

The Co-occurrence of Attention Deficit Hyperactivity Disorder Symptoms in a Sample of Western Cape Children with Autism Spectrum Disorder.

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Word count:

Abstract: 210

Main Body: 4346

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### **Acknowledgements**

I would like to thank my supervisor, Dr. Nokuthula Shabalala for her guidance and tremendous help and support during this research project.

I would also like to thank Dr. Catherine Ward for her helpful advice throughout this year.

In addition, I would like to thank the parents who agreed to take time to participate in this research.

Lastly, I would like to express my gratitude to my parents and my Fiancé for their love and support.

### **Abstract**

Autism Spectrum Disorder (ASD) is an understudied disorder in South Africa today. There is a high co-occurrence of psychopathologies and specifically Attention Deficit Hyperactivity Disorder (ADHD) in children with ASD. However, findings vary significantly from 9% to 83% for ADHD and ASD co-occurrence, and thus more research is needed. This study examined the co-occurrence of ADHD symptoms in a sample of South African children with ASD. By using the CONNERS 3<sup>rd</sup> Edition™ Parent Short Form, this study explored the frequency with which different ADHD symptoms occurred in a sample of children who had an existing diagnosis of ASD. The questionnaires were given to participating English-speaking parents of children between the ages of 6 and 7, diagnosed with ASD. Most participants reported at least two out of six symptoms; 75% of participants indicated peer relation problems and 50% of indicated the presence of defiance/aggression. A majority of the participants exhibited the main criteria for an ADHD diagnosis, namely: inattention and hyperactivity/impulsivity. In comparison with previous research findings, the rate of ADHD in children with ASD would be 88%, which is higher than any other findings. Due to severe limitations in this research, the results should be considered with caution. Further research is needed on a much larger scale.

*Keywords:* Autism Spectrum Disorder; ASD; Attention Deficit Hyperactivity Disorder; ADHD; comorbidity; symptoms

### **Background and Definition of Terms**

Autism spectrum disorder (ASD) is still a relatively misunderstood and under-researched disorder today. According to the South African Medical Journal, no fewer than ten children are diagnosed with ASD every week in the Western Cape (Bateman, 2013). Unfortunately, there are as yet no official data on the number of people affected by ASD in Africa (Elsabbagh et al., 2012). When ASD is associated with comorbid symptoms and disorders, there is usually a significant impairment of the person and an impact on the intervention and medical treatment (Leyfer et al., 2006; Gadow, Devincent & Schneider, 2008). People with ASD and ADHD might also suffer from more severe ASD symptoms, than people who only suffer from ASD (Sprenger et al., 2013). This study sought to explore the co-occurrence of ADHD symptoms in children who had been diagnosed with ASD. The first part of this dissertation will present the literature review, starting by defining the important terms discussed. Findings of recent studies in the field of autism and comorbid psychopathologies, with a special focus on Attention Deficit Hyperactivity Disorder, will then be presented. The second section will describe the method employed in getting data for the study. Following this, the results will be presented and discussed before the concluding section, which will include a reflection on the limitations of the study and suggestion for further research.

### **Autism Spectrum Disorder**

Autism spectrum disorder is considered a neurodevelopmental disorder, characterised by deficits in social communication, social interaction and restricted repetitive patterns of behaviour (American Psychological Association, 2013). The definition of ASD has recently been altered in the newest version of the Diagnostic and Statistical Manual of Mental Disorders, the 5<sup>th</sup> edition (DSM-5). In order to be diagnosed with ASD, the DSM-5 (American Psychological Association, 2013) indicates that one must show a deficit in social interaction including the following: lack of social and emotional reciprocity, lack of nonverbal communication, and a deficit in peer relations. One also needs to exhibit two of the following restricted and repetitive patterns of behaviour: stereotypes that can manifest as repetitive motor movements (e.g. hand-flapping), use of objects, such as touching the object to the face before using it, or speech; inflexibility and reluctance to change, abnormal fixed interests, and increased or decreased sensitivity and reactivity to sensory input, such as lights,

sounds or bodily sensations or unusual sensory interest. ASD symptoms need to be present from an early developmental age (American Psychological Association, 2013).

### **Attention Deficit Hyperactivity Disorder**

Since the introduction of the DSM-5, a diagnosis for ASD can now be accompanied by a diagnosis of Attention Deficit Hyperactivity Disorder (American Psychological Association, 2013). Attention Deficit Hyperactivity Disorder (ADHD) is also a neurodevelopmental disorder, which is characterized by “a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development” (American Psychological Association, 2013, p.59). The inattention symptoms include the following: making careless mistakes and losing things, not being able to maintain attention on specific tasks and being reluctant to perform such tasks, seeming absentminded and forgetful, being generally disorganized, and being easily distracted. The hyperactivity and impulsivity symptoms include the following: inability to sit still or seeming uncomfortable when required to do so, being very active in inappropriate situations, talking a lot and not being able to wait for another person to be done talking, having difficulties waiting in line or queues, and interrupting others. ADHD symptoms need to be present prior to age 12 years (American Psychological Association, 2013).

It is important to note the difference between psychiatric symptoms and psychiatric disorders or psychopathologies. People suffering from ASD may experience several psychiatric symptoms without meeting the specific diagnosis criteria for a full psychiatric disorder (Amr et al., 2011). There are different explanations for comorbidity, including chance, overlapping diagnosis criteria, associated risk factors and direct causation (Valderas, 2009; Rommelse, Franke, Geurts, Hartman & Buitelaar, 2010). In the first instance, the psychopathologies occur simultaneously for no apparent reason other than chance. The co-occurrence due to overlapping of diagnosis criteria does not seem to apply very well to ASD and ADHD, as the criteria are mostly different (American Psychological Association, 2013; Rommelse, Franke, Geurts, Hartman & Buitelaar, 2010). However, both diagnostics involve some degree of peer relation problem (American Psychological Association, 2013). Comorbidity can also occur due to common risk factors or causes, such as Major Depression and Generalised Anxiety Disorder (Goldberg, 2010; Valderas, 2009). At this point in time, little explanation is available regarding the reasons for co-occurrence of other disorders in

people with ASD. Although ASD and ADHD seem to share a common genetic basis, there is as yet limited evidence of the co-occurrence of ASD and ADHD, with more genetic studies still needed in the future (Rommelse, Franke, Geurts, Hartman & Buitelaar, 2010).

### **Comorbid psychopathologies**

After decades of research on the autism spectrum, mostly in Western industrialized countries such as the US and Europe, there has recently been a growing interest in research focused on comorbidity and ASD (Matson & Goldin, 2013).

High rates of comorbid disorders, ranging from 58% to 83%, have been found in children and adults with ASD (Amr et al., 2011; de Bruin, Ferdinand, Meester, de Nijs & Verheij, 2006; Gjevik et al., 2010; Joshi et al., 2010; Leyfer et al., 2006; Matson, Hess & Boisjoli, 2010; Mattila et al., 2010; Simonoff et al., 2008; van Steensel, Bögels & Bruin, 2013). In most studies, a majority of participants presented two or more comorbid disorders (de Bruin, Ferdinand, Meester, de Nijs & Verheij, 2006). Others studies show much lower but not insignificant rates, such as 27% of comorbidity (Memari, Ziaee, Mirfazeli & Kordi, 2012).

The main co-occurring psychopathologies found in samples of people with ASD in recent studies include Oppositional Defiant Disorder, specific phobias, anxiety disorders, with rates as high as 73% for Oppositional Defiant Disorder (Amr et al., 2011; de Bruin, Ferdinand, Meester, de Nijs & Verheij, 2006; Gjevik et al., 2010; Joshi et al., 2010; Konst & Matson, 2014; Levy et al., 2010; Leyfer et al., 2006; Matson, Hess & Boisjoli, 2010; Mattila et al., 2010; Memari, Ziaee, Mirfazeli & Kordi, 2012; Simonoff et al., 2008; van Steensel, Bögels & Bruin, 2013).

Other disorders such as Bipolar 1, Major Depression, Separation Anxiety were found in lesser proportions in most studies, although some researchers reported rates as high as 56% and as low as 0% for Major Depression (Amr et al., 2011; de Bruin, Ferdinand, Meester, de Nijs & Verheij, 2006; Gjevik et al., 2010; Joshi et al., 2010; Konst & Matson, 2014; Levy et al., 2010; Leyfer et al., 2006; Matson, Hess & Boisjoli, 2010; Mattila et al., 2010; Memari, Ziaee, Mirfazeli & Kordi, 2012; Simonoff et al., 2008; van Steensel, Bögels & Bruin, 2013). ADHD and ASD co-occurred in 0% to 83% of cases, with a majority of research finding rates of between 20% and 32%. (Amr et al., 2011; de Bruin, Ferdinand, Meester, de Nijs & Verheij, 2006; Gjevik et al., 2010; Joshi et al., 2010; Levy et al., 2010; Leyfer et al., 2006; Matson, Hess & Boisjoli, 2010; Mattila et al., 2010; Memari, Ziaee, Mirfazeli & Kordi, 2012;

Simonoff et al., 2008; van Steensel, Bögels & Bruin, 2013). The research findings are summarized in Table 1 below.

Table 1  
*Research findings on ADHD in samples with ASD*

Research	Rates of ADHD	Sample size
Amr et al., 2011	31,6%	60
de Bruin, Ferdinand, Meester, de Nijs & Verheij, 2006	14,9% inattentive type 8,5% hyperactive/impulsive type 21,3% combined type	94
Gjevik et al., 2010	21% inattentive type 6% hyperactive/impulsive type 4% combined type	94
Joshi et al., 2010	83%	217
Levy et al., 2010	21,3%	1873
Leyfer et al., 2006	20% inattentive type 0,35% hyperactive/impulsive type 0,70% combined type	109
Matson, Hess & Boisjoli, 2010	10,57%	775
Mattila et al., 2010	32% inattentive type 0% hyperactive/impulsive type 68% combined type	50
Memari, Ziaee, Mirfazeli & Kordi, 2012	8,79%	91
Simonoff et al., 2008	28,2%	112
van Steensel, Bögels & Bruin, 2013	22,5%	80

Research findings seem to vary significantly between studies. This might be due to a number of methodological, developmental and ASD specific factors. Sample sizes vary quite significantly in the different studies, ranging from 50 (Mattila et al., 2010) to 1,873 (Levy et al., 2010) participants. However, there does not seem to be a trend that would explain an increase or decrease of comorbidity rate with a change in the sample size. The relative age of the participants (children, adolescents and adults) seems to play a role in the rate of comorbidity. According to a recent review by Mannion, Brahm and Leader (2014) it appears



that there is a trend toward increasing rates of comorbid psychopathologies with age, at least in children.

Not every research investigates the co-occurrence of ADHD and ASD in the same way. Some studies look at a general ADHD diagnostic (Amr et al., 2011; Joshi et al., 2010; Levy et al., 2010; Memari, Ziaee, Mirfazeli & Kordi, 2012; Simonoff et al., 2008; van Steensel, Bögels & Bruin, 2013), while others examine different types of ADHD, namely: the inattentive type, the hyperactive/impulsive type and the combined type (de Bruin, Ferdinand, Meester, de Nijs & Verheij, 2006; Gjevik et al., 2010; Leyfer et al., 2006; Mattila et al., 2010). The main factor influencing the variations in results might also be the type of measures used, such as a clinical psychiatric interview (Amr et al., 2011), the Diagnostic Interview Schedule for Children (DISC-IV) parent (de Bruin, Ferdinand, Meester, de Nijs & Verheij, 2006) and the Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime version (Mattila et al., 2010). With only a few studies using the same measures, it seems difficult to compare the findings in a meaningful way. However, the co-occurrence of ADHD and ASD seems undeniable (Amr et al., 2011; de Bruin, Ferdinand, Meester, de Nijs & Verheij, 2006; Gjevik et al., 2010; Joshi et al., 2010; Konst & Matson, 2014; Levy et al., 2010; Leyfer et al., 2006; Matson, Hess & Boisjoli, 2010; Mattila et al., 2010; Memari, Ziaee, Mirfazeli & Kordi, 2012; Simonoff et al., 2008; van Steensel, Bögels & Bruin, 2013).

### **Rational for Research**

There is a general need for more research on ASD in the world and especially in South Africa. As discussed previously, studies on comorbid psychopathologies have been done in other countries, mainly in the United States and Western Europe. The results from previous studies show a high rate of comorbid psychopathologies but these rates differ significantly across methods and factors such as age. Thus, more research from different settings is needed to help account for these variations. ADHD seems to be the most frequently co-occurring disorder and thus it should be a priority to study its co-occurrence with ASD. Research into the reasons for the co-occurrence of psychopathologies is also needed in order to better understand this comorbidity phenomenon. Furthermore, there is a need for data from African settings, including South Africa, in order to understand ASD better and thus be able to develop and offer more information and interventions for affected children. In addition, given that symptoms of ADHD may be present without making the child with ASD diagnosable

with the disorder, the symptoms are likely to still have an impact on the child's behaviour. The originality of this research resides in the fact that unlike previous studies, it investigates the co-occurrence of ASD and ADHD in terms of specific symptoms and not general diagnostic. The data from this study could be used to inform future research on causes, risks and possible treatments of ASD.

### **Aims and hypotheses**

The primary objective of the proposed study was to investigate the co-occurrence rate of ADHD and its symptoms in South African children who have been diagnosed with ASD. At the time of writing this dissertation, this study was to the writer's knowledge the only one exploring the co-occurrence of ADHD symptoms and ASD in South Africa. For this reason, this research was mainly exploratory.

The main hypothesis was the majority of children with Autism Spectrum Disorder also suffer from some symptoms of Attention Deficit Hyperactivity Disorder. The following hypotheses were also tested:

- Children with Autism Spectrum Disorder will present with a symptom of Attention Deficit Hyperactivity Disorder (inattention, hyperactivity/impulsivity, learning problems / executive functioning problem, defiance/aggression, or peer relations problem).
- Children with Autism Spectrum Disorder will have peer relation problems.

### **Method**

#### **Design and Setting**

This quantitative study aimed to investigate the comorbidity of ADHD symptoms in children already diagnosed with ASD using the 'CONNERS 3rd Edition™ Parent Short form (Conners 3™- P (S))'. Due to time constraints, and the impossibility to do full assessment of the children, using the widely used 'CONNERS 3rd Edition™ Parent Short form (Conners 3™- P (S))' seemed to be the most appropriate option.

For each child, one parent completed the questionnaire. The data collection took place in October 2014.

### Participants

In order to qualify for this study, the children needed to meet the following criteria:

- Be between the ages of 6 and 18.
- Have an existing ASD diagnosis.

The parents needed to be able to read English in order to fully understand and complete the questionnaire.

Due to the lack of data on the number of children suffering from ASD in South Africa, the calculation of an appropriate sample size was complicated. Because of difficulties accessing participants for this research, which has greatly impacted the sample size, a convenient sample of available and willing participants was used.

**Sample characteristics.** The sample consisted of 8 children, 7 boys (87,50%) and 1 girl (12,50%), 5 six-years old (62,5%) and 3 seven-years old (37,5%). Table 2 summarized the demographic characteristics of the participants.

Table 2

*Demographic Characteristics of Participating Children*

Participants	Gender	Age
1	Male	6
2	Female	6
3	Male	7
4	Male	6
5	Male	6
6	Male	7
7	Male	7
8	Male	6

### Measure

The measure used was the ‘CONNERS 3<sup>rd</sup> Edition<sup>TM</sup> Parent Short form (Conners 3<sup>TM</sup>-P (S))’ (See Appendix A). The CONNERS 3<sup>TM</sup> measures are widely used and accepted as reliable for the diagnosis of ADHD, as defined by the DSM-5 (Kao & Thomas, 2010).

This measure includes a validity scale in terms of positive and negative impression and inconsistency index (Kao & Thomas, 2010). Some of the weaknesses of this measure include the subjectivity of the participants and the fact that is only available in English and Spanish (Kao & Thomas, 2010). This measure has unfortunately not been normed for South Africa, and no data is available on its reliability in the South African context.

The questionnaire was comprised of statements about the child's behaviour during the last month, which needed to be rated from 'not true at all' to 'very much true' (See Appendix A) and takes approximately ten minutes to complete.

The 'CONNERS 3<sup>rd</sup> Edition<sup>TM</sup> Parent Short form (Conners 3<sup>TM</sup>- P (S))' consisted of 45 items and includes the following six scales that will be used to determine the ADHD symptoms:

- Inattention (IN)
- Hyperactivity/impulsivity (HY)
- Learning problems (LP)
- Executive functioning (EF)
- Defiance/aggression (AG)
- Peer relations (PR)

The 'CONNERS 3<sup>rd</sup> Edition<sup>TM</sup> Parent Short form (Conners 3<sup>TM</sup>- P (S))' includes its own scoring system that takes into consideration the age and gender of the child.

## **Procedure**

The recruitment of participants was done in two ways, through the University of Cape Town's Child Guidance Clinic (CGC). The first way was to directly ask current clients who were receiving group or individual treatment at the CGC, when they were in the premises, to participate. The second way was to contact clients that were on the CGC database. These clients had participated in another study at the clinic. Both groups of participants had given a signed agreement that they could be contacted for any future research studies.

Each potential participant was given a letter of invitation (See Appendix B). If they agreed to take part in this research, an informed consent form was signed (See Appendix C). The parents were then given the questionnaires upon return of the consent form. They had the choice of completing the questionnaire at the Child Guidance Clinic or on their own time and

returning it within a week to the CGC. If the participants had to especially use transport with the sole purpose of completing the questionnaire, they received R40.00 (forty rands) for transport costs.

### **Challenges**

Originally, this research was designed in a slightly different way. In addition to the parents, teachers were supposed to complete the ‘CONNERS 3<sup>rd</sup> Edition<sup>TM</sup> Teacher Short form (Conners 3<sup>TM</sup>- T (S))’. This would have increased the reliability of this research and decreased the possible bias of the parents. Unfortunately, due to challenges in getting access to the schools this could not be done. In order to conduct research involving Western Cape school children, authorization from the Western Cape Education Department and the relevant school governing body was required. After significant delays, these authorizations were unfortunately not granted.

### **Statistical Analysis**

The data collected was first scored according to the CONNERS 3<sup>TM</sup> guidelines. The total scores, which reflected the parent’s rating of the child’s behaviour across different areas, were then entered in SPSS (Statistical Package for Social Sciences) software package for descriptive statistics. The data has been analysed in terms of ADHD symptoms. All symptoms have been compared to each other in terms of inter-correlation.

### **Ethical Considerations**

This study follows the guidelines for ethical approval by the Research Ethics Committee of the University of Cape Town Department of Psychology.

### **Consent, Voluntary Participation and Confidentiality**

Informed consent has been obtained from all participating parents. The participants have been ensured anonymity and confidentiality. In order to allow the parents access to the questionnaire’s results, they have been assigned a non-identifiable assessment number. All participants have been informed that they can withdraw from the study at any time without any negative consequences.

### **Risks and Benefits**

There are no particular risks to this study. The main benefit of this study for parents will be to have a free ADHD ‘assessment’ and to learn more about ASD. The parents will be able to know if they should be concerned or not about ADHD, after this project is handed in. If the questionnaire revealed that the child may have ADHD, the parents will be referred to a qualified professional for an official diagnosis at the Child Guidance Clinic.

### **Debriefing**

All participants have been thanked for their contribution. They have also been given the chance to ask any questions about the study and give their opinion on the further ASD studies that would be of interest to them. They have been given the contact details of the investigator for any further communication on the study.

After the end of the study, all participants will receive the study’s findings. The parents will have the opportunity to have access to their questionnaire’s results and communicate them to their psychologist and other professionals. However no other party will have access to the individual results. Parents who wish to have an official diagnosis of ADHD will be referred the Child Guidance Clinic and the Red Cross Children’s hospital for further assistance.

## **Results**

### **Raw scores and descriptive statistics**

The raw scores for each participant were generated with the scoring guidelines of the ‘CONNERS 3<sup>rd</sup> Edition™ Parent Short form (Conners 3™- P (S))’. Table 3 represents the descriptive statistics relating to the raw scores. The minimum and maximum possible scores for each symptom’s scale were 40 and 90. In all scales, except the executive functioning scale, at least one participant reached the maximum. Scores above 65 are considered high scores for the specific symptoms they represent.

Table 3

*Descriptive statistics*

	N	Range	Minimum	Maximum	Mean	Std. Deviation
IN	8	47	43	90	74	16
HY	8	36	54	90	75	13
LP	8	50	40	90	58	17
EF	8	43	40	83	63	13
AG	8	44	46	90	67	19
PR	8	38	52	90	77	15

The numbers of scores above the threshold (Scores of 65 and above) for each participant and for each symptom are displayed in Table 4 and Table 5. All participants, except one, exhibited at least two ADHD symptoms, always including inattention and hyperactivity/impulsivity. Six of the participants displayed at least half of the symptoms investigated. 75% of the participants showed signs of peer relation problems. Half of the participants exhibited signs of defiance/aggression. Only one participant did not reach the threshold for any symptom. There seems to be a high co-morbidity between ASD and ADHD.

Table 4

*Number of high scores per participant*

Participants	Scores above 65
1	5
2	5
3	0
4	4
5	3
6	3
7	6
8	2

Table 5

*Number of high scores per symptom*

	IN	HY	LP	EF	AG	PR
Number of scores above 65	7 (88%)	7 (88%)	2 (25%)	3 (38%)	4 (50%)	6 (75%)

**Intercorrelation**

Table 6 reflects the intercorrelation happening between the various ADHD symptoms found in the sample. There is not a lot of intercorrelation between the various ADHD symptoms. However, inattention and learning problems are highly correlated,  $R=0.721$ ,  $p=0.043$ . The relatively high correlation between executive functioning issues and peer relations problems is at the edge of significance,  $R=0.691$ ,  $p=0.058$ .

Table 6  
*Intercorrelation between ADHD symptoms in Children with ASD*

		IN	HY	LP	EF	AG	PR
IN	Pearson Correlation	1	.294	<b>.721</b>	.304	.195	.604
	Sig. (2-tailed)		.480	<b>.043</b>	.464	.643	.113
HY	Pearson Correlation		1	.016	-.007	.651	.229
	Sig. (2-tailed)			.970	.986	.080	.585
LP	Pearson Correlation			1	.521	-.260	.614
	Sig. (2-tailed)				.185	.534	.106
EF	Pearson Correlation				1	.313	<b>.691</b>
	Sig. (2-tailed)					.450	<b>.058</b>
AG	Pearson Correlation					1	.156
	Sig. (2-tailed)						.713
PR	Pearson Correlation						1
	Sig. (2-tailed)						

**Limitations**

There are three major limitations to these research findings. The first one is the small size of the sample used. This clearly impacts the validity and reliability of the statistical findings, as they may not be representative of the population. The second issue is the problem of subjectivity of the participants. The ADHD symptoms of children have only been described by one of the parent and have not been checked in other settings and by other persons who know the children. A professional clinical assessment would probably be much more reliable, however at this level the researcher was not able to perform this task. The last limitation of this research is the restricted age of the children, namely six-years old and seven-years old. This might have impacted on the co-occurrence of specific ADHD symptoms.



### **Discussion**

From these findings, it is clear that the majority of children in the sample exhibited a high amount of ADHD symptoms. The majority of participants reported the main criteria for an ADHD diagnosis, namely: inattention and hyperactivity/impulsivity. In comparison with previous research findings, the rate of ADHD symptoms in children in this study is 88%, which is higher than any other findings. The closest findings were those of Joshi et al. (2010), who reported 83% of co-occurrence rate for a sample of 217 people.

88% of the sample reported symptoms of hyperactivity/impulsivity, however previous research findings did not exceed 8,5% of hyperactive/impulsive ADHD type (de Bruin, Ferdinand, Meester, de Nijs, & Verheij, 2006; Gjevik et al., 2010; Leyfer et al., 2006; Mattila et al., 2010). 88% of the sample reported inattention symptoms. This result also seems high compared with the previous findings of inattentive ADHD type that were comprised between 14,9% and 32% (de Bruin, Ferdinand, Meester, de Nijs, & Verheij, 2006; Gjevik et al., 2010; Leyfer et al., 2006; Mattila et al., 2010).

The second hypothesis: Children with Autism Spectrum Disorder suffer specifically from peer relation problems, seemed to be accepted as 75% of children were rated as having peer relationship problems. Peer relation issues are also a symptom of ASD (American Psychological Association, 2013). This could also be explained by the deficits in social communication, social interaction, which are symptoms of ASD. These symptoms are associated with lack of interaction and less successful encounter in children with ASD (Guralnick, Connor, Hammond, Gottman & Kinnish, 1996).

Inattention and learning problems were highly correlated. This finding was expected. The correlation might be a causal relationship, as inattention has been linked to memory problems and learning difficulties (Huang-Pollock, Maddox & Tam, 2014; Karatekin, White & Bingham, 2009; Saemi, Porter, Wulf, Ghotbi-Varzaneh & Bakhtiari, 2013).

50% of the sample reported high rates of defiance/aggression symptoms. This finding is not surprising, as many children with ASD suffer from irritability and aggression; and this seems to be the main reason why parents seek treatment for their children (Robb, van den Anker & Robb, 2010). Aggression toward others and themselves, tantrums as well as mood

swings seem to be common symptoms of children with ASD (Gabriels, Cuccaro, Hill, Ivers & Goldson, 2005; Johnson & Myers, 2007). Aggression in children with ASD is an important aspect to consider, as it can often lead to hospitalizations (Robb, van den Anker & Robb, 2010). In the present study, peer relation problems and defiance/aggression were not correlated,  $R= 0.156$ ,  $p=0.713$ . This finding is very surprising, as previous research has revealed that aggression and peer relation issues were related (Crick, 1996; Crick & Grotpeter, 1995).

Finally, the least common symptom was learning problems. This finding might be explained by the young age of the children in the sample and the fact that most of them did not attend a school.

### **Conclusion**

The present research provided us with the first findings on the co-occurrence of ADHD symptoms in children with ASD. High co-occurrence rates of ADHD symptoms and ASD were found. The parents of children with ASD who participated in this study rated their children as suffering predominantly from inattention, hyperactivity/impulsivity and peer relation problems. The least common symptom was learning problems. However due to the high limitations of this research, it is important to consider the findings with caution. Similar research should be done on a much larger scale. Another consideration would to do further research comparing the rates of ADHD symptoms in children with ASD and those who do not suffer from ASD.

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Appendix A

CONNERS 3<sup>rd</sup> Edition™ Parent Short form (Conners 3™- P (S))

Rating:

In the past month, this was...

0 = Not true at all (Never, seldom) 2 = Pretty much true (Often, Quite a bit)

1 = Just a little true (Occasionally) 3 = Very much true (Very often, Very frequently)

1. Forgets to turn in completed work.	0	1	2	3
2. Is perfect in every way.	0	1	2	3
3. Fidgets or squirms in seat.	0	1	2	3
4. Is one of the last to be picked for teams or games.	0	1	2	3
5. Restless or overactive.	0	1	2	3
6. Does not know how to make friends.	0	1	2	3
7. Runs or climbs when he/she is not supposed to.	0	1	2	3
8. Cannot grasp arithmetic.	0	1	2	3
9. Is difficult to please or amuse.	0	1	2	3
10. Needs extra explanation of instructions.	0	1	2	3
11. Is hard to motivate (even with rewards like candy or money).	0	1	2	3
12. Makes mistakes.	0	1	2	3
13. Acts as if driven by a motor.	0	1	2	3
14. Starts fights with others on purpose.	0	1	2	3
15. Has trouble getting started on tasks or project.	0	1	2	3
16. Is happy, cheerful, and has a positive attitude.	0	1	2	3
17. Doesn't pay attention to details; makes careless mistakes.	0	1	2	3
18. Has trouble keeping friends.	0	1	2	3
19. Bullies, threatens, or scares others.	0	1	2	3
20. Loses things (for example, schoolwork, pencils, books, tools, or toys).	0	1	2	3
21. Tells lies to hurt other people.	0	1	2	3
22. I cannot figure out what makes him/her happy.	0	1	2	3
23. Threatens to hurt others	0	1	2	3
24. Is constantly moving.	0	1	2	3
25. Has trouble with reading.	0	1	2	3

## Co-occurrence Of ADHD Symptoms in a Sample of Children with Autism Spectrum

Disorder.	24			
26. Is angry and resentful.	0	1	2	3
27. Has a short attention span.	0	1	2	3
28. Excitable, impulsive.	0	1	2	3
29. Cannot do things right.	0	1	2	3
30. Has trouble concentrating.	0	1	2	3
31. Tells the truth; doesn't even tell "little white lies".	0	1	2	3
32. Has trouble organizing tasks or activities.	0	1	2	3
33. Is fun to be around.	0	1	2	3
34. Inattentive, easily distracted.	0	1	2	3
35. Is messy or disorganized.	0	1	2	3
36. Spelling is poor.	0	1	2	3
37. Is patient and content, even when waiting in a long line.	0	1	2	3
38. Has no friends.	0	1	2	3
39. Does not understand what he/she reads.	0	1	2	3
40. Behaves like an angel.	0	1	2	3
41. Has trouble keeping his/her mind on work or on play for long.	0	1	2	3
42. Has to struggle to complete hard tasks.	0	1	2	3
43. Does not get invited to play or go out with others.	0	1	2	3

### Additional Questions

44. Do you have any other concerns about your child? \_\_\_\_\_

45. What strengths or skills does your child have? \_\_\_\_\_



Appendix B  
Parents' invitation letter

**Invitation letter**

**University of Cape Town**

Invitation letter to participate in a research study: The Co-occurrence of Attention Deficit Hyperactivity Disorder Symptoms in a Sample of Western Cape Children with Autism Spectrum Disorders.

Dear parent,

You are invited to participate in a research study conducted by Gaëlle Lullien (Honours in psychology student) and Dr. Nokuthula Shabalala from the Department of Psychology at the University of Cape Town.

The purpose of this study is to gain more information on the co-occurrence of Attention Deficit Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder in South Africa.

**Study procedures**

If you decide to participate in this study, you will be given a questionnaire to complete about your child. This takes approximately 10 minutes and can be done on your own time. You will have a maximum of one week to complete the questionnaire and return it to the Child Guidance Clinic.

**Possible risks and benefits**

There are no specific risks involved in this study.

The benefit of this study is a free Attention Deficit Hyperactivity Disorder assessment. Please note that this will not provide you with an official diagnosis. However, you will be able to know if you should be concerned or not about ADHD. If the questionnaire reveals that your child may have ADHD, we will refer you to a qualified professional for an official diagnosis.

### **Voluntary participation**

Participation in this study is voluntary. Your decision whether or not to participate in the study will not affect your relationship or your child's relationship with the Child Guidance Clinic.

You may refuse to answer specific questions. You may, also, withdraw from the study at any time, even after completing the questionnaire.

### **Confidentiality**

All information gathered from the questionnaires will be kept confidential and not disclosed to any outsider, including the teachers. You will be assigned a non-identifiable number that will only be accessible by the researchers. The research report will also not include any information that would lead to your identification.

### **Study findings**

Upon completion of the study, end of October 2014, you will be given the general study report. You will also be able to have your child's results, if you wish to. Please note that the individual results will not be provided to a third party.

### **Questions**

You may direct any study-related questions or concerns to the researchers:

Gaëlle Lullien: LLLGAE001@myuct.ac.za or 0791621908

Dr. Nokuthula Shabalala: Nokuthula.shabalala@uct.ac.za or 021650-3908

Any concerns or issues with the study can also be directed to the psychology department at the University of Cape Town, to:

Ms. Rosalind Adams 021 650 3417

For further psychological assistance about Autism Spectrum Disorder and Attention Deficit Hyperactivity Disorder, please contact:

- Autism Western Cape: 0727799726
- Red Cross War Memorial Children's Hospital: 0216585111
- Tygerberg Hospital: 0219384911

Appendix C  
Parents' informed consent form

**Consent Form**

**University of Cape Town**

Consent to participate in a research study: The Co-occurrence of Attention Deficit Hyperactivity Disorder Symptoms in a Sample of Western Cape Children with Autism Spectrum Disorders.

Dear parent,

You have been invited to participate in a research study conducted by Gaëlle Lullien (Honours in psychology student) and Dr. Nokuthula Shabalala from the Department of Psychology at the University of Cape Town.

The purpose of this study is to gain more information on the co-occurrence of Attention Deficit Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder in South Africa.

**Study procedures**

If you decide to participate in this study, please fill in and sign page 3, and return the entire document to the Child Guidance Clinic. You will be given a questionnaire to complete about your child. This takes approximately 10 minutes and can be done on your own time. You will have a maximum of one week to complete the questionnaire and return it to the Child Guidance Clinic.

**Possible risks and benefits**

There are no specific risks involved in this study.

The benefit of this study is a free Attention Deficit Hyperactivity Disorder assessment. Please note that this will not provide you with an official diagnosis.

### **Voluntary participation**

Participation in this study is voluntary. Your decision whether or not to participate in the study will not affect your relationship or your child's relationship with the Child Guidance Clinic.

You may withdraw from the study at any time, even after completing the questionnaire.

### **Confidentiality**

All information gathered from the questionnaires will be kept confidential and not disclosed to any outsider, including the teachers. You will be assigned a non-identifiable number that will only be accessible by the researchers. The research report will also not include any information that would lead to your identification.

### **Study findings**

Upon completion of the study, end of October 2014, you will be given the general study report. You will also be able to have your child's results, if you wish to. Please note that the individual results will not be provided to a third party.

### **Questions**

You may direct any study-related questions or concerns to the researchers:

Gaëlle Lullien: LLLGAE001@myuct.ac.za or 0791621908

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Any concerns or issues with the study can also be directed to the psychology department at the University of Cape Town, to:

Ms. Rosalind Adams 021 650 3417

For further psychological assistance about Autism Spectrum Disorder and Attention Deficit Hyperactivity Disorder, please contact:

- Autism Western Cape: 0727799726
- Red Cross War Memorial Children's Hospital: 0216585111
- Tygerberg Hospital: 0219384911

I have read the consent form and understand the study, its potential risks and benefits.  
I hereby voluntarily consent to my participation in the research study.

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Please return this form to the Child Guidance Clinic.