-TR DIAGNOSTIC CRITERIA FOR OCD

A. Either obsessions or compulsions:

Obsessions as defined by (1), (2), (3), and (4):

(1) recurrent and persistent thoughts, impulses or images that are experienced, at some time during the disturbance, as intrusive and inappropriate and that cause marked anxiety or distress

(2) the thought, impulses, or images are not simply excessive worries about real-life problems

(3) the person attempts to ignore or suppress such thoughts, impulses or images, or to neutralize them with some other thought or action

(4) the person recognizes that the obsessional thoughts, impulses, or images are a product of his or her own mind (not imposed from without as in thought insertion)

Compulsions as defined by (1) and (2):

(1) repetitive behaviors (e.g., hand washing, ordering, checking) or mental acts (e.g., praying, counting, repeating words silently) that the person feels driven to perform in response to an obsession, or according to rules that must be applied rigidly;

(2) the behaviors or mental acts are aimed at preventing or reducing distress or preventing some dreaded event or situation; however, these behaviors or mental acts either are not connected in a realistic way with what they are designed to neutralize or prevent or are clearly excessive

B. At some point during the course of the disorder, the person has recognized that the obsessions or compulsions are excessive or unreasonable. **Note:** This does not apply to children.

C. The obsessions or compulsions cause marked distress, are time consuming (take more than one hour a day), or significantly interfere with the person's normal routine, occupational (or academic) functioning, or usual social activities or relationships.

D. If another Axis 1 disorder is present, the content of obsessions or compulsions is not restricted to it (e.g., preoccupation with food in the presence of Trichotillomania; concern with appearance in the presence of Body Dysmorphic Disorder; preoccupation with drugs in the presence of a Substance Use Disorder; preoccupation with having a serious illness in the presence of Hypochondriasis; preoccupation with sexual urges or fantasies in the presence of a Paraphilia; or guilty ruminations in the presence of a Major Depressive Disorder).

E. The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition.

Specify if:

With Poor Insight: if, for most of the time during the current episode, the person does not recognize that the obsessions and compulsions are excessive or unreasonable.

APPENDIX C

DEMOGRAPHIC QUESTIONNAIRE

1. **Age: _____**
2. **Sex (circle one):** Male Female
3. **What is your race or ethnic background?**

   WHITE

   AFRICAN

   COLOURED

   ASIAN

   OTHER: (specify) _____
4. **Religion**: _____
5. **Home Language**: _____
6. **Size of house (indicate the number of rooms in the house)**:

   _____
7. **Number of people who live in the house**:

   _____
8.

   8.1. What term best describes the kind of neighbourhood in which you live?

   SUBURBAN

   URBAN

   TOWNSHIP

   INTERMEDIATE

   8.2. What is the name of the neighbourhood in which you live?

   _____

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

0-35000: _____

36000-5000:_____

76000-25000:_____

126000-175000:_____

176000-225000:_____

226000-275000:_____

276000-325000:_____

326000-375000:_____

376000-425000:_____

426000-475000:_____

476000-525000:_____

> 526000:_____

EDUCATION LEVEL OF CHILD

10. Education (highest grade completed): _____

11. Has most of your child's schooling been in a rural or urban setting (circle one)?

RURAL URBAN

12. Has he/she repeated any grades? YES

NO

If yes, please specify which grade(s):

_____

11. **What grade is your child presently in? (If not in school please indicate this):**

_____

APPENDIX D

STRENGTHS AND DIFFICULTIES QUESTIONNAIRE (SELF REPORT)

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

Name..... Male/Female Date of Birth.....

	Not True	Somewhat True	Certainly True
I try to be nice to other people. I care about their feelings			
I am restless, I cannot stay still for long			
I get a lot of headaches, stomach-aches or sickness			
I usually share with others (food, games, pens etc.)			
I get very angry and often lose my temper			
I am usually on my own. I generally play alone or keep to myself			
I usually do as I am told			
I worry a lot			
I am helpful if someone is hurt, upset or feeling ill			
I am constantly fidgeting or squirming			
I have one good friend or more			
I fight a lot. I can make other people do what I want			
I am often unhappy, down-hearted or tearful			
Other people my age generally like me			
I am easily distracted, I find it difficult to concentrate			
I am nervous in new situations. I easily lose confidence			
I am kind to younger children			
I am often accused of lying or cheating			
Other children or young people pick on me or bully me			

I often volunteer to help others (parents, teachers, children)

I think before I do things

I take things that are not mine from home, school or elsewhere

I get on better with adults than with people my own age

I have many fears, I am easily scared

I finish the work I'm doing. My attention is good

Overall, do you think that you have difficulties in one or more of the following areas: emotions, concentration, behaviour or being able to get on with other people?

Yes-definite difficulties ☐

Yes-minor difficulties ☐

Yes-severe difficulties ☐

No ☐

If you have answered "Yes", please answer the following questions about these difficulties:

- How long have these difficulties been present?

Less than a month ☐

Over a year ☐

1-5months ☐

- Do the difficulties upset or distress you?

Not at all ☐

Quite a lot ☐

A great deal ☐

Only a little ☐

- Do the difficulties interfere with your everyday life in the following areas?

	Not at all	Quite a lot	A great deal	Only a little
HOME LIFE				
FRIENDSHIPS				
CLASSROOM				
LEARNING				
LEISURE				
ACTIVITIES				

- Do the difficulties make it harder for those around you (family, friends, teachers, etc.)?

Not at all ☐

Quite a lot ☐

A great deal ☐

Only a little ☐

Your Signature .....Today's Date .....

Thank you very much for your help

APPENDIX E

STRENGTHS AND DIFFICULTIES QUESTIONNAIRE (PARENT REPORT)

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

Child's Name..... Male/Female Date of Birth.....

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

Picked on or bullied by other children

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

Thinks things out before acting

Steals from home, school or elsewhere

Gets on better with adults than with other children

Many fears, easily scared

Sees tasks through to the end, good attention span

Overall, do you think that your child has difficulties in one or more of the following areas: emotions, concentration, behaviour or being able to get on with other people?

Yes-definite difficulties ☐

Yes-minor difficulties ☐

Yes-severe difficulties ☐

No ☐

If you have answered "Yes", please answer the following questions about these difficulties:

- How long have these difficulties been present?

Less than a month ☐

Over a year ☐

1-5months ☐

- Do the difficulties upset or distress your child?

Not at all ☐

Quite a lot ☐

A great deal ☐

Only a little ☐

- Do the difficulties interfere with your child's everyday life in the following areas?

	Not at all	Quite a lot	A great deal	Only a little
HOME LIFE				
FRIENDSHIPS				
CLASSROOM				
LEARNING				
LEISURE				
ACTIVITIES				

- Do the difficulties make it harder for you and the family as a whole?

Not at all ☐

Quite a lot ☐

A great deal ☐

Only a little ☐

Your Signature .....Today's Date .....

Thank you very much for your help

APPENDIX F

SCHNEIER DISABILITY SCALE (ADMINISTERED TO PARENT AND CHILD)

A. Main disorder being rated _____

B. Rate impairment due to the disorder relative to the individual's child's desired/potential level of functioning. Use all available information. Sample probes: "If your child were free of this problem, would anything be different in their [work] performance? If your child don't have this problem, would they still [be at the same job]?

1. Lifetime Past 2 weeks
(worst impairment)
_____1.SCHOOL

0. No impairment from this disorder
1. Distress but not clear impairment
2. Moderate: Impaired performance (e.g. lower grades), but disorder does not prevent completing desired level of education
3. Severe: Dropped out temporarily, but able to complete desired level of education.
4. Extreme: Dropped out, unable to complete desired level of education

Complete PAST 2 WEEKS rating for item 1 only if the individual's child is now in school full time or if the child would be in school full time if he/she had not dropped out due to emotional problem.

2. Lifetime Past 2 weeks
(worst impairment)
_____2.WORK (OUTSIDE OR INSIDE THE HOME)

0. No impairment from this disorder
1. Distress but not clear impairment in job appropriate for individual's child's abilities
2. Moderate impairment in job appropriate for individual's child's abilities (e.g., occasional absenteeism, moderate criticism from boss, avoidance of seeking an appropriate promotion, failing to do various household chores or doing them poorly)
3. **Severe** impairment in job appropriate to child's ability (e.g., frequent absenteeism or other behaviour that could jeopardize employment, largely unable to complete household chores); or Underemployed (employed at a job beneath patient's abilities/qualifications)
4.Extreme: Unemployed or completely unable to function as homemaker or severe impairment in job beneath abilities

Complete PAST 2 WEEKS rating for item 2 only if the individual's child is not a full-time student (i.e., only if you do not rate PAST 2 WEEKS for item 1)

3. Lifetime Past 2 weeks

(worst impairment)

_____ 3.FAMILY

0. No impairment from this disorder in relationships with relatives
1. Distress but not clear impairment
2. Moderate: Intact but impaired relationships with relatives (e.g., argues, too dependent)
3. Severe: Severed relationships with a close relative or avoids most contacts
4. Extreme: Severed relationships with most of family

4.Lifetime Past 2 weeks
(worst impairment)

_____ 4.MARRIAGE / DATING

0. No impairment from this disorder
1. Distress but no impairment in dating or marriage
2. Moderate impairment (e.g., dating somewhat less frequently than desired, mildly impaired functioning on dates, or minor marital problems)
3. Severe impairment (e.g., dating infrequently, markedly impaired functioning on dates, major marital problems, separation or divorce)
4. Extreme: Unable to date or marry

5. Lifetime Past 2 weeks
(worst impairment)

_____ 5.FRIENDSHIPS

0. No impairment from this disorder
1. No clear impairment, but **distress** in initiating or maintaining friendship
2. Moderate: The child has a few close friends and acquaintances, but fewer than desired
3. Severe: No close friends or distress in most activities with acquaintances
4. Extreme: No clear friends and distress in almost all activities with acquaintances

6. Lifetime Past 2 weeks
(worst impairment)

_____ 6. OTHER INTERESTS
(RELIGIOUS ACTIVITIES, CLUBS, HOBBIES ETC)

0. No impairment from this disorder in pursuing other interests
1. Distress, but no impairment
2. Moderate impairment: Participates in activities but avoids some or does not participate fully
3. Severe impairment: Participates in far fewer activities than desired, is quite limited in ability to participate (e.g., attends church only sporadically despite desire to be active)
4. Extreme: Unable to pursue any interests

7. Lifetime Past 2 weeks
(worst impairment)

_____ 7. ACTIVITIES OF DAILY LIVING (ADL)

0. No impairment from this disorder in ADL
1. Distress, but no impairment
2. Moderate impairment: Delays in ADL. Minor dysfunction or avoidance of ADL
3. Severe impairment: Major dysfunction or avoidance. Needs some assistance
4. Extreme: Needs assistance in most ADL tasks

APPENDIX G

Consent Form

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

1. **Name of Participant ("Study Subject")**

_____

2. **Title of Research Study**

Comparing Functional Impairments of Children and Adolescents with Obsessive Compulsive Disorder and Children with Attention Deficit Hyperactive Disorder

3. **Investigators and Telephone Number(s)**

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

Mareli Fischer
Masters Student
Department of Psychology
University of Cape Town
Telephone: 082 588 8727

4. **Source of Funding or Other Material Support**

None

5. What is the purpose of this research study?

The purpose of this research study is to describe the nature of functional impairments in South African children and adolescents with Obsessive-Compulsive Disorder (OCD) and to compare their functional difficulties with those of children/ adolescents with Attention Deficit Hyperactive Disorder (ADHD).

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

In this study, you and your child will undergo two interviews that will ask you questions relating to your child's mental health. Both you and your child will undergo the same interview at separate times. In addition, both you and your child will separately complete a questionnaire relating to the impact that your child's ADHD symptoms has had on their lives.

Possible locations for the interviews and filling out the questionnaires and completing the interviews are: the University of Cape Town's Department of Psychology; the Medical Research Council's Anxiety and Stress Disorders Research Unit; child's clinicians' practice; or at your home. Each testing session will be individually conducted by a postgraduate psychology student who has been trained in the use of the measures that will be administered, and who is under the supervision of a clinical psychologist.

After the testing session, you will have the opportunity to ask questions and thus learn more about psychological research. However, your child's particular results will not be disclosed.

If you have any questions now or at any time during the study, you may contact the Principal Investigator listed in #3 of this form.

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

The study consists of 1 session, which will last for a maximum of 2 hours. If at any time, during the interviews or when filling out the questionnaire, you or your child finds any of the procedures uncomfortable, you are free to discontinue participation without penalty.

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

25

9. What are the possible discomforts and risks?

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

If you wish to discuss the information above or any discomforts you or your child may experience, you may ask questions now or call the Principal Investigator listed on the front page of this form.

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

You and your child may or may not personally benefit from the research

10b. What are the possible benefits to others?

This study will help validate or disconfirm previous research conducted on the functional impairments of children and adolescents with OCD and ADHD. In particular, it will help to establish whether children and adolescents with OCD in South Africa exhibit different functional impairments to children and adolescents with ADHD. All this will help inform the future treatment and diagnosis of OCD and ADHD in children and adolescents.

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

Participating in this study will not cost you anything.

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

You will receive R150 for taking part in the study to cover transport costs .

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

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

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

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

Information already collected may be used.

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

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

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

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

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

16. What should you tell your child?

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

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

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

18. Signatures

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

_____ _____

Signature of Person Obtaining Consent and Authorization Date

You have been informed about this study's purpose, procedures, possible benefits, and risks; and how your child's mental health status and ADHD-related functional impairments and other data will be collected, used and shared with others. You have received a copy of this form. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time.

You voluntarily consent to allow your child to participate in this study. You hereby authorize the collection, use and sharing of your child's mental health status and ADHD-related functional impairments and other data. By signing this form, you are not waiving any of your legal rights.

_____ _____

Signature of Person Consenting and Authorizing Date

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

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

Method of contact:

Phone number: _____
E-mail address: _____
Mailing address: _____
_____

APPENDIX H

Assent Form

Project Title: Functional Impairments of South African Children with Attention Deficit/ Hyperactivity Disorder

Principal Investigator: Mareli Fischer

Why are you here?

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

Why is this study being done?

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

What will happen to you if you agree join this study?

"If you take part you will be asked some questions about your feelings and your life. Your mom/dad will also be asked the same questions about you. You and your parents will be asked these questions on two different days. But you will only be asked these questions if you join the study."

"This study won't make you feel better or get well. But the researchers might find out something that will help other children like you later."

What if you have any questions?

"If you have questions about the study you can ask them at any time. You can ask now. You can also ask later. You can talk to the researchers or you can talk to someone else. Do you have any questions now?"

Who will know you are in the study?

"When the study is finished we will tell other researchers, psychiatrists and psychologists what we found out, but we won't tell them your name."

Do you have to be in the study?

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

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

I want to be in this study _____

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

_____ _____
Signature of Person Obtaining Consent Date

_____ _____
Witness to Consent if Subject Unable to Read or Write (Must be different than the person obtaining consent) Date

Signed copies of this consent form must be 1) retained on file by the principal investigator, 2) given to the subject and 3) placed in the subject's medical record (when applicable).