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Evidence for measurement of overlap between Autism Spectrum Disorder and Attachment Disorder

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Submitted to Swansea University in fulfilment of the requirements for the Degree of Doctor of Philosophy

Swansea University

2022

Abstract
The extent of overlapping presentation within Attachment Disorder (AD) and Autism Spectrum Disorder (ASD) gives rise to considerable difficulties for the separation of the disorders. In order to ascertain the impact of the difficulties in differentiating the symptomologies on diagnosis, this study was designed to seek to measure the presenting behaviours of children using psychometric tools with a view to contributing to the understanding of the commonalities, differences and the relationship between ASD and AD.
Chapter 2 explored that a percentage of children with ASD meeting the criteria for AD. It was possible to discriminate between the presence or absence of ASD, and of AD, by the presence of all behavioural problems but ASD and AD could not be discriminated from one another either when predicting clinical diagnosis or psychometric classification. There was an indication that when using clinical diagnosis, hyperactivity was more predictive of AD than ASD. The research gave strength to the argument that overlap between ASD and AD exists.
Chapter 3 considered overlaps and differences between parent reports of ASD and AD, and examined profiles of children fulfilling criteria for ASD and AD in terms of behaviour problems and attachment styles. There was a large overlap in the reported diagnoses and classifications of ASD and AD. Peer problems predicted a reported ASD diagnosis and conduct problems predicted a reported AD diagnosis. Attachment styles differentiated the diagnosis of those with ASD showing more ambivalent, and those with AD more avoidant and anxious, attachment styles.
Chapter 4 compared the similarities and differences in parenting stress and behaviours in parent reports of ASD and AD. Parents of children with AD reported greater levels of parenting stress than parents of children with ASD. Parents of children reaching criteria for both disorders reported the greatest levels of parenting stress. Limit setting was poorest in parents of children with both classifications, followed by parents of children with AD and then ASD. Limit setting mediated the relationship between parenting stress and child behaviour problems for parents of children with ASD, but not for parents of children with AD.
Chapter 5 investigated the differences between ASD and AD using Executive Function (EF) tasks in terms of their clinical diagnoses and psychometric traits, on four EF tasks (Wisconsin Card Sorting Task (WCST), Hungry Donkey, Stroop, and Tower of London). Limited difference between the EF performances of individuals with ASD and AD was noted (there was slightly better AD performance on cold EF tasks, and slightly better performance for ASD on hot tasks).
Chapter 6 examined whether EF mediated the relationship between either ASD or AD, and behaviour problems, examined in terms of their AD and ASD traits, their levels of behaviour problems, and performance on four EF tasks (WCST, Hungry Donkey, Stroop, and Tower of London). There were positive correlations between levels of ASD and AD, and between both of these traits and behaviour problems. However, there was no relationship between these traits and EF and no relationship between EF and behaviour problems.

Declarations and Statements

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

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Acknowledgements

I wouldn't have been able to complete this PhD without the support of some special people. I would also like to thank the staff and school who supported and enabled my research and to the pupils who participated.

A special thank you to my supervisor Phil Reed. The depth of warmth and support that Phil has given has enabled a way through my own journey. This includes Lisa, who let me in to being me. Thank You.

For Rob Keasley, for his patience and his ways, Sam for being Sam. For just being Sam is more than enough… And always for my Debs, for loving all versions of Joanna, regardless.

Finally, dedicated with all my love for Andrew. For without Andrew, we would not have Edward and Elizabeth. And without Edward and Elizabeth we would not have our story.

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Abbreviations

AD	Attachment Disorder
ADHD	Attention Deficit Hyperactivity Disorder
ADI-R	Autism Diagnostic Interview - Revised
ADOS	Autism Diagnostic Observation Schedule
APA	American Psychiatric Association
ASD	Autism Spectrum Disorder
CP	Child Protection
DAD	Disinhibited Attachment Disorder
DISCO	Diagnostic Interview for Social and Communication Disorders
DSED	Disinhibited Social Engagement Disorder
DSM	Diagnostic and Statistical Manual of Mental Disorders
EF	Executive Function
FFSF	Face to Face Still Face
GCR	Greatest Characteristic Root
GWAS	Genome-Wide Association Studies
HST	Honest Significance Test
ICD	International Classification of Diseases
IQ	Intelligence Quotient
NHS	National Health Service
NICE	National Institute for Clinical Excellence
PCRI	Parent-Child Relationship Inventory
PDD	Pervasive Developmental Disorders
PDD-NOS	Pervasive Developmental Disorders - Not Otherwise Specified
PEBL	The Psychology Experiment Building Language
PSI	Parenting Stress Index
RAD	Reactive Attachment Disorder
RADQ	Randolph Attachment Disorder Questionnaire
SCQ	Social Communication Questionnaire
SD	Standard Deviation
SDQ	Strengths and Difficulties Questionnaire
TOL	Tower of London
ToM	Theory of Mind
WCST	Wisconsin Card Sorting Task
WHO	World Health Organisation

The day to day collision of growing up has an impact on every brain differently.

Chapter One : Introduction and Literature Search

1.1. Introduction

The aim of this thesis is to investigate the presentation and overlap of symptomology of individuals with Autism Spectrum Disorder (ASD) and Attachment Disorder (AD). It will attempt to determine differentials in diagnosis and suggest either refinements of the differentials or alternative explanations of the diagnostic presentations.

1.2. Autism Profile

Current estimates of the prevalence of ASD generally fall between 0.9 and 1.5% of the general population (Baird, et al., 2006; Baron-Cohen, et al., 2009); though some researchers have given estimates of over 3.5% in males and 1.5% in females (Elsabbagh, 2012). Russell, et al. (2021) reported a 787% exponential increase in recorded incidence of autism diagnoses between 1998 and 2018 in the UK, with the greatest rises in diagnostic incidence among adults. There is a clear impression that there is an increase in the prevalence of ASD, this can be attested to an increased level of diagnosis (Reed, 2016; Russell, et al., 2021).

1.3. History of Autism

In 1911, the term 'autism' was coined by Eugen Bleuler to describe a feature of schizophrenia in *Dementia Praecox*, the term was borrowed from the Greek word *autos*, meaning 'self', to suggest a state of "*detachment from reality together with the relative and absolute predominance of the inner life."* (Bleuler, Dementia praecox or the group of schizophrenias, 1911, 1950, p. 63). The etymology of the word 'autism' is accredited to Bleuler and Freud, who utilised the phrase 'autoerotism' in 1905 as a descriptor for the self-soothing hallucinatory behaviours observed in early infant development before external reality was available for the child (Moskowitz & Heim, 2011). Bleuler considered autism to have the same pathology as schizophrenia and as such, would be present in all human capacities as a presentation of normal fantasies with an exaggerated expression of this phenomenon. It was suggested that those experiencing such symptoms were regarded as being unable to engage with reality. However, Bleuler's descriptor of an internal symbolic model was not clearly

observable, identifying the model as that of infantile expression of the avoidance of unsatisfying realities and replace them with fantasies and hallucinations (Freeman, 1999).

Theodore Heller conducted a study in 1908 (Manjunatha, 2017), with a report of *Dementia Infantilis* in a group of six children, which increased to twenty-eight children in total over a period of 25 years (Smith, 1958). Heller reported normal developmental pathways in these children until they were around three or four years of age and then identified that a developmental change presented in terms of behaviour, language capacity and adaptive behaviours. Moeitz Tramer (Piersel, 1979) offered the first description of elective mutism, where he identified the shift in language development similar in effect to that described by Heller. Tramer also sought to identify a potential environmental impact effect on the child.

Developmental disability, as a concept, was promoted within Henry Herbert Goddard's book in 1912, *The Kallikak Family* (Goddard, 1912) which was followed on in 1914 by Sigmund Freud's concept of primary narcissism (Freud, 1914) as a description of autism as a norm for the newborn. Characteristics of autism, which could be identified as the precursors to modern diagnostic criteria, started to be identified in the 1920's. Avgusta Yarmolenko, a Soviet Child Psychologist penned a paper in 1926, *Change of environment as a factor determining an anomaly of behaviour (autism in uncontrolled children)*. This historic paper identifies characteristics that are comparable to the diagnostic criteria of ASD as recognised today; inhibited behaviour with restricted and limited repertoire of responses, expressions of "irradiated reactions" meaning responses that are generally suppressed or are indicative of over selective patterns of response and weak central coherence, and the children were said to demonstrate "static co-ordination" of hand movements with "dynamic co-ordination" of active movement, again reflective of fine and gross motor skills (Yarmolenko, 1926). Contemporary research (Tanner & Dounavi, 2020) identifies the connectivity to fine and gross motor skills as indicators of ASD, reinforcing the relevance of Yarmolenko's observations (Yarmolenko, 1926). In 1926 Grunya Sukhareva published a detailed description of autistic traits that match closely with those later presented in the DSM-5 (American Psychiatric

Association, 2013), but as a citizen of the USSR, her work has remained obscure in the West (Monouilenko & Bejerot, 2015).

Leo Kanner in 1943, *Autistic Disturbances of Affective Contact*, reported 11 cases, all exhibiting the same behavioural signature. Kanner (1943), working from the USA and Hans Asperger (1944), Austria, independently published work that laid the foundation of the presentation of ASD to contemporary understanding of ASD. Kanner in 1943, published a report of his observations of 11 children who displayed difficulties in social routines, impaired ability to adapt to changes in routines, good memory, sensitivity to stimuli, difficulties with spontaneous activities and echolalia (tendency to repeat speaker's words). In 1944, Asperger published a definition of autism based on his own observations of 4 children who had difficulty with social integration. Asperger's (1944) definition was similar to that of Kanner (1943), however Asperger (1944) used the phrase 'autistic psychopathy,' Asperger described the syndromes of four children described as having 'a lack of empathy, little ability to form friendships, one-sided conversation, intense absorption in a special interest and clumsy movements.' The expression of 'little professors' syndromes' was also used to explain the behavioural patterns, although this did not include echolalia. From children that Kanner observed, some progressed to great academic acclaim however, there is no reflection on their functional capacity.

The suggestion of a biological cause of autism traits was first suggested by Bernard Rimland in 1964. Rimland's paper *Infantile Autism* made the first case for the biological causation of autism and defended parents against the case of psychogenesis. However, Bruno Bettelheim countered this with his book in 1967, *The Empty Fortress,* focusing on parenting as causation for autism.

In 1980, Autism appeared for the first time in the DSM-III (American Psychiatric Association, 1980), *Infantile Autism* was listed along with three other versions of *Pervasive Developmental Disorders*. Lorna Wing published her seminal account of Asperger's Syndrome which resulted in its inclusion in the DSM IV (American Psychiatric Association, 1994) in 1994. During the DSM V (American Psychiatric Association, 2013) period, ASD was regarded as a developmental condition with a

tripartite diagnostic category of social reciprocity, language, with restricted and unusual interests and activities (Pellicano, 2010). ASD was one of the five pervasive developmental disorders (PDD), characterised by widespread abnormalities of social interactions, communication, and severely restricted interests and highly repetitive behaviour (American Psychiatric Association, 1994). Of the five PDD forms, childhood autism and Asperger syndrome was regarded as closest to ASD in signs and likely causes; Rett syndrome and childhood disintegrative disorder shared several signs with ASD but were considered to possibly have unrelated causes; PDD not otherwise specified (PDD-NOS; also called atypical ASD) was diagnosed when the criteria were not met for a more specific disorder. The terminology of ASD was varied; Asperger syndrome and PDD-NOS were often called the autism spectrum disorders (ASD) or sometimes the autistic disorders. However, ASD itself was often reported as autistic disorder, childhood ASD or infantile ASD.

The DSM-5 in 2013 introduced the definition of Autism Spectrum Disorder by removing the subgroups and in so doing, the removal of Asperger's Syndrome. This caused some controversy with the Asperger community who felt disregarded by the broad stroke criteria and unrepresented in the diagnostic literature (Giles, 2014).
No diagnostic subtypes were listed; instead, the focus became to measure the core features of autism spectrum disorder using severity scales including social communication, fixed interest and repetitive behaviour. Each scale ranged from 1 to 3, with higher scores indicating an individual's core deficits and greater severity of impairment.

1.4. Autism Definitions

A contemporary clinical diagnosis of autism is based on the Diagnostic and Statistical Manual (DSM-5 of the American Psychiatric Association (APA, 2013). The diagnostic premise being that autism presents as a deficit model and therefore a lack of capacity is inherent in the condition. The diagnostic language employed suggests an alignment between autism and limitation and inabilities described in other conditions. The notion of able-bodiedness, as defined by Siebers (2008), defines this as the baseline for humanness and sets a clinical tone, which potentially denies human status to those with differences (Siebers, 2008). ASD has a broad

range of unique abilities (Lai & Szatmari, 2020), which are not a focus within the recognition of the presence of differences, clinical direction seeks to associate with deficits. Whereas, the strengths such as hyperlexia (early reading), logical thinking, specific memory skills and the capacity to excel within academic areas (e.g. science, engineering, technical and logical domains) are noted as strong functional capacities, which distract from diagnosis. This further compounded by gender differences, where both the strengths and difficulties profile of autism are less consistent (Lai & Szatmari, 2020). The severity of autistic symptoms and more complex behavioural and cognitive symptoms need to be present in a female group for a diagnosis of ASD to be made using the current clinical criteria (Bargiela et al., 2016). Dworzynski et al. (2012) compared groups with similar levels of autistic traits, indicating that girls need to have either more behavioural problems or significant intellectual disability, or both, to be diagnosed (Bargiela et al., 2016). Hence, females with a higher IQ or less severe symptoms stand at a risk of missing a diagnosis (Van Wijngaarden-Cremers et al., 2013). Diagnostic criteria for autism has a known bias in clinical samples with an underrepresentation of female participants (Lai & Szatmari, 2020), Which in turn reinforces the male bias in diagnostic tools and instruments, perpetuating the exclusion of females in the way autism is both defined and diagnosed (Haney, 2016). The expansion of understanding of the presentation and underlying causation of ASD, with a reference to different ways of the brain functioning and interpreting variance with a bias awareness became apparent in the development of neurodiversity.

1.4.1. Autism as Neurodiversity

Neurodiversity made its first appearance in 1998 when Judy Singer, an Australian sociologist, (Singer, 1998), sought to put forward her argument for the social model of disability, which some contrast to the medical model. The medical model of disability identifies disability as a health condition that requires intervention from medical professionals. Disability is identified as different on a normal to abnormal spectrum. The medical model of disability has a focus on deficits, whereas the social model seeks to identify disability on a continuum with the implication that the physical, attitudinal, communication and social environment must change to enable people living with impairments to participate in society on an equal basis with others.

A social model perspective does not discount impairment or seek to detract from the impact on the individual. However, it does confront the physical, attitudinal, communication and social environment to accommodate impairment as an expected incident of human diversity.

Autism is increasingly 'viewed as on a spectrum' of human neurological diversity, with the emphasis on alternative thinking styles. The range of differences can be significant- from the ability to give greater attention to detail and focus, the heightened capacity for recall of visual and aural information, and alternative sensory abilities such as synaesthesia and enhanced perception of environment. This suggests that a framework of neurodiversity may identify alternative perception and thought processes. The basis for this could encourage expression of autism to be understood through a biopsychological function, as opposed to unilateral deficit. The difference model would give value to autistic process as progressive, less of a deficit model with impairment at its core.

Proponents of the neurodiversity model of understanding ASD, challenges the medical model's focus on disability focus. Though seeking to define autism as a facet of personal identity, a contrast between the medical model and the neurodiversity movement was researched by (Kapp et al., 2013). This research found that self-identification as autistic alongside neurodiversity awareness was associated with the perception of ASD as an identity that needed no cure. When considering how individuals with ASD perceive their own diagnosis Fletcher-Watson, et al. (2017), ascertained the degree to which autistic and non-autistic individuals identified ASD awareness, and the rate at which ASD was associated as a disability over difference. This research added to a growing body of evidence that people with ASD may often have enhanced understanding of autism in comparison to non-autistic individuals (Komeda, 2015). This movement seeks to resist against a medical construct of ASD (Kapp et al., 2013). Jaarsma and Welin (2011) however, suggested that the understanding of the range of neurodiversity, inclusive of low-functioning as well as high-functioning ASD, is challenging. Autism may also be understood in a cultural or social context (Perepa, 2014). However, this may only be clearly defined by twentieth century levels of measurement and data collection. While there have

always been individuals with autism, the contemporary need for the norm to be standardised means that historically there was a lesser need for testing and defining the condition (Nadesan, 2005).

1.4.2. Autism as Neurobiological

The etiopathogenesis of ASD is still basically unknown (Marotta, et al., 2020). When considering ASD from a neurobiological standpoint it is the connectivity between brain regions that offers insight into the condition, which may offer insight into the difficulties within diagnosis and contribute to a more comprehensive insight into the causation of difficulties inherent in the clinical diagnostic process (Chmielewski et al., 2015). This may occur due to weakened connections, a deficit in connections or organisational issues. It has been found that both environmental and genetic factors can increase the risk of ASD (Chaste, 2012). The in-utero development of the foetus may be where the connection is first challenged, or later during developmental stages. The influence between genetics and environmental factors can vary due to an individual's experiences. As such, functional impact with greater externalising behaviours and emotional expression can be a crucial component in deciding the variance in disruption and response to environmental cost. Internalising and externalising behaviours may have heterogeneous patterns across childhood. Different characteristics of children's environments may influence behavioural profiles, with experiences of poverty and maternal depression having the strongest and most consistent associations with children's behaviours at all ages (Evans & Wachs, 2010).

The insult of such events may have a profound impact on the development of the brain, corresponding with the timing of the developmental window (Miskolczi et al., 2019). Diagnosis of ASD is dependent on observable behavioural manifestation of differences. It is further thought that the neurochemical events which occur during the development of the central nervous system relate to the pathophysiology of ASD (Dadalko & Travers, 2018) intrauterine development have to be considered alongside this research to further understand the implication later in the behavioural discussion relating to the child (Verny, 1982).

Consideration must be given to the epigenetic factors associated to the heritable changes in gene activity, which are not caused by changes in the DNA sequences. Endocrine-disrupting chemicals are thought to interact with the neurodevelopment of autism (Moosa et al., 2018). Neurotransmission dysregulations in autism are suggested to be associated with aberration within gamma aminobutyric acid (GABA) glutamate, serotonin, dopamine, N-acetyl aspartate, oxytocin and arginine-vasopressin, melatonin, vitamin D, orexin, endogenous opioids, and acetylcholine could contribute to the onset of ASD. However, such biological interactions remain unfathomable as yet due to the breadth of heterogeneity of the condition (Marotta, et al., 2020). Research also suggests that risk to genetic integrity may be further exasperated due to environmental factors. These may include parental ethanol exposure, paternal age, digestive tract differences, oxidative stress, brain inflammation and early brain injury, particularly when considering the impact this has on the human chromosome responsible for ASD (Liberto, et al., 2020).

Research shows that the markers for ASD increase over the first two years of life, with observable behaviours demonstrating the presence of traits which may indicate ASD. Such behavioural patterns are particularly observable when social interactions are developing and expressing themselves (Ozonoff, et al., 2015). As such, atypicalities may be observed as sensorimotor, with the behavioural measures of social communication not being available due to age related developmental presentation (Coll et al., 2020). Further research suggests that ASD symptomology beyond the sensorimotor indicators may be perceivable after the age of 10 months (Ozonoff, et al., 2015). These are not however identifiable in discrete anatomical regions but rather have a widespread presentation (Hazlett, 2017). According to (Johnson et al., 2021) there is requirement to further explore atypicality in behavioural expression of phenotypes as a whole brain networking consideration, as there is not an identical outcome in every individual (Zahibi, et al., 2019).

Traits of ASD present in a range of patterns at various age ranges (Hong, et al., 2020), with the combination of such interactions, suggestive of symptoms of risk and protective markers providing a range of possible outcomes (Astle & Fletcher-Watson, 2020), which could further inform the diagnostic menu of the overlap analysis. The

Anterior Modifiers in the Emergence of Neurodevelopmental Disorders (AMEND) framework (Johnson et al., 2021) explores the factors that predispose an individual to ASD and sought to find protective or resilient factors which may reduce, modify, or mediate the ASD symptomology through early interventions. Such factors may impact on clinically measurable ASD severity ratings (Johnson et al., 2021). It is also suggested that identification of time related development markers coupled with early detection and intervention could further modify outcomes providing clearer understanding of neurodevelopmental disorder overlap issues.

Foetal brain development is structured via a genetic sequence that can be influenced through biological or environmental factors (Wang et al., 2014). Foetal development may further be influenced by a plethora of alleles increasing the risk of ASD. Occurring when one or two alternative gene forms may lead to a mutation within a chromosome. The timing of such genetic variation has been positively correlated to changes to the structure of the cerebellum, resulting in a developmental sequence, which has been positively correlated to ASD (Limperopoulos, et al., 2008). This is significant as the cerebellum is an essential component within the development of social interaction. A second window of potential environmental risk is within the sensorimotor stage, where a lack of social or sensory stimuli will present as ASD symptomology (Wang et al., 2014).

The implication of genetics places individual at increased risk of presenting with ASD. This is apparent when considering the high level of heritability in ASD when compared to other neurodevelopmental disorders (Abrahams & Geschwind, 2008). In 2017 the heritability rating for ASD was revised to 83% from the previous 90% following a series of twin studies (Sandin et al., 2017), and contrasted greatly to the to the 38% heritability reported via the California twin study, this study found that fraternal twins, who shared the same environment before birth but have different DNA, were more likely to both have an autism spectrum disorder (ASD) than siblings who weren't twins (Sandin et al., 2017). This research went onto suggest that environmental insult was of minimal risk in terms of developing ASD, however it should be noted that this research was conducted via twin studies and subjects from a small community of families.

Contemporary research is still not fully able to ascertain accurately the genetic and non-genetic risk factors to ASD development. The Population-based Autism Genetics and Environment Study (PAGES) explored more severely affected individuals, chosen from a national, population-based sample of over 7,000 living individuals. This study subsequently reported that 40% of the genetic footprint for ASD remains unaccounted for (Connolly et al., 2016). The study focused on environmental variables such as paternal and maternal age, gestational history with phenotyping data of IQ, autism severity, family psychiatric history to measure the ASD liability. As yet, the final outcome of the study is unknown however, researchers are hopeful that data may offer a more informed clinical assessment of risk, prevention and care (Grove et al., 2019). Maternal factors such as age, metabolic syndrome, pre-pregnancy maternal antidepressant use have also been associated with an increased risk of ASD (Grove et al., 2019).

Genome-Wide Association Studies (GWAS) have identified genetic variants in ASD that are can either be inherited or caused by de novo mutations. This complex inheritance pattern does not follow the same routes of inheritance behaviours as may be observed in monogenetic disorders (Grove et al., 2019). Research also suggests that the molecular mechanism for disease may represent the signature deficit in both attachment and autism due to aberrant endogenous opioid binding of the μ-Opioid gene and this in turn may be responsible as a mediator for infant attachment behaviours (Machin & Dunbar, 2011).

1.5. Diagnostic Criteria ASD

To diagnose ASD, the ICD-11 (World Health Organization, 2020) criteria demands evidence of impairment in language development, social attachments, social interaction, or functional or symbolic play before the age of three years. Similarly, the DSM-5 (American Psychiatric Association, 2013) diagnosis for Autism Spectrum Disorder is described as a dyad of impairment. This is characterised through reciprocal social interactions, communication and the demonstration of restricted, repetitive repertoires of interests and activities. The DSM-5 diagnostic criteria for ASD also includes persistent deficits in social communication and social interaction

across multiple contexts. Requiring subjects to display restricted repetitive patterns of behaviours, interests or activities, with ASD severity being defined by such social communication impairments and restricted, repetitive patterns of behaviour.

In the United Kingdom, diagnosis for ASD is given through a multi-disciplinary diagnostic assessment, as there are no clearly identifiable biological markers, this assessment is made by observation alone. The observation team may be composed of numerous professionals which may include a paediatrician, a speech and language therapist and a specialist psychologist. Assessment criteria are defined by clinical guidance National Institute for Clinical Excellence (NICE), (NICE, 2018) Clinical Guideline 128 in England, Wales and Northern Ireland, and the Scottish Intercollegiate Guidelines Network (SIGN) Clinical Guideline 145 (NICE, 2018) in Scotland. The assessment includes reports from all settings with an autism-specific developmental and family history. Assessments are made across more than one environmental setting, utilising cognitive, communication, behaviour and mental health assessments. Assessment narratives are compiled by clinicians and assessed collectively by the diagnostic team to remove uncertainty of an ASD diagnosis (Hayes et al., 2020). This diagnostic binary considers both the visible and invisible presentation of ASD in a clinical setting, and other frequented environments. Due to the potential for subjects to mask typical ASD behaviour in clinical settings through previously learned appropriate social behaviour, the outcome has to provide a coherent narrative that is only explained as ASD (Hayes et al., 2020).

The DSM-5 and ICD-10 criteria for ASD, created the foundation for diagnostic tools such as the DISCO (Diagnostic Interview for Social and Communication Disorders), the ADI-R (Autism Diagnostic Interview - Revised), and the ADOS (Autism Diagnostic Observation Schedule). The diagnostic criteria form the basis for the diagnoses, facilitating the team and clinician's judgement on the outcome and diagnosis.

1.6. Development of Child Attachment

'Bowlbyism' refers to the impact of British psychologist, John Bowlby (1907 – 1990) and his work regarding attachment between the child and carer. Bowlby

suggested that deprivation of a warm, continuous relationship between a caregiver and child would evoke significant and irreversible mental health problems, due to Bowlby's research and promotion of attachment theory, parents were given improved access to children in hospital environments, and also resulted in the Curtis Committee Report on Child Care, which informed the 1948 Children Act.

Bowlby used the methodology of evidencing maternal deprivation and the impact on the child development. Using through statistical and social scientific studies he was able to document the observed child behaviour due to deprivation. However, it is important to acknowledge that Bowlby's studies occurred in a post war society where significant trauma was prevalent. Bowlby's findings were treated with scepticism from the psychoanalytic community, with Isaacs, Kein and Anna Freud's instinct theory (Isaacs, 1948) being vogue at the time.

Bowlby also utilised animal studies to inform his outcomes with the studies of Lorenz and Harlow further supporting the demonstrable impact of maternal deprivation. Harlow (1958) conducted research on monkeys reared in isolation from their mother, showing that they suffered emotional and social problems in older age. The monkeys were unable to form an attachment and as such grew up to be aggressive and had problems interacting with other monkeys. This gave weight to the model of mother love as natural and all essential, with no substitute being as effective. Mead (1962) however, asserted that there were methodological flaws in the research. It was suggested by Mead (1962) that there were issues with the sampling bias of the research, and quantitative data flaws. This implied an absence of insight into the population at large and as many of the subjects in Bowlby's research sample were children presenting with abnormal psychopathology, an imbalance of data collection had occurred. Bowlby was accused of not distinguishing between deprivation and privation, indicative of the complete lack of an attachment bond, rather than its loss. It was suggested by Mead (1962) for the findings of Bowlby's research to be validated, a sample of the general population was required in order to ascertain the incidence of separation experiences. To confirm the frequency with which these appear to cause damage, and the level of damage that was both serious and lasting, was necessary in a broader population (Mead, 1962). Bowlby wrote

about ‘partial deprivation’ giving leeway to interpretation being attributed to a broad definition of parent/ child dynamics. This argument has developed by Allen (2016) to position that attachment disorder should be removed from the clinical lexicon, as there is such a profound contemporary lack of agreement on their usage (Allen, 2016).

Current theories of attachment agree that secure attachment profiles in children are indicative of an internal working model. The ability of the child to perceive the caregiver or parent as available, which in turn allows for secure exploration of the environment, without the anxiety of checking for engagement or safety (Walsh et al., 2019) is indicative of a good internal working model of attachment. Attachment theory identifies the congruence and interaction of two behavioural systems; attachment and exploratory (Walsh et al., 2019). It is suggested that synchronicity of these systems is demonstrated in securely attached children (Bowlby, 1982; Weinfield et al., 2008). The opportunity for a child to explore from a safe base, allows the individual to explore more effectively. The child can demonstrate from these starting point stronger characteristics of readiness, and self-determination. A child from a secure base can display evidence of increased flexibility around perceived challenges (Sroufe, 2005). Thus there are four classifications of attachment patterns: secure, insecure-avoidant, insecure-resistant and disorganised (Ainsworth & Bell, 1981; Schuengel et al., 1999).

Figure 1-1 Attachment patterns

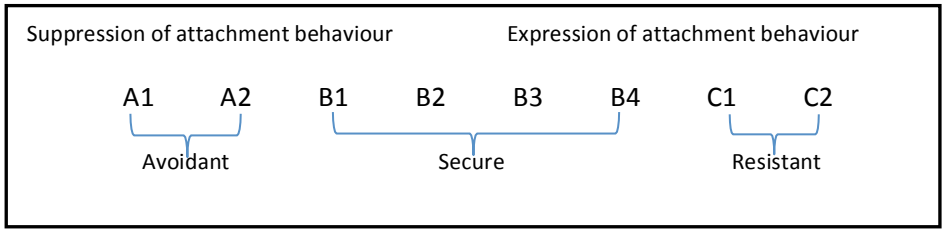


Figure 1-1 The continuum of attachment subgroups (reproduced from Prior & Glaser, 2006, p. 26)

As Figure 1-1 illustrates, three of the four attachment patterns have been constructed within bands, with A1 and C2 subgroups representing the more extreme ends of insecure attachment. According to this model, children who are classified as having A type attachment show avoidance behaviours. A1 children show themselves as

being consistently avoidant, whereas A2 children demonstrate a combination of avoidance and a degree of seeking behaviour. While predominantly secure, those classified as B1 or B2 show a degree of avoiding behaviour, with B1 children demonstrating a higher level of avoidance than those classified as B2. Children classified as having C type attachments are demonstrably angrier, with C1 children externalising this and C2 children expressing their needs in the form of helplessness. While predominantly secure in their attachments, children classified as B3 or B4 find separation more distressing and are more resistant during reunification with caregivers. B4 children show a greater degree of distress and resistance than B3 babies (Ainsworth et al., 1978).

Regulatory processes are grounded in the formation of attachment relationships, and then extended into the wider environment (Calkins & Hill, 2007). Attachment is emotionally driven, with the parent needing to be capable of supporting the child to engage with activities that can be difficult and challenging. Through effective modelling and support, the child will develop coping and performance strategies alongside persistence when potential failure and frustration. Caregiver ability to navigate tasks that are challenging, emotive or cognitive in tone are more effective when holding and coping strategies are also modelled alongside the task in hand (De Wolff & van Ijzendoorn, 2006). These findings are further indicative of development of effective executive function rehearsal and growth.

The successful reduction of negative child arousal behaviours evolves into a pattern of developed skills, giving capacity for the child to develop independence in their responses across a range of challenges. This then embodies neurobiological functioning, with emotional and behavioural regulation incorporated into more appropriate neurobiological functioning (Calkins & Hill, 2007).

1.6.1. Attachment Disorder

Reactive attachment disorder (RAD) is a relatively new diagnostic term, being first introduced in the DSM IV in 1980 (American Psychiatric Association, 1994). Further to this, in 1987 RAD was divided into inhibited and disinhibited subtypes.

The inhibited subtype classifies children who demonstrate no clear preference toward a caregiver, have reduced comfort-seeking behaviours, have low demonstration of positive affection, and emotional regulation fluctuates significantly. Inhibited symptoms are described in children that lack selective attachment and symptoms tend to represent disturbances in attachment. It has been suggested internalising behaviours are more indicative of inhibited patterns of disordered attachment, however the study that reported correlations between inhibition and internalising problems had a limited participation group (Gleason et al., 2011), this report further suggested that inhibited symptoms are have a low representation in subsequent studies for the post-institutionalised group and therefor is associated as being responsive to caregiving.

The disinhibited subtype classifies children who do not discriminate between know caregiver and strangers and externalising behaviours, with a suggestion that it is less responsive to caregiving (Chisholm, 2008). In 2013, the diagnosis was revised further with the DSM -5 referring to disinhibited attachment as a separate condition called disinhibited social engagement disorder (American Psychiatric Association, 2013). This condition refers to the disordered processes associated to a lack of secure attachment with a caregiver, it has similarities to RAD. Children with disinhibited social engagement disorder present as interacting with unfamiliar adults without expressing fear or anxiety and are cited as being able to interact and relate to a stranger with reduced defensive behaviour or concern for self-preservation.

The term attachment disorder (AD) will be used to denote the general concept of attachment in this research, while RAD, DAD, and DSED refer to the distinct disorders as described in the diagnostic manuals. Sroufe et al. (2005) in his research found only two or three out of one hundred and eighty children fitted categories of attachment disorders, and the prevalence was low. Upadhyaya et al. (2018) stated that RAD was rare at 6.38 per 10,000/10,000. For Gleason et al. (2011), the incidence of RAD cases treated in specialised healthcare services for severely neglected children in Eastern European orphanages found 4.6% of their children showed inhibited RAD and 31.8% disinhibited RAD.

RAD, as a failure to form normal attachments in early childhood, is differentiated from developmental disorders as a psychosocial condition. This may present as an individual's internal working models of attachment, the mental representation formed through a child's early experiences with their primary caregiver. This mental representation impacts on how the child functions in terms of relational connections and the development of attachment within their relationships and further impacting on interpersonal and behavioural interactions. The existence of an attachment infers behaviours from a stable propensity to seek proximity to and contact with a specific figure over time (Fraley, 2002).

Presentations of behaviours were classified by the studies of Mary Ainsworth's (Ainsworth et al., 1978), which through the utilisation of the Strange Situation Protocol designated specific patterns of avoidant, secure and anxious ambivalent behaviours within the attachment profile. During the first year of their lives, children form attachment relationships with their parents, permitting them to deal with stressful situations and negative emotions (Bowlby, 1982). During these stressful experiences, securely attached children will seek the parent for comfort and protection, and then return to exploring their environment (Ainsworth et al., 1978). Avoidant attached infants minimise the expression of any negative emotions, while ambivalently attached children maximize the expression of negative emotions, remaining angrily or passively focused on the parent at the expense of exploration. The category of disorganised attachment was later deemed indicative of severe mistreatment (Main & Solomon, 1986), however, further suggested that it is not just abusive parenting that evokes attachment profiles. Experiencing frightening and dissociative parenting strategies that place the child in an irresolvable and impossible paradox, where the only source of relief and safety is found in a situation where the parental care is inadequate or frightening. A child may also meet diagnostic criteria if the only source of relief or safety is offered in an extreme insensitive manner (Lyons-Ruth et al., 2003).

Table 1-1

Attachment Classifications

Attachment classification	Description
Insecure avoidant attachment (type A)	Continuous exploration behaviours, strategy directed to minimising attachment behaviours. Child expresses little or no seeking or distress to the attachment figure. Upon reunification, child does not seek proximity or contact, will look away and self-occupy.
Secure attachment (type B)	Child presents with a balanced approach to attachment and exploratory behaviour. Caregiver is regarded as a base from which to explore. During separation, distress may be expressed by the child. Upon reunion child actively seeks contact with caregiver, is quickly regulated and returns to play activities.
Insecure resistant attachment (type C)	Child persists in seeking contact with caregiver in preference to exploration activities. During separation the child displays extreme levels of upset. Upon reunion child displays both contact and rejection behaviours and is difficult to regulate.
Insecure disorganised attachment (type D)	Child does not have the capacity to establish an attachment pattern with their caregiver. Child presents with contrasting behaviours upon separation and reunion, combining fear and anxiety.

Table 1-1 Attachment Classifications and their descriptions (Ainsworth et al., 1978)

The orphanages of Eastern Europe in the early 1990s, provided a window of opportunity on infants and children who had experienced extraordinary deprivation subsequently resulting in longitudinal studies (Weir, 2014). This resulted with a developed understanding of prevalence and mechanism of causation, and subsequently the development of intervention programs and more effective assessment measurements.

It is thought that there is a wider diagnosable range of attachment conditions than that which currently exists (see Table 1-1), although there is no universally accepted diagnostic protocol available. Recognised assessment methods of attachment styles, difficulties or disorders include the Strange Situation Procedure, the separation and reunion procedure, the Preschool Assessment of Attachment, the Observational Record of the Caregiving Environment, the Attachment Q-sort and narrative techniques using Stem Stories. The Child Attachment Interview and the Autobiographical Emotional Events Dialogue are used with older children.

RAD is one of the least researched and most poorly understood disorders in the DSM. There is little systematic epidemiologic information on RAD, resulting in a lack of understanding regarding its genesis, making the condition extremely difficult to diagnose accurately (Chaffin, et al., 2006). There is a lack of clarity about the presentation of attachment disorders over the age of five years and difficulty in distinguishing between aspects of attachment disorders, disorganized attachment or the consequences of maltreatment (Chaffin, et al., 2006). Bakermans-Kranenburg et al., (2005) conducted a meta-analysis, subsequently suggested that the prevalence of disorganised attachment was 15% in middle class environments and was potentially higher in households with more adverse interactions.

There remains an issue regarding the possibility to reliably diagnose attachment disorders in older children and adults which has not yet been resolved (Guyon-Harris et al., 2019). The attachment behaviours used as indicators for the diagnosis RAD change markedly with development, making defining similar behaviours in older children difficult. Currently there are no substantially validated measures of attachment for middle childhood or early adolescence. The assessment of attachment disorders (AD) in children post school age may not be possible at all due to developing individuality resulting in increasingly complex emotional and behavioural presentations.

The attachment therapies were historically formed with a lack of standardised diagnostic procedures; classifications and checklists were produced informally as a result of clinical and parental experiences, resulting in lists and checklists being un-validated and including characteristics that are not part of any formal diagnostic criteria (Toth et al., 2013).

1.6.2. Complex and Developmental Trauma

Human development is punctuated by the ability to navigate adversity and threat to survival. The development of the human physiological and psychological construct has been effective through adaptation required to develop the capacity to cope and manage the potential of harm through life threatening or challenging situations. The physiological changes and evolution of the body the body means that the individual

is equipped to respond to threat developing a mechanism of survival based on significant bygone events which have threatened life. The need for human coping and recovery from such events is as crucial today as with historical trauma. While the modern presentation of traumatic events may take different guises; the mediators for successful coping of such events still occupy a place in the modern arrangement of life (Wamser-Nanney et al., 2018).

The additionality of shifting societal norms and relational structure and demands means that stress and anxiety responses are well-documented physiological responses in terms of fight or flight (Lanius et al., 2017). The neuroscience of the event is also noted to occupy parts of the brain associated with either cognitive or limbic reactive structures, often beyond the conscious control of the person experiencing the stress event, giving rise to the complexities of behavioural presentation in child development.

Complex trauma is defined in parallel to the individual's reactions to a single event but rather as trauma experienced over an extended period of time (Terr, 1991). Complex trauma is further outlined as trauma that involves repeated or prolonged exposure to triggering event (Ford & Courtois, 2013). Such trauma may involve direct harm to the individual through abandonment, or neglect from caregivers or parents. In the case of attachment disorder, such traumas need to occur during early childhood development and be of a severity to impact the child's development and lead to complex attachment patterns and the child's ability to develop relationships and regulate behaviours adequately to be functional.

Research shows that the cumulative impact of early life stress recognised as a predictor of psychopathology across the lifetime of individuals who have experienced repeat trauma events (Carr et al., 2018). Contemporary diagnostic techniques such as neuroimaging offer indicators to the neurobiological mechanisms and the relationship between repeated early life stress, amygdala responses and reduced functional connectivity between the amygdala and medial prefrontal cortex (McLaughlin et al., 2015). Such techniques also highlight the positive associations between the impact of early life stress to emotion related brain circuitry in females

(Burghy, et al., 2012). The impact of these stressors and the subsequent effect on the neural pathways has specific bearing on neurodevelopmental patterns and may present as predictive biomarkers of risk for psychopathology.

Exposure to multiple chronic or prolonged stress experiences result in developmental trauma. In such cases the absence of appropriate or protective care giving in early life which subsequently results in adverse outcomes is still not considered part of the diagnostic criteria in the DSM-5 (American Psychiatric Association, 2013). The repercussions of such childhood trauma may have a significant impact both in childhood later life, being potentially detrimental to social interaction, academic outcomes and anti-social behaviours (Hildyard & Wolfe, 2002) and can impact on attachment capacity in the child.

The current DSM-5 literature only identifies RAD as a diagnostically defined condition. The current diagnosis for RAD includes awareness of emotional neglect and deprivation, however, the effects of domestic violence or functional impairment are not considered (Rahim, 2014). This potential oversight means that the DSM-5 classification system may not be sensitive enough to diagnose attachment disorders due to the impact of trauma particularly if that trauma comes from a caregiver (Rahim, 2014), the diagnostic process identifies and considers anxiety levels but fails to consider underlying developmental trauma.

1.6.3. Diagnostic Criteria AD

International Classification of Diseases (ICD-11; World Health Organization, 2020) and the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2016) both organise the symptoms of AD into two related but distinctly different disorders. These are classified as inhibited and disinhibited behaviours. In both the ICD-11 and the DSM-5 an inhibited child would receive a Reactive Attachment Disorder (RAD) diagnosis. A disinhibited child would receive a Disinhibited Attachment Disorder (DAD) in the ICD-11 and Disinhibited Social Engagement Disorder (DSED) in the DSM-5. The current DSM-5 literature only identifies RAD as a diagnostically defined condition. The current diagnosis for RAD

includes awareness of emotional neglect and deprivation, however, the effects of domestic violence or functional impairment are not considered (Rahim, 2014). This potential oversight means that the DSM-5 classification system may not be sensitive enough to diagnose attachment disorders due to the impact of trauma particularly if that trauma comes from a caregiver (Rahim, 2014), the diagnostic process identifies and considers anxiety levels but fails to consider underlying developmental trauma. Diagnosis of AD is assessed in a range of ways as it is dependent on the age of the child, with the NICE guidelines (NICE, 2018) citing a progressive use of assessment tools. For children aged 12 – 24 months the Strange Situation Procedure is used, with the utilisation of a Q-Sort for assessment for more prolonged observations. Story Stems are used for children aged 4 – 8, with the Dynamic Maturational Model of Attachment and the Child Attachment Interview for children into adolescence.

In the DSM-5 (American Psychiatric Association, 2016), both disorders are described found under Trauma and Stressor Related Disorders. The criteria for these diagnoses require onset of the disorder in early childhood; markedly disturbed and developmentally inappropriate social relatedness in most contexts, beginning before age five years. This is evidenced by a persistent failure to initiate or respond in a developmentally appropriate fashion to most social interactions. This may be manifested by excessively inhibited, hyper-vigilant, or highly ambivalent contradictory responses. The child may respond to caregivers with a mixture of approach, avoidance and resistance to comforting behaviours. Children may also exhibit frozen watchfulness and diffuse attachments as manifested by indiscriminate sociability, with a marked inability to exhibit appropriate selective attachments. This behaviour may be demonstrated in observable patterns such as excessive familiarity with relative strangers, or lack of selectivity in choice of attachment figures (DSM-5 APA, 2016). Exposure to traumatic or stressful events is a shared criterion for disorders. More specifically, social neglect and the absence of adequate caregiving during childhood are criteria for both RAD and DSED (APA, 2016).

It should be noted that AD, is still one of the least researched and most poorly understood disorders in the DSM (Hanson & Spratt, 2000; Woolgar & Scott, 2013), and there is very little systematically gathered epidemiologic information on AD. In

the absence of empirical research, much of what is understood about AD is based on clinical anecdotes, case studies, and extrapolation of data from laboratory research (Rockett & Carr, 2014). Existing research also fails to consider the developmental progression of AD with little long-term longitudinal data being presented regarding the outcomes of children diagnosed with AD (Hanson & Spratt, 2000).

1.7. Differential Diagnostics

The diagnostic criteria for AD set out in the DSM-5 and ICD-11, should be sensitive enough to allow a differential diagnosis between ASD and AD, with specific conditions included to clarify the overlapping presentation (World Health Organization, 2020). For AD, there is the need for evidence of social neglect, deprivation, lack of attention to the child's needs for comfort, repeated changes of primary caregiver, and experience of being reared in an institutional setting (World Health Organization, 2020). Contradictors for diagnosis include the presence of ASD, DAD, or 'Maltreatment Syndromes giving rise to physical difficulties' (World Health Organization, 2020).

All classification systems stress that a diagnosis of AD should be made from 9 months to 5 years of age, which differs from ASD. According to Velotti et al., (2013), AD diagnosis may not be possible in older children, and any diagnosis made with an individual over 5 years of age should be cautious. This is however countered by the literature available on the adult presentation of attachment difficulties. Bowlby (1982) wrote extensively on the theory of interpersonal relating conceptualising attachment theory in terms of typical and psychopathological development. In contrast to Velotti et al. (2013), Bowlby (1982) believed that early attachment experiences would exist throughout an adult's lifespan.

The focus of the ICD-10 differential diagnosis of ASD and AD, indicates that the social reciprocity for ASD would be observed irrespective of environmental factors, whereas children with AD will demonstrate a reduction in diagnostic indicating behaviours when placed in an appropriate child rearing environment. It is further indicated that there are definite levels of social language impairment in ASD and AD,

however, a child with AD will not present with repetitive, stereotyped behaviours (World Health Organization, 2020).

These distinct differences between diagnostic groups have been challenged by Sadiq et al. (2012), who suggested the overlap for children with AD and ASD was significant in all areas. This research reported that 60% of the children with an AD met the clinical criteria of use of language and other communication skills; 46% scored positive in the reciprocal social interaction and although a lesser percentage; and 20% scored positively within significant repetitive and stereotyped behaviours. The conclusion offered by Sadiq et al. (2012) was that the presenting behaviours were at least as impaired in AD as in ASD.

1.8. Diagnostic Challenges

It may be suggested that determining whether a child has AD or ASD may be clinically challenging (Golding et al., 2006; Sadiq et al., 2012). A diagnosis of either ASD or AD is only given following a period of observation to assess presenting behaviours (Davidson, et al., 2015).

However, when assessment is focused on behaviour, AD may present in similar ways to ASD (Davidson, et al., 2015), (Sadiq et al., 2012), with social deficits being the most clearly distinguishable indicator for ASD in the first two years of life. When considering the behavioural presentation of ASD and AD, it is clear that is can be difficult to differentiate reliably (Moran, 2010). There is emerging research, which seeks to clearly identify the clinical differences between the two (Davidson et al., 2015; McCullough et al., 2014; Moran, 2010; Rutter et al., 2003; Sadiq et al., 2012). Moran (2010) asserts eight symptoms of overlap which are present in both ASD and AD, these are recorded as inflexibility, atypical play, poor social interaction, deficits in Theory of Mind, communication difficulties, emotional regulation deficits, executive function difficulties and sensory integration needs. Yet, these variations are not reflected accurately the screening tools or diagnostic armoury.

1.9. Attachment behaviours in ASD

The use of Attachment-related behaviours as an indicator of AD in children with ASD, seeks to identify the interaction in which a child seeks comfort or proximity seeking from a caregiver (Ainsworth et al., 1978). Accurate assessment is further complicated in a population expressing within these domains as part of their ASD construct. Nevertheless, it is found that despite the effects of ASD symptomology the attachment profiles of children with ASD are similar to those of typically behaving children (Rutgers et al., 2004). Research by (IJzendoorn, et al., 2007), suggests that this could be due to erroneous measurement of confounding underlying motivations, but the similarities in measures are of note.

Rutgers et al. (2004) meta-analytic review of studies evaluated specific attachment behaviours and the quality of children's attachment relations. Results from this meta-analytic review showed that around only 50% of children with ASD form secure attachment relationships with their caregivers. In comparison to neurotypically developing children those with ASD reported significantly lower secure attachments. This may be suggestive of the impact that ASD symptomology has in terms of the barriers in attachment building for children with ASD. This may be due to the child's interpretation of emotional cues and intentional states of others. This highlights the value of effective executive function (EF) skills within theory of mind (ToM) as a core requirement for attachment, and child's ability to construct a safe working model of the parent and self (McCormick & Kennedy, 1994). The degree of impact from the environment on child's development of ToM in terms of how that child learns how to respond, as opposed to the intrinsic capacity of the child and their internal motivation to behave and respond in a particular way (Schlinger, 2017). Schlinger (2017) also identified that there were uncertainties around the child experiences and the use of language in the environment that lead to the development of ToM and the ability to generalise this skill (Schlinger 2017). It is also note worthy that parents, and more so fathers of children with ASD, have impaired executive function skills in the area of attention shifting and planning skills (Hughes et al., 1997). The transactional impact resulting in further potential developmental impediment, in addition to the baseline deficits of the child with ASD (Cowell et al., 2018).

The construct of attachment in children with ASD can only be viewed when their ASD symptomology is considered. It has been suggested by IJzendoorn et al. (2007), that children's ASD symptomology would be reflected in their attachment profiles. This would further suggest that the nature of the assessment tool may actually be measuring the social deficits of the children as opposed to measuring their attachment construct. The Strange Situation Procedure (Ainsworth et al., 1978) seeks to evoke a proximity seeking behaviour as an indicator of function of closeness and emotional familiarity. In the child with ASD, such observed behaviours could indicate sought familiarity or avoidance of the unfamiliar and so give rise to the rise to the suggestion that the child could be presenting their deficits in social functioning as opposed to attachment responses. To seek a disentanglement of this presentation is presenting as a significant challenge for clinicians and the overlap of behavioural presentation of ASD and AD as a result remains somewhat unresolved.

1.9.1. Attachment patterns in ASD

Interpersonal coordination is a known impairment in ASD. The recognised research in this area however remains limited. Interpersonal synchrony has been found to be reduced in individuals with ASD with regards the quality of interaction and reciprocal mirror actions of the communicative partner. This is perceived in terms of their facial and body movements, which reveal emotions and behaviours. The rhythmic interactions between infant and caretaker, when fluid, take the pattern of mutual focus, reciprocity and the mirroring of emotions and behaviours. From birth, babies move in a rhythm when interacting with an adult. The child imitates turn taking behaviours. Infant and caregiver, with intact interpersonal synchrony, are more able to anticipate responses from each other. Synchronised communication can elicit shared responses. However, despite nonverbal differences in the social domain, which are known to be impairments for those with ASD (DSM-5, 2016), the sensitivity for diagnosis of this within the diagnostic armoury is lacking (Koehler, et al., 2021).

For effective interpersonal interaction to occur with success, the individuals need to rely on each other's behaviours in order to predict, monitor and plan responses (Knoblich & Sebanz, 2008). The exploration of parental sensitivity when explored further by (Allen, 2016), could imply that AD in ASD children could be in part due to modelled behaviour of parent's skills, in both responding to and meeting need. Where the parent also meets the clinical criteria of ASD diagnosis themselves, there will be a potential for discordance in connectivity. Such intergenerational transmission of attachment traits may be observable in a range of areas, more specific to the overlap could be reflective function found, within EF skills. Reflective function is a core development that is dependent on the parenting, for successful attachment development, parents require a fully functional and sophisticated theory of mind (Ruhl, 2020).

Parenting influences epigenetic regulation, and negative early experiences are significantly associated with epigenetic changes (Borghol, et al., 2012). A mother's reflective function capacity, predicts future infant attachment styles. Any reduction in skill could evoke different attachment outcomes for the child (Fonagy et al., 1991).

Mentalising capacity, through the mother's representations toward the child, influences emotional self-regulation. The external regulation of the child, supported by the mother, is through affective interactive experiential learning (Rosenblum et al., 2008). Such maternal mentalisation is considered to influence reflective function capacity (Ensink et al., 2015). Externalising child behaviour is also related to the maternal capacity to effectively use reflective tools (Ensink et al., 2016). Research shows there is an accumulation of impact on developmental stages, and epigenetic patterns with lifespan outcomes (Naumova, et al., 2016). Mirror neural networks and theory of mind systems are associated with social engagement and interaction. Fonagy and Target, (1997) highlight the need for a parent to have a caring investment in the child. For this process to be effective, the caregiver needs to identify the child as an individual.

For development of self, affect regulation should be direct and considered. Parents need to take responsibility for their parenting styles, mindfully offering appropriate interactions and modelling of appropriate behaviours. Through treating infants as individuals, and interpreting behaviours as a communication of their feelings and mental states, infants can effectively learn that they are entities, separate from their parents. If the parent is able to do this in a way where emotions are modulated successfully, the child will experience positive growth, while maintaining and experiencing an affectionate relationship. The child can be motivated into developing a positive internal working model of self. The role of parenting holds mentalisation as a key component of the interplay of child interaction (Shai & Fonagy, 2014). This process requires attunement with immediate adjustment of intensity, to synchronise with the child, for agreed effect (Beebe & Steele, 2013). A parent needs to have secure theory of mind to allow for the subjective experience of the child to be fulfilled. Understanding and awareness of the internal and psychological world of the child promotes secure growth. This process allows the child to form a clearer understanding and awareness of their internal, psychological and emotional world.

Joint task performance, in the form of parent child interaction, relies on these neurocognitive mechanisms in order to predict secure outcomes. To do this effectively the performer, or in this case parent, has to be able to predict their collaborator's response through a process of internal action simulation. Bekkering et al., (2009) emphasises that complimentary actions, coordinated as simulation, monitoring and selection, are essential for efficient and effective social interactions. The mirror system logically uses inferences to respond, offering flexible and adaptive actions with the agents of communication. Research suggests that maternal sensitivity may also be reflected in the attachment profiles of ASD children (Koren-Karie et al., 2009). This research suggests that secure attachment may be associated with increased maternal sensitivity, whereas children with ASD with insecure attachment profiles were found to have mothers with lower levels of sensitivity (Koren-Karie et al., 2009). These findings further indicate the impact of executive function and theory of mind skill sets, attachment development being impacted through theory of mind differences, from parent to child, and compounded when

both are presenting with theory of mind deficits leading to the potential disruption of the formation of attachment within intergenerational ASD families.

The capability for children with ASD to form secure attachment raises the question of what could insult this developmental process. Siller et al. (2014), in accordance with Koren-Karie et al. (2009) further confirmed that increase in parental sensitivity had a positive impact on the attachment profile of the child with ASD. However, in this study it was also found that motivation and ability of parents to sustain this level of sensitivity could significantly impact on the effectiveness of parent child interaction over time. An exhausted parent who is unable to maintain a sensitive relationship with a child may have a negative attachment, with an increase in attachment anxiety (Sivaratnam et al., 2018).

The relationship between parent and a child with ASD may be formed with a degree of atypical social reciprocity. The child with ASD may display lower social reciprocal behaviour (Usher et al., 2015), and the impact of this is often observed as a reduced awareness of the caregiver's emotional state. This may in turn lead to the child avoiding social interaction and force reduced reciprocal interaction (Keenan et al., 2017). The continued demand to find the capacity to play and interact with a child with ASD, requires the parents forge considerable imagination and find additional space to engage in play with a child with ASD. For a parent, encouraging the pretend dimension of play and developing the symbolic content of play requires good theory of mind. This in itself can pose challenges with engaging and forming attachments with children with ASD.

1.10. Identifying underlying reasons for overlap of symptoms

1.10.1. Executive Functioning

Executive functioning (EF) is a set of higher order interrelated cognitive processes that together enable purposeful planning and the implementation of goal directed behaviours (Diamond, 2013), (Puranik & Lonigan, 2014). These behaviours would typically be utilised by an individual to manage and cope when encountering novel situations or a challenging environment (Banich, 2004; Shallice, 1988; Stuss et al.,

1992). EF has three components: working memory, inhibition control and flexibility of cognition (Miyake et al., 2000). As a neurodevelopmental disorder, ASD is characterised by its social communication difficulties, alternative executive function process is thought to explain some of the underlying characteristics of ASD. The relevance of EF when considering those with ASD diagnoses is still under question in academic research (Demetriou et al., 2019). EF performance is a good predictor of social understanding (Riggs et al., 2006), with impairment of executive function being linked to behavioural presentation differences. This may be evidenced in neurodevelopmental disorders such as attention deficit hyperactivity disorder (ADHD), ASD and several genetic syndromes (Demetriou et al., 2019)

The integrative executive function model (Miyake et al., 2000), identifies the "common executive" as an underlying process of all executive function. This model suggests deconstruction of the partitioning of specific executive function processes (Friedman & Miyake, 2017). The specific processes related to individual functions such as planning or goal direction may be considered in isolation to each other. While it has been hypothesised that executive functioning abnormalities are clinical markers for ASD (Rodgaard et al., 2019), limited research exists exploring the relations between executive function and social impairment in ASD (Leung et al., 2016). This research suggested that a link could be identified between a distinct metacognitive executive function and a social symptom link in ASD. This research also indicated that behavioural regulation, and executive processes within EF, predicted social function in all children. However, the metacognitive executive processes predicted social function only in children with ASD and not in typically developing children (Leung et al., 2016). This is further confirmed by the executive dysfunction account (Ozonoff, 1997), which proposes that the symptomology of ASD is a manifestation of a failure of executive function skills.

The meta-analysis performed by (Demetriou et al., 2019) considered 235 studies investigating executive dysfunction in ASD. The conclusion from this indicated that ASD would generally show impairment in the domains of concept formation, mental flexibility, fluency, response inhibition, planning and working memory with equal impairment across these concepts. It should be noted that this impairment was shown

to be less in adults than children with ASD, indicative of perhaps learnt strategies or developmental growth capacity. Extending this out to the neurodevelopmental trajectory of AD is key to understanding the impact of EF development on a broader range of children, and key to seeking interventions and further understanding of the condition.

1.10.2. Executive Function Development

The potential for initial growth is strongly dependent on the relational component of EF skill development (Korucu et al., 2019). There is academic research which suggests that the efficacy of carer to child interaction is related to child EF performance and development (Hammond et al., 2012). However, parental executive functioning skills cannot be ignored, and should be considered as a contributory factor to the impact of EF development in their children. Parents with effective EF skills are more able to facilitate EF growth through their parenting skills, due to their capacity to allow their children to make mistakes and then to support recovery (St. John et al., 2019). The first five years of a child's life is critical to the development of attentional capacity and EF functioning (Conway & Stifter, 2013; Garon, 2008). The ability of a caregiver's ability to direct a child's attention was further found to be an influencing factor over child temperament and a predictor of EF skill (Conway & Stifter, 2013). The ability to sustain attention progresses as babies develop. Attention shifting between two objects also begins to develop within a child's first year of life and increases into the second year. This development includes a more intrinsic exploration and understanding of the environment, which matures as the child moves from basic information gathering to the manipulation of information for themselves (Conway & Stifter, 2013).

Parental scaffolding and effective modelling behaviours support a positive developmental trajectory for child development. Internalised problem-solving abilities and regulatory skills through positive efforts from parents, lead to effective child growth. However, from a neural perspective, the complexity of learning and development through experiential interactions lends to the understanding that this development of skill is not wholly dependent on the caregiver in isolation. The wider impact of environmental involvement cannot be ignored, and research suggests that

this is a factor which influences the frontal structures of children's EF skill (Doebel, 2020). The quality of parental interactions with the child, however, significantly determines a range of child outcomes.

Three specific aspects of parental interaction have been indicated in terms of development of child EF skill. This includes parental sensitivity, metacognition, and the ability to promote independence (Fleur et al., 2021). Sensitivity in this context, refers to the appropriate and consistent response to infant communication, providing the child with successful experiences of interaction with the social world. This ensures the child's experience of the world is both orderly and predictable and this in turn impacts on self-regulatory capacity (Fleur et al., 2021). The promotion of independence offers the child strategies, which are likely to promote effective problem-solving skills, which in turn can then be used to master executive tasks. Finally, metacognition, or parental capacity to identify and comment on their perceived mental state of their child during parent- child interaction, facilitates reflection and response awareness and as such developing the overarching control central to EF mastery (Carlson & Beck, 2009). Increased quality of parenting is associated with better EF outcomes in young children (Bernier et al., 2010).

Attachment styles found in parental interaction and the subsequent quality of parenting, can affect attachment security as an outcome (Gunnar, 2006). A conceptual model proposing that the caregiver's own reflective and self-regulatory ability the flexible regulation of cognition, behaviour, and emotion, as well as EF, can impact on children both biologically, and in a psychosocial dimension (Berger et al., 2007). It is clear that parents and caregivers who are able to effectively inhibit impulsive behaviour in themselves can effectively concentrate on their child, and support children's development (St. John et al., 2019). A parent's responsive capacity to challenge behaviour can impact on outcomes (Deater-Deckard et al., 2012). Intergenerational links have been further been identified between parents' and children's performance on tasks of EF, and this link is one of stability, further suggesting that initial bio-social mechanisms that are responsible for parent- child EF development are present in early child developmental stages (Cuevas & Bell, 2013)

The caregiver's ability to self-regulate has an impact on the child's response to trauma during this critical developmental period (Blaustein & Kinniburgh, 2019). A feedback response is also experienced by the parent, from the child and informs a parents' own distress and depression (Morris et al., 2012). The potential combination of stress that a caregiver may experience, both with parenting child with autism and the impact from the trauma experience that a child with ASD perspective, is likely to add to the compounding difficulties of managing complex attachment outcomes.

1.10.3. Developmental mechanisms in Executive Function Skills

Early life stress is identified as a predictor of psychopathology with neuroimaging giving more indicators of neurobiological mechanisms that are affected by such experience. In turn, this research gives rise to understanding of the impact of connectivity and resulting outcomes (Kessler, et al., 2010).

There are identified mitigating and protective factors around child trauma such as supportive caregiver roles. Pozzi, et al. (2021) suggested that there was an association between positive parenting and future connections in neural networks. It was found through longitudinal data collection that the connectivity of higher order control networks was positively associated with positive maternal interaction. This included sensitivity to reward, positivity and maturing of prefrontal amygdala circuitry (McLaughlin & Lambert, 2017). Given this finding however, it is important to note that in children with higher levels of early life stress, differing patterns of connectivity were found in reward and emotion related regions and that stress during early childhood may results in alterations to reward processing (Morelli et al., 2015). This serves to increase the risk of poor outcomes. Parenting, and attachment-based development of child stress response systems, further contributes to the effective development of frontal brain regions. Secure attachment relationships support child executive function development, which facilitate the function and development of the neural systems that underpin EF (Glaser, 2000), giving rise to the concern that in the absence of a secure attachment differences and deficits can arise.

The extent of overlapping presentation within AD and ASD gives rise to considerable difficulties for the separation of the disorders. The review of evidence

suggests that ASD and AD have a considerable overlap of contributory risks, demanding a careful differential diagnostic approach. Diligent consideration of the presentation of either disorder or both combined, with informed understanding on how this would be understood and what presenting behaviours could reliably recognise a more complex picture of the child. In order to ascertain the impact of the difficulties in differentiating the symptomologies on diagnosis, this study was designed to seek to measure the presenting behaviours of children using psychometric tools with a view to contributing to the understanding of the commonalities, differences and the relationship between ASD and attachment.

There is significant cause for research based on the overlap between ASD and AD. It would also be particularly helpful if behaviour problems, easily identifiable by both professionals and parents, might be used to differentiate between otherwise similar but complex presentations.

1.11. Research Questions

1. What is the degree to which there is overlap in the diagnosis of ASD and AD?
2. What is the degree of overlap when screening tools are used to assess these disorders?
3. Are there any behaviours or cognitive processes that will discriminate between the two disorders?

1.12. Thesis Structure

Chapter 2 outlines the methods that will be used throughout the thesis and explores the overlap degree presenting between ASD and AD, with analysis discriminating behaviour problems form either psychometric or diagnostic categories. Chapter 3 discusses the overlaps and differences from parental reporting of ASD and AD and explores the behavioural differences in each group. Chapter 4 analyses similarities and differences in parental stress and reported behaviours of ASD and AD. In Chapter 5, the differences between ASD and AD using Executive Function (EF) tasks in terms of their clinical diagnoses and psychometric traits is explored. Chapter

6 examined whether executive functioning (EF) mediated the relationship between either Autism Spectrum Disorder (ASD) or Attachment Disorder (AD) and behaviour problems, examined in terms of their AD and ASD traits, their levels of behaviour problems, and performance on four EF tasks. Chapter 7 discusses the overall results of the studies and concludes with suggestions for future research.

The flow within the research programme was responsive to the on going findings and sought avenues to explore, as the extent of overlap was confirmed. The studies were formed in 3 overall stages. The school based screening formed a secure starting point and from this, the exploration of a wider demographic further supports these findings. The second on-line study supported the additional findings of Chapter 4. Chapters 5 and 6, the cognitive functions were considered later in the study as the research developed. This was a single study with the duality of focus, giving rise to separate discussion, data analysis focus and chapter presentation.

1.13. Ethical Considerations

All the studies in this thesis were approved by Swansea University Ethics Committee. All participants were fully briefed, and informed-consent was sought from participants and also from guardians of the children. Before the commencement of any study, the participant was once more asked if they were happy to participate and informed of their right to withdraw at any time, without the need to state a reason. During study design for those studies involving children with ASD, teachers and carers at the supporting schools were consulted and given a chance to view the study materials and offer feedback which where concerns were noted, led to adjustments in materials and tasks used.

Chapter Two : Diagnostic overlap between Autism Spectrum Disorder and Attachment Disorders, for children with Learning Difficulties

Despite the clear theoretical demarcation, in practice it can be challenging to determine whether a child has AD or ASD (Golding, 2006; Sadiq et al., 2012), and several reports have suggested that there is no reason to exclude the presence of both (Mayes et al., 2017; Minnis et al., 2020). Levels of overlap in terms of occurrence are currently unclear and may depend on how a classification is made. A number of reports have all noted that some children diagnosed with ASD and AD will fulfil the criteria for the alternative classification. For example, Minnis et al. (2020) using parent report tools, found a 2% overlap between the two disorders in a large community sample. Mayes et al. (2017) found 13/20 (65%) cases of AD met ASD criteria, and Sadiq et al. (2012) noted that 21/35 (60%) cases with AD met ASD criteria. Davidson et al. (2015) found that 36/58 (62%) of cases with ASD met criteria for AD. Whatever the actual level of overlap, further work is needed in this area, and to date no study has attempted to explore the results when using both clinical diagnostic assessment and screening-tool criteria on the same sample.

Another area of importance is whether any behavioural signs can discriminate between the two disorders. It is certainly the case that AD can present behaviourally in similar ways to ASD (Davidson et al., 2015; Sadiq et al., 2012), and research is emerging concerning these differentials (McCullough et al., 2014; Moran 2010; O'Connor et al., 1999; Sadiq, et al., 2012). Despite overlap in the criteria for ASD and AD, Davidson et al. (2015) found that 35/36 of the children with ASD who met the diagnostic criteria for AD displayed some features that are associated with ASD but not AD. A similar suggestion was made by Mayes et al. (2020), especially in terms of the absence of many ASD symptoms from AD cases. However, this suggestion does assume that there is sufficient grounds for assuming there are ASD- and AD-specific behaviours. However, it is important to note that AD is one of the least researched disorders in the DSM (Hanson & Spratt, 2000; Woolgar & Scott, 2014). In its absence, much of what is believed about AD is based on theory, clinical anecdotes, case studies, and extrapolated from laboratory research on humans and animals (Rocket & Carr, 2014).

In contrast, Sadiq et al. (2012) found high overlap in presentations for children with AD and ASD in terms of language and communication skills; impairments in reciprocal social interaction; and repetitive and stereotyped behaviours. Likewise, Moran (2010) noted eight symptoms present in both ASD and AD; inflexibility, atypical play, poor social interaction, Theory of Mind deficits, communication difficulties, emotional regulation deficits, executive function difficulties, and sensory integration needs. Thus, it remains unclear which behavioural presentations of ASD and AD, if any, differentiate the two reliably remains unclear, and whether there are any reliable indicators that are easily available to teachers to be able to indicate which disorder is present. The latter may be important, as despite the challenges presented in attributing appropriate diagnosis, outcomes and treatment pathways are clearly different (Denis et al., 2009).

2.1. Method

2.1.1. Participants

All parents and carers were informed of the study via individual letters with participation information and informed consent slips, following permission from the head teacher. An inclusion criterion for the study was a placement in the Special School, and a diagnosed mild learning disability. There was no exclusion criterion for this study.

Data was gathered from 105 pupils (77 male, 28 female) with a clinically confirmed diagnosis of a learning difficulty. The sample has a mean age of 14 ($\pm$ 1.78; range 9-16) years. The mean IQ of the pupils was 56.77 ($\pm$ 15.71; range = 31 – 91), and the mean reading age was 7.18 ($\pm$ 2.08; range = 4 – 10) years. It was hoped that recruiting participants with a wide range of ages and IQs would allow a more representative sample of real world educational settings. G-Power analysis suggested, for 80% power, a rejection criterion of $p < .05$, for a medium effect size $w = .35$, that 98 participants are needed to identify a significant X^2 with 4 dfs. This information was gathered from school based assessments and the LEA assessment information was analysed for each pupil. All participants had been through the statementing process of the school's county Additional Learning Needs department,

accessing the same assessment and services towards diagnosis, and towards obtaining the statement of special educational needs through the LEA statutory assessment process. Those pupils who had migrated in from other counties were subject to the county panel adopting the statement, or underwent a reassessment of need for a statement.

2.1.2. Setting

All participants were pupils from a special school, which has 109 pupils in total. All pupils in the school have a statement of educational needs. These needs could involve a wide range of problems, including Learning Difficulties, Autism Spectrum Disorder, Attention Deficit Hyperactivity Disorder, Emotional and Behavioural Difficulties, and/or children known to Social Services for family issues additionally to any diagnosis. To be legally included in the statement of educational needs, confirmation of the diagnosis was needed from a NHS clinician. Additional background information regarding social services involvement was included through the school-based social worker. Given the wide range of children, it was thought that this would be a good sample to use to include sufficient numbers of children with different disorders. The organisation of the school management results in small classes of 8-10 pupils, with a permanently assigned member of support staff, and a class teacher.

2.1.3. Diagnostic procedures

Autism Spectrum Disorder: Diagnosis was made through multi-disciplinary clinical diagnostic assessment, including a range of professionals independent of the current study, such as a paediatrician, speech and language therapist and specialist psychologist prior to the study and confirmed in their statements of educational need. The DSM-5 criteria were employed with clarification from the NICE Clinical Guideline and supported by psychometric tools, such as the Diagnostic Interview for Social and Communication Disorders, the Autism Diagnostic Interview – Revised, and Autism Diagnostic Observation Schedule. These form the basis for the diagnosis, facilitating the team and clinician's judgement on the final outcome and diagnosis. Assessment included observations across a wide range of settings with an

autism-specific developmental and family history. An assessment of the needs and strengths of all family members was included and full physical examination with tests and assessments for other conditions were conducted as appropriate.

Attachment Disorder: Diagnosis of attachment difficulties was assessed in a range of ways by clinical psychologists and social workers, who were independent of the current study. The procedure was dependent on the age of the child, along with clarification from NICE guidelines (NICE 2015), and a progressive use of assessment tools (Strange Situation Procedure; Q-Sort; Story Stems; Dynamic Maturational Model of Attachment; Child Attachment Interview), supporting clinical judgement. Diagnosis was also dependent on whether the children were known to Social Services because of issues in the home environment, for reasons independent of any other clinical diagnosis. Additional background information regarding social services involvement was obtained through the school-based social worker.

2.1.4. Psychometric measures

Social Communication Questionnaire (SCQ; Rutter et al., 2003) (See Appendix C for example form) is used for the identification of Autism, and symptom levels. The scale has 40 items, with a total score ranging from 0 to 39, and a cut-off score of 15 indicating a high probability of ASD (Berument et al., 1999). The SCQ has excellent psychometric properties for reliability and validity (Rutter et al., 2003), and a sensitivity of .88, and a specificity of .86, for the discrimination of ASD (Chandler et al., 2007). The internal reliability of the scale (Cronbach α) for the present sample was .913.

Randolph Attachment Disorder Questionnaire (RADQ; Randolph, 2000) (see Appendix D for example form) screens for attachment disorder in children between 5 and 18 years and distinguishes children with attachment disorder from those with conduct disorder or other psychiatric disorders. A child's score on the RADQ estimates the severity of AD, and may indicate whether the child experiences an anxious, avoidant, or ambivalent type of attachment disorder. A RADQ score of 50-65 indicates the presence of AD, but the required score for a diagnosis is 66-75 for mild attachment disorder; 76-89 for moderate; and 90 and over for severe AD. For the purpose of this

study, 66 was taken as the cut-off point. Randolph (2000) reported a test-retest reliability of between .82 and .85. Validity was reported as being established through the use of several techniques: item validity, criterion-references validity, construct validity and predictive validity (Randolph, 2000). The internal reliability of the scale (Cronbach α) for the present sample was .951. In addition, the scale allows classification into attachment styles of the children: avoidant, anxious, and ambivalent, each scored on a scale of 5-25. The internal reliability of the attachment type scales (Cronbach α) for the present sample were: Avoidant = .712, Anxious = .841, and ambivalent = .740.

Strengths and Difficulties Questionnaire (SDQ; Goodman, 1977) (See Appendix B for example form) is a brief behavioural screening questionnaire for emotional and behavioural disorders in children and adolescents aged 4-16 years. The scale comprises 25 items: emotional symptoms (5 items), conduct problems (5 items), hyperactivity/inattention (5 items), peer relationship problems (5 items) and prosocial behaviour (5 items), with scores from the subscales generating a total difficulties score: normal range = 0-15; 16 -19 = borderline; and 20-40 = abnormal (Youth in Mind, 2005). The SDQ has strong reliability, internal consistency, for the total and subscales (Stone et al., 2010). The internal reliability of the scale (Cronbach α) for the present sample was .959.

2.2. Procedure

The assigned member of support staff, and class teacher, completed all psychometric assessment tools together following training and how to complete correctly. Assessments were completed over a period of 6 weeks, and each pupil was discussed individually. Background information regarding clinical diagnoses was completed from the pupils' statements of educational needs.

2.3. Results

Of the sample, 19 (18%) pupils had a clinical diagnosis of ASD, with more males (18/77; 23%) than females (1/27; 4%) having a diagnosis, $X^2(1, N = 105) = 5.434$, $p = .020$, $\varphi = .227$. In terms of AD, 37 (35%) pupils qualified for a clinical diagnosis,

with similar proportions of males (26/77; 33%) and females (11/28; 39%) qualifying, $X^2(1, N = 105) = .274, p > .30, \varphi = .051$.

Table 2-1 shows the sample results for the three screening tools. Inspection of these data for the SCQ (ASD screening tool), reveals that 22% of the sample had a score in the abnormal range. Slightly more males (24%) than females (14%) fell into this abnormal range, but this difference was not significant, $X^2(1, N = 105) = 1.296, p = .255, \varphi = .11$. However, the mean SCQ score for males was higher than that for the females, $t(103) = 2.26, p = .026, d = .56$.

Inspection of the RADQ data (AD screening tool) shows 23% of the sample scored positive for AD, with the range (106) indicative of a wider spread of attachment difficulty. There was a considerably higher presence of males (30%) scoring positive in relation to females (7%), $X^2(1, N = 105) = 7.527, p = .006, \varphi = .27$. The male mean was significantly higher than the female mean (44), $t(103) = 1.98, p = .050, d = .42$.

Table 2-1:

Sample Results for the screening tools. Mean (standard deviation and range) for the sample, and for male and female, for each of the three screening tools.

	SCQ	RADQ	SDQ
Mean	8.11 (9.07)	51.8 (24.75)	15.18 (8.13)
Range	0 – 34	28 – 134	2 – 38
Scored positive	23 (22%)	24 (23%)	31 (30%)
Male			
Scored positive	19 (25%)	23 (30%)	27 (35%)
Mean (SD)	10.16 (9.68)	54.47 (25.84)	16.29 (8.47)
Female			
Scored positive	4 (14%)	2 (7%)	4 (14%)
Mean (SD)	6.09 (6.30)	44.75 (20.75)	14.50 (7.25)

Table 2-1: Mean (standard deviation and range) for the sample, and for male and female, for each of the three screening tools. SCQ – Social Communication Questionnaire (ASD). RADQ = Randolph Attachment Disorder Questionnaire (AD). SDQ = Strengths and Difficulties Questionnaire (emotional and behavioural difficulties).

Inspection of the SDQ (behavioural-emotional difficulties) indicates 30% of the sample was within the abnormal range. Considerably more males (35%) than

females (14%) scored positive, $X^2(1, N = 105) = 4.261$, $p = .038$, $\varphi = .20$. However, a t-test revealed the male mean was not different to the female mean, $t < 1$, $d = .10$.

Table 2-2 presents the numbers of pupils receiving a clinical diagnosis (left panel), and exceeding the screening-tool cut-off points (right panel) for ASD and AD. The left panel for clinical diagnoses shows that 51% of pupils had neither diagnosis, 13% had a diagnosis of ASD only, 30% qualified for a diagnosis of AD only, and 5% both had a diagnosis of ASD and qualified for a diagnosis of AD, $X^2(1, N = 105) = .809$, $p > .302$, $\varphi = .09$. Of those with a diagnosis of ASD 5/19 (26%) also qualified for a diagnosis of AD; and, of those who qualified for a diagnosis of AD, 5/37 (14%) also had a diagnosis of ASD.

Table 2-2

The numbers of pupils receiving clinical diagnosis (left panel), and exceeding the screening-tool cut-off points (right panel), for Autism Spectrum Disorder (ASD) and Reactive Attachment Disorder (RAD).

Diagnosis			**Screening**		
	RAD	**No RAD**		**RAD**	**No RAD**
ASD	**5**	**14**	**ASD**	**10**	**13**
No ASD	**32**	**54**	**No ASD**	**14**	**68**

Table 2-2 Number of Pupils Receiving a clinical Diagnosis (left panel), and exceeding the screening-tool cut-off points (right panel), for Autism Spectrum Disorder (ASD) and Reactive Attachment Disorder (RAD).

The right panel shows that 64% were classed as having neither disorder, 12% having ASD but not AD, 13% as having AD but not ASD, and 9% were classed as having both ASD and AD, $X^2(1, N = 105) = 7.102$, $p = .008$, $\varphi = .261$. Thus, of the 23 pupils scoring in the abnormal range for ASD (SCQ), 10 (43%) also scored in the abnormal range for AD (RADQ). Of the 24 pupils scoring in the abnormal range for AD (RADQ), 10 (42%) also scored positive for ASD (SCQ).

Table 2-3 shows the mean (standard deviation) scores on the three screening tools for the pupils diagnosed with ASD and those with no ASD diagnosis, and also for the

pupils with and without a diagnosis of AD. Inspection of the top panel, showing results for pupils with and without an ASD diagnosis, shows significantly higher SCQ scores for those clinically-diagnosed with ASD, $t(103) = 4.97$, $p < .001$, $d = 1.07$, no difference for RADQ scores, $t(103) = 1.53$, $p = .128$, $d = .38$, but significantly higher SDQ scores, $t(103) = 2.40$, $p = .018$, $d = .69$. Inspection of the bottom panel for pupils who did, and did not, qualify for a AD diagnosis, shows no significant difference for SCQ scores, $t(103) = 1.21$, $p < .230$, $d = .26$, significantly higher RADQ scores for those qualifying for a AD diagnosis, $t(103) = 4.23$, $p < .001$, $d = .86$, and higher SDQ scores, $t(103) = 4.39$, $p < .001$, $d = .97$.

Table 2-3:

Mean (standard deviation) scores on the three screening tools for pupils diagnosed with ASD and those with no ASD diagnosis (top panel), and for pupils with and without a diagnosis of RAD (bottom panel). SCQ = Social Communication Questionnaire (ASD). RADQ – Randolph Attachment Disorder Questionnaire (RAD). SDQ = Strengths and Difficulties Questionnaires (behaviour problems).

		N	SCQ	RADQ	SDQ
ASD	Present	19	16.52 (12.69)	60.26 (24.23)	19.78 (6.98)
	Absent	88	6.19 (6.87)	51.12 (23.32)	14.93 (8.18)
RAD	Present	37	9.51 (9.05)	65.05 (30.01)	20.18 (7.58)
	Absent	68	7.27 (9.06)	46.01 (15.96)	13.42 (7.50)

Table 2-3 Mean (standard deviation) scores on the three screening tools for pupils diagnosed with ASD and those with no ASD diagnosis (top panel), and for pupils with and without a diagnosis of RAD (bottom panel). SCQ = Social Communication Questionnaire (ASD). RADQ – Randolph Attachment Disorder Questionnaire (RAD). SDQ = Strengths and Difficulties Questionnaires (behaviour problems).

Figure 2-1 shows the mean scores for the four sub-scales of the SDQ for those diagnosed with ASD or not (left panel), AD or not (middle panel), or with ASD or AD only (right panel). In order to determine whether any of the behavioural problems discriminated between these diagnoses, a series of discriminant function analyses were performed: one on the ASD versus no ASD groups; one on the AD

versus no AD groups; and one on those diagnoses with either ASD or AD (excluding those with an overlapping diagnosis).

Figure 2-1:

Mean scores for the four sub-scales of the Strengths and Difficulties Questionnaire (SDQ) for those diagnosed with Autism Spectrum Disorder ASD or not (left panel), Reactive Attachment Disorder (RAD) or not (middle panel), or with ASD or RAD only (right panel). Error bars = 95% confidence intervals.

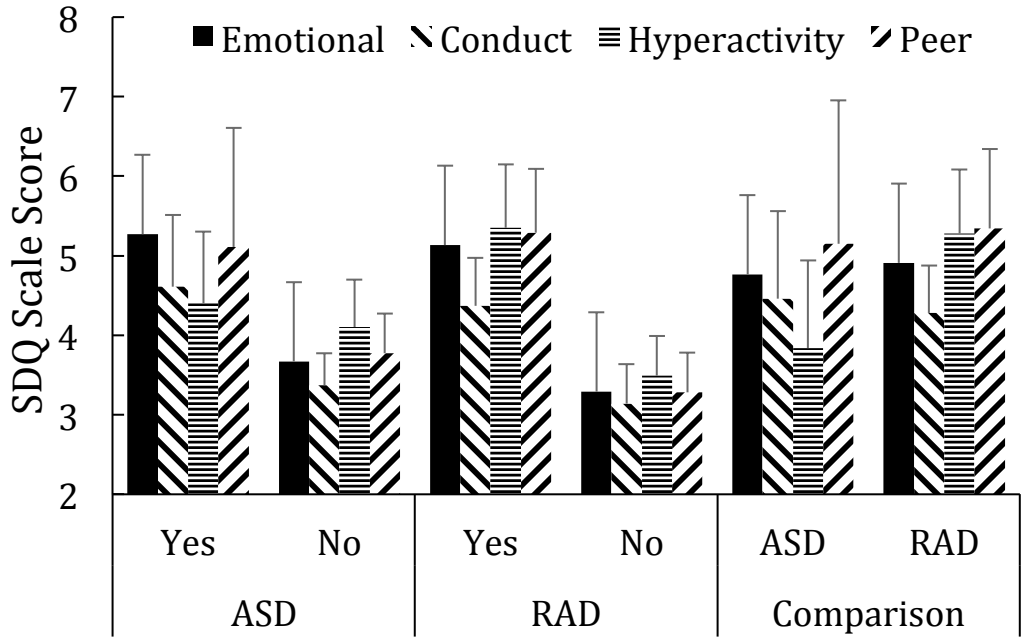


Figure 2-1 Mean scores for the four sub-scales of the Strengths and Difficulties Questionnaire (SDQ) for those diagnosed with Autism Spectrum Disorder ASD or not (left panel), Reactive Attachment Disorder (RAD) or not (middle panel), or with ASD or RAD only (right panel). Error bars = 95% confidence intervals.

A discriminant function analysis was conducted to uncover the dimensions of values that may differentiate between a diagnosis of ASD and no ASD diagnosis (left panel). The predictors were the four subscales of the SDQ (emotional problems, conduct problems, hyperactivity, and peer problems). The first function significantly differentiated between ASD and no ASD, *Wilks Lambda* = .884, $X^2(4) = 12.325$, $p = .015$, $\varphi = .342$. According to the structure matrix, the function represents emotional problems (.710), conduct problems (.635), and peer problems (.564), but not hyperactivity (.125), which are also reflected in the group centroids and in the mean differences for ASD or not in Figure 1. Thus, all behaviour problems, except

hyperactivity, predict the presence of ASD, and predict diagnosis with a 79.8% accuracy.

A discriminant function analysis was conducted to uncover the dimensions of values that may differentiate between a diagnosis of AD and no AD diagnosis, using the four subscales of the SDQ (emotional, conduct, hyperactivity, and peer problems) as predictors. The first function significantly differentiated between AD and no AD, *Wilks Lambda* = .819, $X^2(4) = 19.914$, $p < .001$, $\varphi = .435$. According to the structure matrix, the function represents peer problems (.873), hyperactivity (.858), emotional problems (.825), and conduct problems (.624), which are also reflected in the group centroids and in the mean differences for AD or not (middle panel, Figure 1). Thus, all behaviour problems, including hyperactivity, predicted the presence of AD, and predict diagnosis with a 69.2% accuracy.

A discriminant function analysis was conducted to uncover the dimensions of values that may differentiate between a diagnosis of ASD and AD, comparing only pupils with no overlapping diagnosis (right panel), using the four subscales of the SDQ (emotional, conduct, hyperactivity, and peer problems) as predictors. No function significantly differentiated between ASD and AD, with the first function being closest to significance, *Wilks Lambda* = .846, $X^2(4) = 6.837$, $p = .145$, $\varphi = .255$. According to the structure matrix, the function represents hyperactivity (.694), but conduct problems (-.104), peer problems (.074), or emotional problems (.062), did not discriminate between ASD and AD.

Table 2-4:

Mean (standard deviation) scores on the three screening tools for pupils exceeding, and not exceeding, the cut-off for ASD on the SCQ (top panel), and also for the pupils exceeding, and not exceeding, the cut-off for RAD on the RADQ (bottom panel). SCQ = Social Communication Questionnaire (ASD). RADQ – Randolph Attachment Disorder Questionnaire (RAD). SDQ = Strengths and Difficulties Questionnaires (behaviour problems).

		N	SCQ	RADQ	SDQ
ASD	Present	23	22.61 (6.93)	72.91 (30.59)	24.00 (6.64)
	Absent	82	3.98 (3.98)	47.13 (17.77)	13.51 (7.02)

RAD	Present	24	13.63 (10.77)	88.29 (20.61)	25.45 (6.26)
	Absent	81	6.42 (7.88)	42.25 (10.66)	12.95 (6.26)

Table 2-4 Mean (standard deviation) scores on the three screening tools for pupils exceeding, and not exceeding, the cut-off for ASD on the SCQ (top panel), and also for the pupils exceeding, and not exceeding, the cut-off for RAD on the RADQ (bottom panel). SCQ = Social Communication Questionnaire (ASD). RADQ – Randolph Attachment Disorder Questionnaire (RAD). SDQ = Strengths and Difficulties Questionnaires (behaviour problems).

Table 2-4 shows the mean (standard deviation) scores on the three screening tools for the pupils exceeding, and not exceeding, the cut-off for ASD on the SCQ, and for pupils exceeding, and not exceeding, the cut-off for AD on the RADQ. Inspection of the top panel, showing the results for pupils exceeding or not the cut-off for ASD, shows significantly higher SCQ scores for the pupils exceeding the ASD cut-off, $t(103) = 16.53$, $p < .001$, $d = 3.88$, higher RADQ scores, $t(103) = 5.16$, $p < .001$, $d = 1.04$, and higher SDQ scores, $t(103) = 6.40$, $p < .001$, $d = 1.61$. Inspection of the bottom panel, presenting mean scores on the screening tools for pupils who did and did not exceed the cut-off for AD, shows significantly higher SCQ scores, $t(103) = 3.61$, $p < .001$, $d = .82$, higher RADQ scores, $t(103) = 14.63$, $p < .001$, $d = 3.07$, and higher SDQ scores, $t(103) = 8.59$, $p < .001$, $d = 2.09$.

Figure 2-2 Mean scores for the four sub-scales of the Strengths and Difficulties Questionnaire

Mean scores for the four sub-scales of the Strengths and Difficulties Questionnaire (SDQ) for those scoring above and below the psychometric cut-off for Autism Spectrum Disorder (left panel), Reactive Attachment Disorder (middle panel), or ASD or RAD only (right panel). Error bars = 95% confidence intervals.

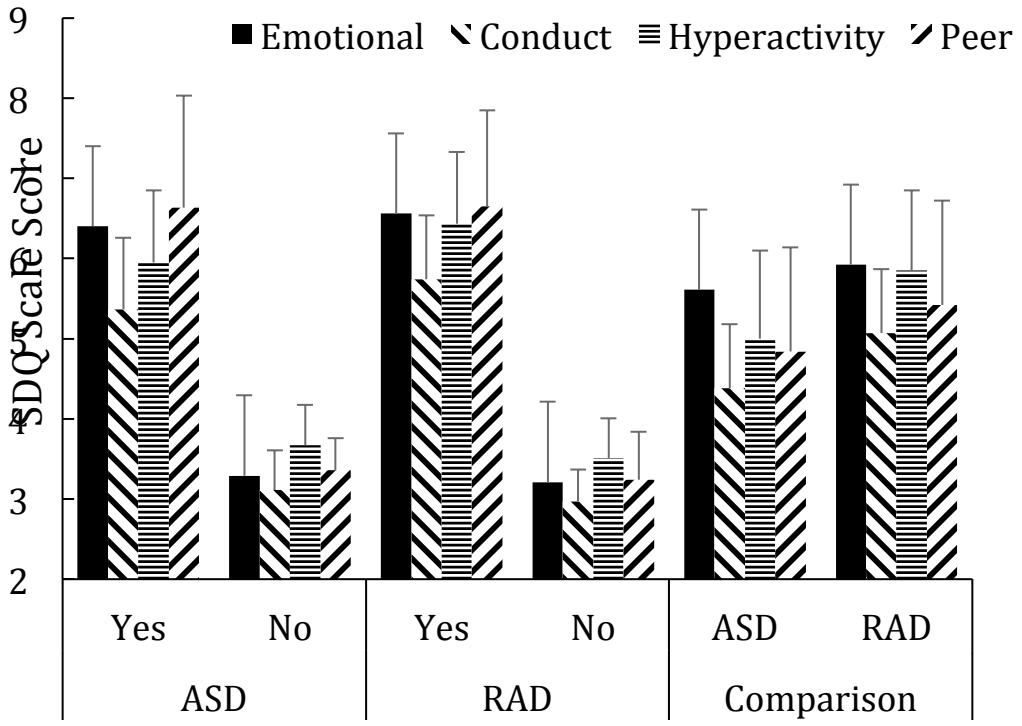


Figure 2-2 Mean scores for the four sub-scales of the Strengths and Difficulties Questionnaire (SDQ) for those scoring above and below the psychometric cut-off for Autism Spectrum Disorder (left panel), Reactive Attachment Disorder (middle panel), or ASD or RAD only (right panel). Error bars = 95% confidence intervals.

Figure 2-2 shows the mean scores for the four sub-scales of the SDQ for those scoring above and below the psychometric cut-off for ASD (left panel), AD (middle panel), or ASD or AD only (right panel). In order to determine whether any behavioural problems discriminated between these classifications, a series of discriminant function analyses were performed: one on ASD versus no ASD; one on AD versus no AD; and one on either ASD or AD (excluding those with an overlapping diagnosis).

A discriminant function analysis was conducted to uncover the dimensions of values that differentiate between a psychometric ASD and no ASD classification (left panel). The predictors were the four SDQ subscales (emotional, conduct, hyperactivity, and peer problems). The first function significantly differentiated between ASD and no ASD classifications, *Wilks Lambda* = .693, $X^2(4) = 36.723$, $p < .001$, $\varphi = .591$. According to the structure matrix, the function represents emotional problems (.920), peer problems (.825), conduct problems (.735), and hyperactivity (.639), which are also reflected in the group centroids and in the mean differences for ASD

classification in Figure 2 (left panel). Thus, all behaviour problems predict the classification of ASD, and predict classification with an 82.7% accuracy.

A discriminant function analysis was conducted to uncover the dimensions of values differentiating between a psychometric classification of AD and no AD, using the four subscales of the SDQ (emotional, conduct, hyperactivity, and peer problems) as predictors. The first function significantly differentiated between AD and no AD, *Wilks Lambda* = .594, $X^2(4) = 52.067$, $p < .001$, $\varphi = .704$. According to the structure matrix, the function represents emotional problems (.843), peer problems (.809), conduct problems (.624), and hyperactivity (.718), which are also reflected in the group centroids and in the mean differences for AD classification (middle panel, Figure 1). Thus, all behaviour problems predicted the classification of AD, and predict diagnosis with 87.5% accuracy.

A discriminant function analysis was conducted to uncover dimensions differentiating between a classification of ASD and AD, comparing only pupils with no joint classification (right panel), using the four subscales of the SDQ (emotional, conduct, hyperactivity, and peer problems) as predictors. No function significantly differentiated between ASD and AD; first function, *Wilks Lambda* = .908, $X^2(4) = 2.264$, $p > .60$, $\varphi = .146$.

2.4. Discussion

The research sought to determine the degree to which there is overlap in the clinical diagnosis of ASD and AD for a sample with learning difficulties in a special school setting. It also assessed the degree of overlap when screening-tools are used to assess these disorders and whether any easily identifiable behaviour problems might discriminate between the two disorders. The current results indicated that there was a degree of overlap between the two disorders both when clinical diagnoses and psychometric methods were employed (Mayes et al., 2017; Minnis et al., 2020). This overlap was larger when psychometric screening-tools were employed. The level of overlap in clinical diagnosis being about half that observed when using screening tools (5% versus 10% of the sample receiving a joint classification). The level of joint classification for pupils with learning difficulties was marginally higher

(4% versus 2%) than that noted in a community sample by Minnis et al. (2020). However, the percentage of children with ASD also meeting the criteria for AD, and vice versa (about 40% in both cases), was lower than in many previous studies (Davidson et al., 2015; Mayes et al., 2017; Sadiq et al., 2012), which tended to report about 60% overlap.

The current data give strength to the argument that overlap between ASD and AD can exist (Mayes et al., 2017; Minnis et al., 2020; Sadiq et al., 2012), and is clearly evident in a group of individuals with learning disability. Thus, the evidence of an association between behavioural presentation of ASD and the behavioural presentation of AD is one that is increasingly difficult to contest (Denis et al., 2009; Moran, 2010). Diagnostic accuracy is essential, as, despite the challenges presented in attributing appropriate diagnosis, outcomes and treatment pathways are clearly different (Denis et al., 2009). Thus, any individual predictors of differentiation, rather than diagnostic labels, may be of value (Davidson et al., 2015; Mayes et al., 2017).

However, accurately predicting whether a behavioural presentation is ASD or AD remains a challenge. The current research explored whether behavioural problems commonly noted in a special school environment could be used for these purposes. Although it was possible to discriminate between the presence of ASD or the presence of AD, compared to their absence, using the presence of all measured behavioural problems, ASD and AD could not be discriminated from one another on this basis. This was true when the classification was made on the basis of clinical diagnosis, and on the basis of a psychometric screening tool. There was an indication that, when using the clinical diagnosis criteria, hyperactivity was more predictive of AD than ASD, but this was not statistically reliable. Thus, the current results tend to support those of Sadiq et al. (2012) who noted very little discrimination between the two disorders using general behaviour problems. Of course, it may be possible to use specific behaviours tied to the clinical criteria to make such a diagnosis, a suggested by Davidson et al. (2015) and Mayes et al. (2017). Although the degree of the overlap in the clinical diagnosis noted in this

study may temper this optimism. Moreover, the lack of discriminating behaviour problems that a special schoolteacher could easily identify remains a challenge.

Chapter Three : Overlap in parent ratings of Autism Spectrum Disorder and Attachment Disorder symptoms

The aims of the third Chapter seeks to extend the initial study by extending the parameters by including psychosocial differences in the parents of the children with ASD or AD. Research shows that the parenting a child with increased ASD symptomology is linked with increased marital discord and both parental stress and conflict (Chan & Leung, 2020). Research also shows with children with AD, the stress regulation capacity of the main caregiver contributed to emotional and behavioural differences (Hornfeck et al., 2019). Evidence is also clear that psychosocial deprivation leads to a host of short and long-term consequences. It is predicted that the stress level will be high, however the hypothesis is that this will be for difference reasons between ASD, AD and ASD and AD parenting.

The introduction of on-line collection of data was developed and the measures of Chapter 2 were repeated with the on-line population (Social Communication Questionnaire (SCQ), Rutter et al., (2003 - parent report); the Randolph Attachment Disorder Questionnaire (RADQ; Randolph, 2000)). In addition to this the profiles of children who fulfilled criteria for both ASD and attachment difficulties were examined in terms of demographics (See Appendix A), the level of both ASD and AD symptomology and how the correlation between child symptomology as reported by parents, and the level of parenting stress.

Reported parent characteristics were also examined, including demographics, levels of stress and parental emotional well being, as well as parental attitudes and behaviours. It was possible to explore these factors as the on-line response facilitated the gathering of this level of information from participants. The similarities and differences were examined in the parent-characteristics between children who met criteria for ASD and children who met criteria for attachment difficulties. An examination was made of the similarities and differences in child characteristics (demographics, ASD behaviours, attachment difficulties, and behaviour problems) between children who met criteria for ASD and those who met criteria for attachment difficulties, several studies have examined overlap between ASD and AD based on professional clinical diagnoses and classifications (Davidson et al., 2015;

Mayes et al., 2017) and as found in Chapter 2, but few have examined the overlap in potential classifications based on parent ratings.

ASD, as established in Chapter 2, is a developmental disorder defined by impaired social communication, and restricted and repetitive behaviours and interests (APA, 2016; WHO, 2020). ASD comprises a wide spectrum of problems, with considerable heterogeneity in symptom presentation and severity (Wing et al., 2011). Children with ASD typically have poor or limited social relatedness and social-emotional reciprocity, which may include difficulties with empathy, perspective taking, following social rules, and understanding and being aware of personal boundaries (Davidson et al., 2015). ASD is also characterised by restricted and repetitive behaviours and interests, including repetitive motor movements, or unusually intense fixations on certain objects or topics (Szatmari et al., 2006). Many children with ASD also exhibit high levels of externalising behaviours (Hartley et al., 2008).

Children can present with marked difficulties with social relationships but are thought not to have ASD, such as children who have experienced significant disruption or deprivation in attachment (DSM-5; ICD-10). The conceptualisation of AD is similar between both the DSM and ICD classification systems; children with AD are withdrawn, hypervigilant, or are highly contradictory or ambivalent in their behaviours towards caregivers and others. Thus, a child with AD may have problems developing committed intimate social relationships due to a lack of social boundaries or social disconnection (Davidson et al., 2015; Rutter et al., 2009). However, empirical and clinical observations indicate children with AD often present with a wider range of difficulties than outlined in DSM and ICD criteria. These difficulties may include impairment in the interpretation and/or use of social cues, problems sharing experiences, and problems with pragmatic language (Moran, 2010; Mukaddes, et al., 2000; Sadiq et al., 2012). Other symptoms may include repetitive behaviours (Moran, 2010; Mukaddes et al., 2000; Sadiq et al., 2012), and high levels of aggressiveness, impulsiveness, and controlling behaviours (Buckner et al., 2008; O'Connor & Zeanah, 2003).

Thus, as discussed in Chapter 2, children with AD may present with many symptoms that are also clinical features of ASD. This similarity in behavioural presentations of ASD and AD raises important questions surrounding whether ASD and AD can co-occur. According to diagnostic frameworks (DSM-5; ICD-10), ASD and AD are distinct disorders with separate aetiologies, and diagnosis of ASD precludes a concurrent diagnosis of AD, and vice versa. However, diagnostic frameworks do not necessarily reflect clinical reality, nor are they always supported by empirical evidence (e.g., Zeanah & Gleason, 2015).

O'Connor et al. (1999) examined emotional, behavioural, and social functioning of 111 Romanian orphans, adopted into UK families, who had experienced physical and emotional neglect. ASD-like behaviours were assessed using parent-reports. At 4 years old, 5% showed ASD-like patterns of behaviours, and 5% demonstrated milder ASD features. However, these ASD features did diminish over a two-year period. Sadiq et al. (2012) explored whether 35 children (5-8 years) clinically diagnosed with AD showed symptoms consistent with ASD. In this sample of children with AD, 46% met the threshold for impairment in reciprocal and social interaction, 63% for impaired use of language and social communication, and 20% displayed repetitive and stereotyped behaviours. Davidson et al. (2015) investigated the relationship between ASD and AD in a sample comprising 115 children (5-11 years); 58 were diagnosed with ASD according to DSM-IV criteria, and 67 with AD. Of the sample, 62% of children with ASD met core AD criteria, although behaviours were more indicative of ASD in all but one children. Thus, there appears to be some convergence that ASD and AD can jointly diagnosed, but that some features of the two disorders can classify individuals as having one or the other of the disorders. Most of these reports have employed clinical assessments to make such diagnoses and differentiation. It is unclear whether similar results would emerge when parent perceptions are considered, and when different forms of behaviour problems (such as peer problems, conduct problems), which are highly prevalent presentation in both disorders, are considered, as discussed in Chapter 2.

Another area that has received little attention is the attachment style of the children. Attachment styles are not necessarily related to either AD (Minnis et al., 2009) or

ASD (Van Ijzendoorn et al., 2007). However, there may be differences in the degree to which particular attachment styles could discriminate between the two disorders. For example, while 30% of children diagnosed with AD display secure attachment, 42% display disorganised insecure attachment, and rates are higher than would be expected in the general population (Minnis et al., 2000). In contrast, there is only limited evidence for systematic differences in attachment styles for those with ASD (Van IJzendoorn et al., 2007), with insecure attachment being related to parental sensitivity and insight (Kahane & El-Tahir, 2015) or to authoritarian parenting (van Steijn et al., 2013) rather than the disorder itself. Nevertheless, no research has attempted to explore whether such styles discriminate between ASD and AD.

There are important theoretical reasons to examine whether or not ASD and AD overlap, and what characteristics distinguish the two disorders. Regardless of whether diagnostic overlaps between ASD and AD exist, it is clear that children may have ASD without AD, or AD without ASD. Since the prognosis and appropriate treatments are considered to be quite different between the two disorders (Becker-Weideman, 2006; Denis et al., 2009; Mukaddes et al., 2000) finding predictors of differential diagnosis, that are not necessarily related to clinical features of the DSM and ICD, is crucial.

The current study aimed to gain insight into the overlap, similarities, and differences between ASD and AD based on parental report, which is an under-examined topic. Firstly, it examined the overlap between ASD and AD using standardised assessment measures. Secondly, the profile of children who fulfilled criteria for ASD and AD were examined in terms of demographics and behaviour problems, and the similarities and differences between children who met criteria for ASD and AD. Thirdly, differences in attachment style were examined. It was hoped that these comparisons may allow better understanding of what variables, if any, can distinguish between the two disorders from the perspective of the parent.

3.1. Method

3.1.1. Informants and Recruitment

Informants were parents of children with developmental disabilities who volunteered after responding to online advertising on websites and social media sites. Around 400 websites and social media groups, set up by parents whose children had developmental and intellectual disabilities, were identified in the UK. The moderator of these sites was contacted, and permission sought to place an advertisement on their site for the users to see and respond to if they wished. Of these websites and social media sites, 180 agreed to have the advert posted. Participation was available to parents or caregivers who satisfied three criteria: they had to be aged 18 years or older; have a child aged between 3-22 years to give an increased range to the study and to capture those children with a later clinical diagnosis, and English as a first language. Ethical approval was granted by the University Psychology Department Ethics Committee.

After the adverts were posted, 178 parents or caregivers responded and completed the online questionnaire. From this initial sample, 18 were excluded for not satisfying the inclusion criteria, and 5 failed to complete more than 10% of the survey. Thus, the final sample of parents for analysis was 155 informants.

Of the final 155 parents (150 female, 5 male), the mean age was 40.81 (*S.D.* $\pm$ 8.95; range = 22 – 72) years, who identified largely as having a white ethnic heritage (85.5%). In terms of relationship status, 111 (71%) were married, 18 (11%) were single, 18 (11%) were separated or divorced, 4 (2%) were widows, and 5 (3%) did not specify. 76 (42%) had a university degree, 71 (45%) had high school or trade-related qualifications, 13 (6%) had left school at 16 years of age, and 6 (4%) did not specify. 46 (30%) were professional or managerial, 21 (15%) were in skilled or clerical work, 17 (10%) were self-employed, 7 (4%) were volunteers, 4 (2%) were students, 49 (31%) were unemployed, and 12 (8%) did not specify.

In terms of parental responsibility, 106 (69.7%) identified as being a biological parent, 17 (11%) as a biological grandparent, 29 (19%) as adoptive/foster parents with legal custody of the child, and 4 (2%) did not specify. Of the parents, 30 (19%)

had 1 child, 60 (38%) had 2 children, 31 (19%) had 3 children, 18 (11%) had 4 or more children, and 17 (10%) did not specify. In terms of the characteristics of the child on whom the questionnaire was based, there were 99 (63%) males, 52 (33%) females, and 6 (4%) unspecified, and their mean age was 10.19 (± 4.49; range = 2 – 22). Of the children, 54 (35%) were reported to have a diagnosis of ASD, and 51 (33%) were reported to have an attachment disorder and be known to social services due to behavioural/attachment problems; the remaining 50 (32%) were reported as having no diagnosis of either AD or ASD. The parents reported that their child's diagnosis was made at a mean age of 6.90 (± 3.99; range 2 – 21) years.

3.2. Measures

3.2.1. Demographics

General information was requested about the parent or caregiver (age, ethnicity, marital status, education level, and occupation), and about their child (age, gender, diagnosis, age at diagnosis).

Social Communication Questionnaire (SCQ; Rutter, Bailey, & Lord, 2003) is used for the identification of ASD and its symptom levels. The scale has 40 items, with a total score ranging from 0 to 39, and a cut-off score of 15 indicating a high probability of ASD (Berument et al., 1999). The SCQ has excellent psychometric properties for reliability and validity (Rutter et al., 2003), and a sensitivity of .88, and a specificity of .86, for the discrimination of ASD (Chandler et al., 2007). The internal reliability of the scale (Cronbach α) for the present sample was .913.

Randolph Attachment Disorder Questionnaire (RADQ; Randolph, 2000) is a 30-item scale that screens for attachment disorder and distinguishes attachment disorder from conduct or other psychiatric disorders. The total RADQ score estimates the severity of AD. A RADQ score of 50-65 indicates the presence of AD, but the required score for a diagnosis is 66-75 for mild attachment disorder; 76-89 for moderate; and 90 and over for severe AD. For the purpose of this study, 66 was taken as the cut-off point. Randolph (2000) reported a test-retest reliability of between .82 and .85. Validity was reported as being established through the use of several techniques: item validity, criterion-references validity, construct validity and

predictive validity (Randolph, 2000). The internal reliability of the scale (Cronbach α) for the present sample was .951. In addition, the scale allows classification into attachment styles of the children: avoidant, anxious, and ambivalent, each scored on a scale of 5-25. The internal reliability of the attachment type scales (Cronbach α) for the present sample were: Avoidant = .712, Anxious = .841, and ambivalent = .740.

Strengths and Difficulties Questionnaire (SDQ; Goodman, 1977) is a brief behavioural screening questionnaire for emotional and behavioural disorders in children and adolescents aged 4-16 years. The scale comprises 25 items: emotional symptoms (5 items), conduct problems (5 items), hyperactivity/inattention (5 items), peer relationship problems (5 items) and prosocial behaviour (5 items), with scores from the subscales generating a total difficulties score: normal range = 0-15; 16 -19 = borderline; and 20-40 = abnormal (Youth in Mind, 2005). The SDQ has strong reliability, internal consistency, for the total and subscales (Stone et al., 2010). The internal reliability of the scale (Cronbach α) for the present sample was .959.

3.3. Procedure

Participants could see an advert for the study on their online group, and could obtain more information by clicking a link that took them to an Information Sheet. If they wished to participate further, they clicked a consent button, and were taken to the online survey. Participants were then asked to complete an online survey, for which there was no set time limit, but which took about 30 min. Once completed parents were shown a debrief page on-screen.

Prior to analysis, data were cleaned and screened for missing values and outliers. Missing data were replaced using the person-mean substitution method for any questionnaire measure where $\leq$ 10% of the items were missing (Hawthorne & Elliot, 2005). Visual inspection of histograms and Q-Q plots demonstrated the data were normally distributed on all variables

3.4. Results

Table 3-1 shows the sample mean (standard deviation) for the SCQ, RADQ, and SDQ, along with their correlations with each other and participant characteristics. For the SCQ (ASD), 94/151 (62%) of the sample had a score in the abnormal range. More males (70/99; 70%) than females (24/52; 46%) fell into this range, but this difference was not significant, $X^2(1, N = 151) = 8.748$, $p = .003$, $\varphi = .241$. However, the mean SCQ score for males **(**18.60 $\pm$ 8.84**)** was higher than the female mean (13.91 $\pm$ 8.92), $t(149) = 3.09$, $p = .002$, $d = .50$. The RADQ (AD) shows 97/151 (64%) of the sample scored positive. Although there was a numerically higher presence of males (65/99; 65%) scoring positive in relation to females (32/52; 61%) this was not significant, $X^2(1, N = 151) = .252$, $p > .60$, $\varphi = .041$. The male mean (79.94 $\pm$ 26.98) was similar to the female mean (78.53 $\pm$ 29.5844), $t(149) = .29$, $p > .70$, $d = .05$. Inspection of the correlations shows that SCQ (ASD) correlated positively with RADQ (AD), and with SDQ (behavioural problems) score. SCQ scores also correlated with being male (male was scored 1 and female 0 in a point biserial correlation). The RADQ correlated positively with the SDQ, and negatively with being a biological parent of the child using a point biserial correlation (parent relationship was scored 0 for adoptive parent and 1 for biological parent).

a = Pearson's correlation; b = point biserial correlation *p< .05; **p<.01; ***p<.001

Table 3-1

Mean (standard deviation) for the Social Communication Questionnaire (SCQ), Randolph Attachment Disorder Questionnaire (RADQ), and the Strengths and Difficulties (SDQ) questionnaire, along with their correlations with one another, and with some of the participant characteristics.

	Mean (SD)	**RADQ**	**SDQ**	**Parent age**	**Parent relation**	**Child age**	**Child age at diagnosis**	**Child gender**
SCQ	16.91 (9.07)	[a].259***	[a].425***	[a]-.017	[b].056	[a].040	[a]-.069	[b].180*
RADQ	78.87 (28.06)		[a].676***	[a].096	[b]-.312***	[a].139	[a]-.014	[b].006
SDQ	22.54 (7.40)			[a].082	[b]-.097	[a].127	[a].330***	[b].128

Table 3-2 Mean (standard deviation) for the Social Communication Questionnaire (SCQ), Randolph Attachment Disorder Questionnaire (RADQ), and the Strengths and Difficulties (SDQ) questionnaire, along with their correlations with one another, and with some of the participant characteristics.

Of the sample, 54 (34%) children were reported to have a clinical diagnosis of ASD, with more males (43/99; 43%) than females (11/50; 22%) having a diagnosis, $X^2(1, N = 149) = 6.605$, $p = .010$, $\varphi = .211$. In terms of AD, 52 (33%) children were reported as having an attachment disorder, with similar proportions of males (34/96; 35%) and females (18/51; 35%) qualifying, $X^2(1, N = 147) = .001$, $p > .90$, $\varphi = .001$.

Table 3-2 presents the numbers of children reported as having a clinical diagnosis (left panel), and exceeding the screening-tool cut-off points (right panel), for ASD and AD. The left panel for clinical diagnoses shows 40% of children had neither diagnosis, 24% had a reported diagnosis of ASD only, 24% had a reported diagnosis of AD only, and 11% had a reported diagnosis of both ASD and AD. Of those with a reported diagnosis of ASD, 17/52 (32%) also had a reported AD diagnosis; and, of those who had a reported diagnosis of AD, 17/52 (32%) also had a reported diagnosis of ASD. The right panel shows 19% were classed as having neither disorder by the psychometric tools, 16% having ASD but not AD, 18% as having AD but not ASD, and 45% were classed as having both ASD and AD. Of the 96 children scoring in the abnormal range for ASD, 70 (70%) also scored in the abnormal range for AD. Of the 99 children scoring in the abnormal range for AD, 70 (70%) also scored positive for ASD.

Table 3-2

The numbers of children reported as having clinical diagnosis (left panel), and exceeding the screening-tool cut-off points (right panel), for Autism Spectrum Disorder (ASD) and Attachment Disorder (AD).

Diagnosis			Screening		
	AD	No AD		AD	No AD
ASD	17	35	ASD	70	26
No ASD	35	58	No ASD	29	30

Table 3-3 ***Numbers of children reported as having clinical diagnosis (left panel), and exceeding the screening-tool cut-off points (right panel), for Autism Spectrum Disorder (ASD) and Attachment Disorder (AD).***

Table 3-3 shows the mean (standard deviation) scores for children reported as having an ASD diagnosis and not (top panel), and reported to have a diagnosis of AD or not (bottom panel). Inspection of these data for children reported to have ASD compared to those reported as not having the diagnosis, shows significantly higher SCQ scores, $t(147) = 7.22$, $p < .001$, $d = 1.26$, no difference for RADQ scores, $t(147) = 1.03$, $p > .30$, $d = .18$, and no difference in SDQ scores, $t(147) = 1.43$, $p = .148$, $d = .30$. Inspection of these data for children reported to have an AD diagnosis compared to not, shows no significant difference for SCQ scores, $t(145) = .21$, $p > .80$, $d = .06$, marginally higher RADQ scores, $t(145) = 1.66$, $p = .099$, $d = .29$, and no difference for SDQ scores, $t(145) = .44$, $p > .60$, $d = .08$. Cohen's Kappa revealed a moderate agreement between the diagnoses and psychometric classifications of .540, $p < .001$.

Table 3-3:

Mean (standard deviation) scores on the three screening tools for children reported as having an ASD diagnosis (top panel), and for children reported as having a diagnosis of AD (bottom panel). SCQ = Social Communication Questionnaire (ASD). RADQ – Randolph Attachment Disorder Questionnaire (AD). SDQ = Strengths and Difficulties Questionnaires (behaviour problems).

		N	SCQ	RADQ	SDQ
ASD	Present	54	23.07 (7.87)	76.16 (25.04)	23.52 (6.68)
	Absent	95	13.39 (7.86)	81.02 (28.85)	21.71 (7.75)
AD	Present	52	17.01 (8.36)	84.74 (28.37)	22.72 (6.61)
	Absent	95	16.67 (9.54)	76.74 (27.69)	22.15 (7.95)

Table 3-4 Mean (standard deviation) scores on the three screening tools for children reported as having an ASD diagnosis (top panel), and for children reported as having a diagnosis of AD (bottom panel). SCQ = Social Communication Questionnaire (ASD). RADQ – Randolph Attachment Disorder Questionnaire (AD). SDQ = Strengths and Difficulties Questionnaires (behaviour problems).

Figure 3-1 shows the mean scores for the four sub-scales of the SDQ, for those reported to have an ASD diagnosis or not (left panel), an AD diagnosis or not (middle panel), or with ASD or AD only, excluding those with an overlapping diagnosis (right panel). To explore whether any behavioural problems discriminated

between diagnoses, a series of discriminant function analyses were performed using the subscales of the SDQ (emotional problems, conduct problems, hyperactivity, and peer problems): one on the ASD versus no ASD groups; one on AD versus no AD groups; and one on ASD or AD.

Figure 3-1:

Mean scores for the four sub-scales of the Strengths and Difficulties Questionnaire (SDQ) for those reported with Autism Spectrum Disorder (ASD) or not (left panel), Attachment Disorder (AD) or not (middle panel), or with ASD or AD only (right panel). Error bars = 95% confidence intervals.

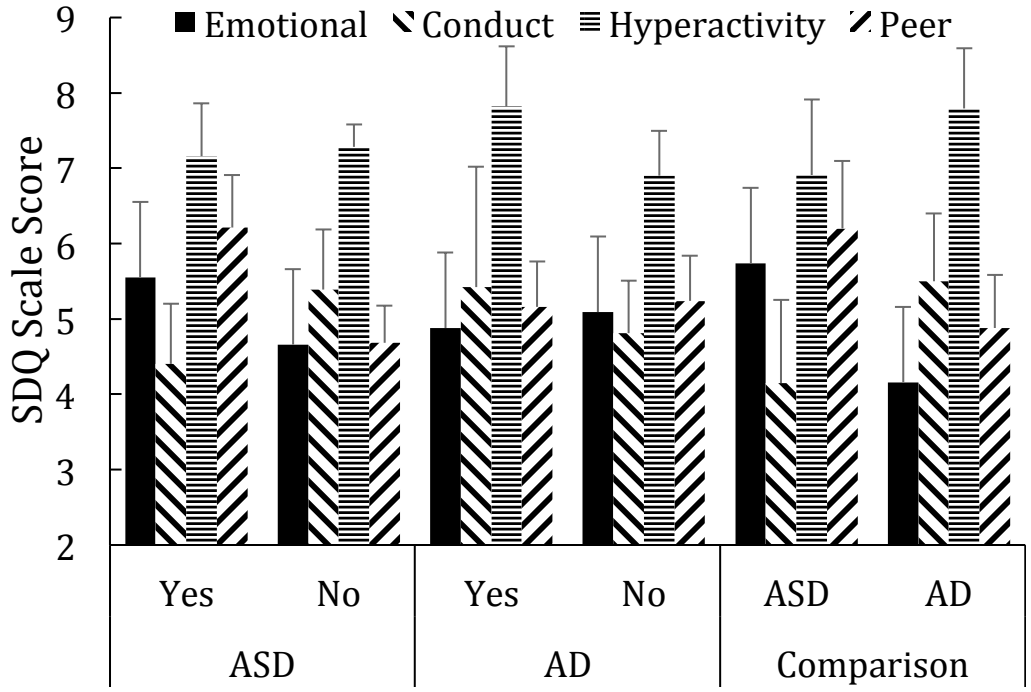


Figure 3-1 *Mean scores for the four sub-scales of the Strengths and Difficulties Questionnaire (SDQ) for those reported with Autism Spectrum Disorder (ASD) or not (left panel), Attachment Disorder (AD) or not (middle panel), or with ASD or AD only (right panel). Error bars = 95% confidence intervals.*

When a discriminant function analysis was conducted to differentiate reported diagnosis of ASD and no reported ASD (left panel) found the first function significantly differentiated the groups, *Wilks Lambda* = .844, $X^2(4) = 22.818$, $p < .001$, $\varphi = .394$. According to the structure matrix, the function represents peer problems (.732), with conduct problems (-.389), emotional problems (.362), and hyperactivity (-.048) less strongly associated. This was reflected in the group centroids, and in the mean differences shown in the left panel of Figure 1. Greater peer and emotional problems and fewer conduct problems predicted the presence of

an ASD diagnosis report, with a 69.8% accuracy. In contrast, the discriminant function analysis conducted to differentiate between reported AD diagnosis and no AD diagnosis (middle panel), found no function significant, *Wilks Lambda* = .967, $X^2(4) = 4.423$, $p > .30$, $\varphi = .174$. According to the structure matrix, the first function only included hyperactivity (.841), with conduct (.347), peer (-.297), and emotional (-.222) problems being less strongly associated.

The discriminant function analysis to differentiate between reported ASD and AD diagnoses, comparing only children with no reported conjoint diagnosis (right panel), found the first function significantly differentiated ASD and AD, *Wilks Lambda* = .802, $X^2(4) = 13.67$, $p = .008$, $\varphi = .307$. According to the structure matrix, the function represents peer problems (.606), conduct problems (-.489), and emotional problems (.405), with hyperactivity less strongly associated (-.356). This was reflected in the group centroids, and in the mean differences for ASD or AD (right panel Figure 3-1). Thus, greater peer and emotional problems, and lower conduct and hyperactivity problems, predicted the presence of a reported ASD diagnosis report, and the function had a 74.2% accuracy.

Table 3-4:

Mean (standard deviation) scores on the three screening tools for children exceeding, and not exceeding, the cut-off for ASD on the SCQ (top panel), and also for the children exceeding, and not exceeding, the cut-off for AD on the RADQ (bottom panel). SCQ = Social Communication Questionnaire (ASD). RADQ – Randolph Attachment Disorder Questionnaire (RAD). SDQ = Strengths and Difficulties Questionnaires (behaviour problems).

		N	SCQ	RADQ	SDQ
ASD	Present	96	22.79 (5.76)	86.43 (27.59)	25.08 (6.17)
	Absent	59	7.33 (3.67)	69.19 (25.63)	18.43 (7.42)
AD	Present	99	18.52 (8.59)	95.79 (21.84)	25.85 (5.73)
	Absent	56	14.07 (9.27)	51.71 (9.56)	16.71 (6.36)

Table 3-5 *Mean (standard deviation) scores on the three screening tools for children exceeding, and not exceeding, the cut-off for ASD on the SCQ (top panel), and also for the children exceeding, and not exceeding, the cut-off for AD on the RADQ (bottom panel). SCQ = Social Communication Questionnaire (ASD). RADQ –*

Randolph Attachment Disorder Questionnaire (RAD). SDQ = Strengths and Difficulties Questionnaires (behaviour problems).

Table 3-4 shows the mean (standard deviation) scores on SCQ, RADQ, and SDQ for children exceeding, or not exceeding, the cut-off for ASD on the SCQ (top panel), and the cut-off for AD on the RADQ (bottom panel). Inspection of data for children exceeding the cut-off for ASD compared to those not, shows significantly higher: SCQ, $t(153) = 18.41$, $p < .001$, $d = 3.75$; RADQ scores, $t(153) = 3.88$, $p < .001$, $d = .64$; and SDQ scores, $t(153) = 6.02$, $p < .001$, $d = 1.00$. Inspection of the bottom panel, presenting mean scores on the screening tools for children who exceed the cut-off for AD compared to those who did not, similarly shows significantly higher SCQ, $t(153) = 3.01$, $p = .003$, $d = .49$; RADQ, $t(153) = 14.32$, $p < .001$, $d = 2.93$; and SDQ scores, $t(153) = 9.16$, $p < .001$, $d = 1.47$, scores.

Figure 3-2:

Mean scores for the four sub-scales of the Strengths and Difficulties Questionnaire (SDQ) for those scoring above and below the psychometric cut-off for Autism Spectrum Disorder (left panel), Attachment Disorder (middle panel), or ASD or AD only (right panel). Error bars = 95% confidence intervals.

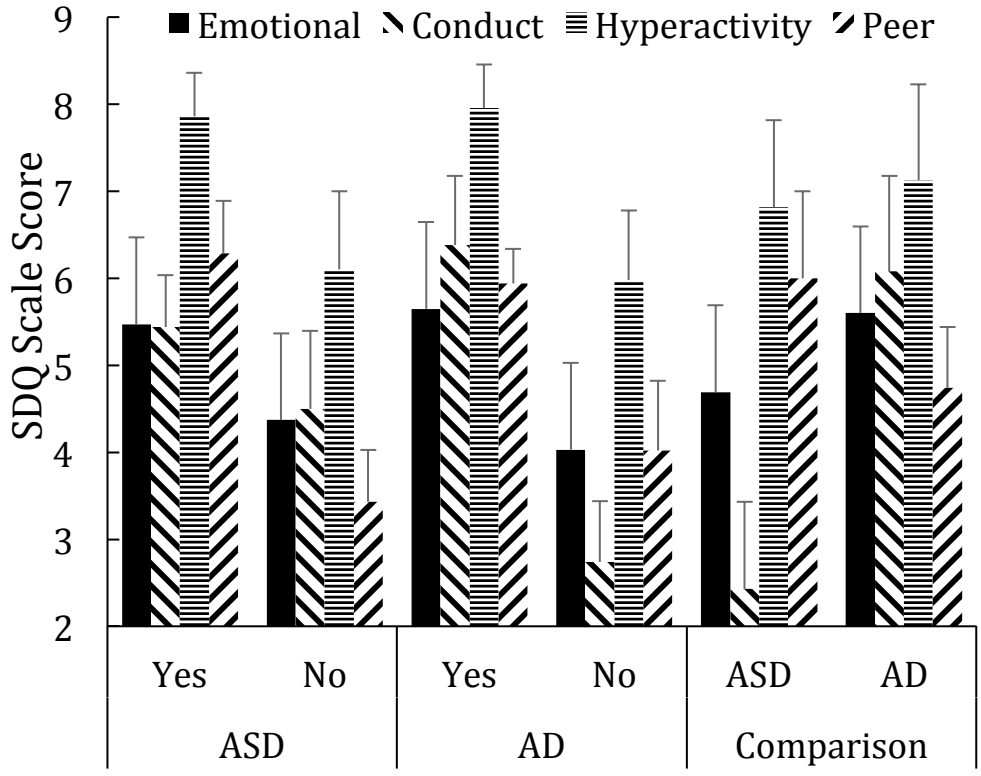


Figure 3-2 Sub scales of SDQ for children scoring above/ below cut-off for ASD / AD

Figure 3-2 shows the mean scores for the four sub-scales of the SDQ, for those scoring above and below psychometric cut-off for ASD (left panel), AD (middle panel), or ASD or AD only (right panel). A series of discriminant function analyses using these SDQ data: one on ASD versus no ASD; one on AD versus no AD; and one on either ASD or AD (excluding those with an overlapping diagnosis). A discriminant function analysis conducted to differentiate psychometric ASD classification (left panel) found the first function significant, *Wilks Lambda* = .650, $X^2(4) = 60.675$, $p < .001$, $\varphi = .629$. According to the structure matrix, the function represents peer problems (.913), and hyperactivity (.444), with emotional problems (.262), and conduct problems (.215) contributing less. These values are also reflected in the group centroids, and in the mean differences for ASD classification in Figure 2 (left panel). Thus, higher levels of all behaviour problems predicted the classification of ASD, with a 77.9% accuracy. Similarly, the discriminant function analysis to differentiate psychometric classification of AD found the first function significant, *Wilks Lambda* = .581, $X^2(4) = 76.521$, $p < .001$, $\varphi = .707$. According to the structure matrix, the function represents conduct problems (.885), peer problems (.473), and hyperactivity (.422), with emotional problems (.340) contributing less strongly, which are also reflected in the group centroids and in the mean differences for AD classification (middle panel, Figure 2). Thus, all behaviour problems predicted the classification of AD, and predicted diagnosis with an 83.4% accuracy.

A discriminant function analysis was conducted to uncover dimensions differentiating between a classification of ASD and AD, comparing only children with no joint classification (right panel). The first function significantly differentiated between ASD and AD, *Wilks Lambda* = .563, $X^2(4) = 25.315$, $p < .001$, $\varphi = .406$. According to the structure matrix, the function represents conduct problems (.885), and peer problems (-.364), but not emotional problems (.186), or hyperactivity (.069), which are also reflected in the group centroids and in the mean differences for AD classification (middle panel, Figure 3-2). Thus, high conduct problems and low peer problems predicted AD, with an accuracy of 83.3%.

The top panel of Figure 3-3 shows the mean scores for the three attachment style scales of the RADQ, for those with and without a reported diagnosis for ASD (left

panel), AD (middle panel), or ASD or AD only (right panel). In order to determine whether any attachment styles (avoidant, anxious, ambivalent) discriminated between reported diagnoses, discriminant function analyses were performed on ASD versus no ASD, AD versus no AD, and on either ASD or AD (excluding those with reported overlapping diagnosis). The analysis of attachment styles differentiating reported ASD revealed a significant first function, *Wilks Lambda* = .880, $X^2(4)$ = 16.934, $p < .001$, $\varphi = .339$. The function represented avoidant (.923) and ambivalent (-.415), but not anxious (.007), styles. This was reflected in the group centroids, and differences in attachment style means for ASD (top left panel Figure 3-3). Thus, high avoidant and low anxious styles predicted a report of ASD diagnosis, with a 70.6% accuracy. The analysis differentiating between reported AD and no AD found no significant function, *Wilks Lambda* = .956, $X^2(4) = 5.819$, $p = .121$, $\varphi = .200$. However, discriminant function analysis differentiating attachment styles between reported ASD and AD diagnoses found the first function significant, *Wilks Lambda* = .854, $X^2(4) = 9.678$, $p = .022$, $\varphi = .258$. The function predicting ASD representing lower avoidant (-.999) and to a lesser extent anxious (-.367) styles, and higher ambivalent (.548) styles, which are reflected in the group centroids, and in the mean differences for ASD and AD classification in Figure 3-3 (top right panel). Thus, higher ambivalent and lower avoidant and anxious styles predicted a report of an ASD diagnosis with a 69.2% accuracy.

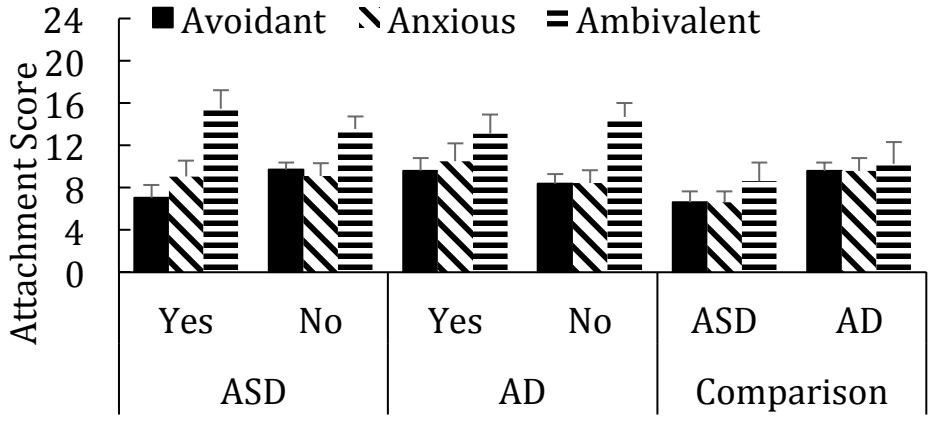
The bottom panel of Figure 3-3 shows mean scores for the three attachment styles for those scoring above and below psychometric cut-offs for ASD (left panel), AD (middle panel), or ASD or AD only (right panel). A discriminant function analysis differentiating psychometric ASD and no ASD classification (left panel) found the first function significant, *Wilks Lambda* = .821, $X^2(4) = 27.378$, $p < .001$, $\varphi = .431$. According to the structure matrix, the function represents anxious (.756), with ambivalent (-.355) and avoidant (-.260) styles contributing less. The group centroids and mean differences for ASD classification in Figure 3-3 (bottom left panel) reflect this, and the function predicted a report of an ASD diagnosis with a 76.4% accuracy. The first function of the discriminant function analysis differentiating psychometric AD and no AD classifications (middle panel bottom Figure 3) was significant, *Wilks Lambda* = .454, $X^2(4) = 109.442$, $p < .001$, $\varphi = .868$. The structure matrix suggested

anxious (.920), ambivalent (-.806), and avoidant (.412), styles contributed, which are reflected in the group centroids and mean differences for AD (bottom middle panel of Figure 3). The function predicted AD classification with a 90.14% accuracy.

The discriminant function analysis differentiating psychometric ASD and AD only classifications (right panel) found a significant first function, *Wilks Lambda* = .427, $X^2(4) = 37.862$, $p < .001$, $\varphi = .510$. According to the structure matrix, the function predicting ASD represented higher ambivalent (.841), but lower avoidant (-.801) and anxious (-.669) styles, which are also reflected in the group centroids and in the mean differences for ASD classification in Figure 3-3 (top right panel). Thus, higher ambivalent and lower avoidant and anxious styles, predicted an ASD classification with 91.7% accuracy.

Figure 3-3:

Top Panel = Mean scores for the three attachment type scales of the Randolph Attachment Disorder Questionnaire (RADQ) for those with and without a reported diagnosis for ASD (left panel), AD (middle panel), or ASD or AD only (right panel). Bottom panel = Mean scores for the three attachment type scales of the RADQ for those scoring above and below the psychometric cut-off for ASD (left panel), AD (middle panel), or ASD or AD only (right panel). Error bars = 95% confidence intervals.



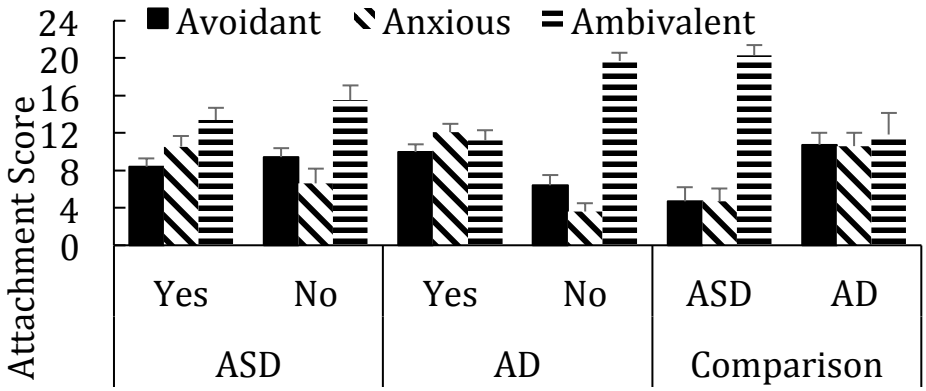


Figure 3-3 Top panel = Mean scores for the three attachment type scales of the Randolph Attachment Disorder Questionnaire (RADQ) for those with and without a reported diagnosis for ASD (left panel), AD (middle panel), or ASD or AD only (right panel). Bottom panel = Mean scores for the three attachment type scales of the RADQ for those scoring above and below the psychometric cut-off for ASD (left panel), AD (middle panel), or ASD or AD only (right panel). Error bars = 95% confidence intervals. Error bars = 95% confidence intervals.

3.5. Discussion

The current study explored the overlap and differences between ASD and AD based on parental report. It investigated the profile of children fulfilling the criteria for ASD and AD in terms of behaviour problems and attachment style, which previously has not been investigated. The data demonstrated that there was overlap between those reported to have a diagnosis of ASD and of AD. About 10% of the sample was reported to have received both diagnoses during their lives. This value is a higher than in some previous reports that have relied on actual clinical diagnoses (Minnis et al., 2020) and as found in the Chapter 2 results, but the overlap between those with a reported ASD diagnosis who also had a reported AD diagnosis, and vice versa, is similar to that reported in several studies (Mayes et al., 2017; Sadiq et al., 2012). These joint classification figures for ASD and AD were higher when considering the psychometric classifications, but they were in line with previous reports (Mayes et al., 2017; Sadiq et al., 2012).

Comparing the psychometric scores as a function of reported diagnoses, shows that those with a reported ASD diagnosis scored higher on the ASD scale, but not on the other scales; whereas those with a reported AD diagnosis scored higher on the RADQ but not the other two scales. These results suggest the reported diagnosis were accurate and are again, consistent with previous examinations of this topic as

reported in Chapter 2. One feature of these data that is also consistent with previous reports and which is worth brief comment, is that the proportion of males and females with ASD is much more even than might be predicted and this finding has been noted previously in Chapter 2, when relying on parent reports as opposed to clinical diagnoses.

In terms of the behaviours that may differentiate between the disorders, which have been a key focus of recent work (Mayes et al., 2017; Sadiq et al., 2021) and within Chapter 2, when reported clinical diagnoses were employed, greater peer problems predicted the presence of an ASD diagnosis report, and greater hyperactivity predicted AD. When comparing only un-diagnosed groups, greater peer and emotional problems, and lower conduct and hyperactivity problems, predicted the presence of a reported ASD compared to AD. These data are consistent with those reported in the previous chapter when examining actual clinical diagnosis, rather than parent reports. However, when psychometric scales were employed to classify the children into ASD and AD groups, these groups were not differentiated on the basis of these measures. This latter finding is, again, consistent with the data reported in Chapter 2, where teacher completed versions of these psychometric forms were used.

The findings from the parental reports using psychometric tools are somewhat similar to those noted with the clinical diagnoses, but there are differences between the findings that remain to be explored. In general, the parent psychometric reports reflect a much higher prevalence of behavioural problems than previous reports using teacher or clinician ratings as previously reported in Chapter 2 (see also Goin-Kochel & Cohen, 2008; Sadiq et al., 2012). Indeed, there were higher proportions of both ASD and AD than typically found in clinical reports, which are less easily distinguished from one another. These higher ratings of problem behaviours are typical of parent reports, and have been related to levels of stress that parents report in relation to their children (Davis & Carter, 2008; Osborne & Reed, 2009). It has been noted that levels of parenting stress can inflate ratings of behavioural problems, even when rating exactly the same behaviours (Fong, 1991; Reed & Osborne, 2013). It may also be that parents, often rating one child, will perceive greater levels of

problems, than teachers or clinicians, who are rating many (Reed & Osborne, 2013). It is also worthy to note that the parents capacity for introspection, or the ability to perceive ones own mental and emotional process, could have an impact on reporting given that there are biological parents of children, and there is a high degree of heritability of ASD (Bai et al., 2019). Whatever the explanation, the role of parents' mental state requires analysis in this context.

The differences in attachment styles, as found using the attachment style subscales of the RADQ, found that when both the reported diagnosis and the parent-reported psychometrics were used, that ASD was predicted by lower avoidant and anxious attachment styles, but by higher ambivalent styles. This is the first suggestion that attachment styles may differ between the groups. Of course, great caution is needed in interpreting the results. These results are drawn from subscales of the RADQ, and need to be replicated using scales specifically designed to examine attachment styles. Nevertheless, that these findings were broadly consistent across a number of ways of assessing these differentiating attachment styles may give impetus to explore this finding more fully. Previous reports have noted only weak associations between attachment styles with either ASD or AD (Minnis et al., 2009; Van Ijzendoorn et al., 2007), however, these studies have examined the relationship for disorders in isolation from one another rather than comparing the two directly. It is also possible that these attachment styles are related to parenting behaviour differences between the disorders, rather than the disorder itself. For example, insecure attachment styles of most types have been related to a lack of parental sensitivity and insight (Kahane & El-Tahir, 2015), and authoritarian parenting (van Steijn et al., 2013). It is not known if this is the case with the current sample.

In summary, the current study replicated a number of features of previous investigations of the overlap between ASD and AD classifications. It found that there was a potential for a large overlap in the diagnoses and classification and that some behavioural problems can be used to differentiate between the disorders – especially peer problems for ASD and conduct problems for AD. It also noted that attachment styles differentiated between the diagnosis, with those with ASD showing more ambivalent, and those with AD more avoidant and anxious styles. That these

findings emerge from parent reports are broadly similar to previous studies using professional ratings suggests fruitful avenues may be available to help differentiate between similar presentations.

Chapter Four : Exploratory study of parenting differences for Autism Spectrum Disorder and Attachment Disorder

Chapter 4 seeks to look more specifically at the child characteristics that present in the overlap between Autism Spectrum Disorder (ASD) and Attachment Disorder (AD) and measuring the levels of stress experienced by parents. The understanding that ASD and AD can present with similar symptoms to one another (Denis et al., 2009; Moran, 2010) and as discussed in Chapters 2 and 3, furthers the need to further explore the differential diagnostic challenges, specifically in regard to how the difficulty in distinguishing the two disorders has implications for services, interventions, and family dynamics (Kendall-Jones, 2014; Moran, 2010). ASD is a neurodevelopmental disorder with considerable heterogenic presentation and severity (Wing et al., 2011), but characterised with impaired social communication, and restricted and repetitive behaviours and interests (APA, 2016; WHO, 2020). Children with AD can be withdrawn, hypervigilant, or highly ambivalent in behaviours towards caregivers and others (Davidson et al., 2015). In addition, their difficulties include impairment in interpretation and/or use of social cues and with pragmatic language (Moran, 2010; Sadiq, et al., 2012). Both disorders are associated with high levels of externalising behaviours (Buckner et al., 2008; Hartley et al., 2008; O'Connor & Zeanah, 2003), which is a key issue in education of these groups. Both classifications also have moderate to high levels of comorbidity with learning disabilities (Kildahl, et al., 2019; O'Brien & Pearson, 2004). The presence of comorbid learning disabilities has been subject to investigation regarding its impact on differentiation of ASD and AD, within Chapter 3, as little is known about this group of key interest to many special educators, (Giltaij et al., 2015).

Several studies have reported some differences in child characteristics between ASD and AD as reported in Chapters 2 and 3, (Davidson et al., 2015; Mayes et al., 2017; Minnis, et al, 2020; Sadiq et al., 2012). Although, overlap in diagnosis or classification can vary between 10 and 60% (as evidenced in Chapter 2). However, few studies have extended the search for differences into the realm of the parenting of the children with ASD or AD, which may permit further understanding of features associated with the two conditions. This area has some theoretical interest, as ASD is taken to be neurodevelopmental and is present from birth. Whereas, AD is

considered a psychosocial disorder, with strong contribution from inappropriate early experiences (Kay et al., 2016; Mayes et al., 2017; Richters & Volkmar, 1994). If this is the case, then there may be differences in parenting behaviours associated with ASD and AD.

Although the diagnostic and theoretical accounts of ASD and AD are specific regarding parenting between these groups, empirical research suggests that these differences may be ambiguous in practice. For example, with AD, the stress regulation capacity of the main caregiver has been taken to be impaired, and deemed to contribute to child emotional and behavioural differences in AD (Hornfeck, Bovenschen, Heene, Zimmermann, Zwönitzer, & Kindler, 2019). However, parenting a child with ASD also is linked with higher parental stress (Osborne & Reed, 2009), which contributes to child behaviour problems (Osborne & Reed, 2009). Thus, in both cases, there are high levels of parenting stress, and disrupted parenting behaviours.

Parenting stress has been the target of extensive research across a range of developmental and paediatric medical problems (Osborne & Reed, 2009) and is central to many models of how parenting behaviours are impacted by, and impact, child behaviour problems (Deater-Deckard, 1979; Hastings, 2002; Osborne, 2009). It has been assumed that levels of parenting stress are particularly high for parents of children with ASD (Davis & Carter, 2008; Pisula & Porębowicz-Dörsmann, 2017) and these levels are often higher than for parents of children with other disorders (Osborne, 2009). These levels have not been compared to the levels reported by parents of children with AD, which was the first aim of the current study. This has some importance in terms of intervention, as parenting stress has been shown to retard the effectiveness of many interventions across many paediatric conditions (Hattangadi et al., 2020; Helgeson et al., 2012; Osborne et al., 2008).

Altered patterns of parenting behaviour have been examined in relationship to parenting stress for ASD, and child behaviour problems have been shown to be related to the parents' ability to limit set (Deater-Deckard, 1979; 2002; Osborne & Reed, 2010). This particular behaviour mediates between levels of parenting stress,

which reduce positive limit setting, utilising prosocial 114 behaviours, where quality of mother–child relationship and balanced positive discipline is utilised efficiently (Deater-Deckard, 2002; Osborne & Reed, 2010). This particular behaviour mediates between levels of parenting stress, which reduce positive limit setting abilities, and the expression of child externalising problems (Hastings, 2002; Lloyd et al., 2019; Osborne & Reed, 2019). The importance of parenting behaviours in mediating between stress and child behaviours problems is amplified for ASD given potentially impaired perception of emotions of children with ASD. Limit setting is key among parenting behaviours, as opposed to communication, given the nature of the ASD condition (Osborne, 2009). It is unclear whether a similar pattern would be found for AD, and, although there should be impacts of parenting stress on parenting behaviours for this group (Hornfeck et al., 2019), it may be that an unmediated effect of parenting stress on child behaviour problems could exist, or that a wider range of parenting behaviours could mediate the relationship.

The current study explored differences in associations between ASD and AD and parenting stress, and in a range of parenting behaviours, for children with comorbid learning disabilities – a group of importance in special education (Giltaij et al., 2015; Kildahl et al., 2019). Moreover, it examined whether relationships between parenting stress, parenting behaviours, and child behaviour problems differed across children with ASD and AD – child behaviour problems being strongly associated with parenting, and also of key interest to theoretical models (Deater-Deckard, 1979; Osborne, 2009) and education (Buckner et al., 2008; O'Connor & Zeanah, 2003). An online survey of parents of children with learning disabilities was conducted to facilitate access to the group, and as differences in associations between aspects of parenting stress, behaviours, and child behaviour problems, have been shown to be more pronounced when parent, rather than professional, ratings are taken (Fong, 1991; Osborne & Reed, 2009). As considerable overlap in presentations of child behaviour problems between ASD and AD exist as evidenced in Chapter 2, (Mayes et al., 2017), especially when using parent reports (Sadiq et al., 2012), and as explored in Chapter 3, groups of children with comorbid learning disabilities displaying psychometrically-defined ASD, AD, or both conditions were compared with those not displaying either condition.

4.1. Method

4.1.1. Participants and Recruitment

Parents or caregivers, the same participants as in Chapter 3, aged 18 years or older, had a child aged between 3-22 years, and have English as a first language were recruited through online advertising on websites and social media sites. Ethical approval was granted by the University Psychology Department Ethics Committee. Around 400 UK sites for parents whose children had developmental and intellectual disabilities were identified, and 180 agreed to post the advert. 155 participants satisfied the inclusion criteria (18 respondents were excluded for not satisfying the inclusion criteria, and 5 failed to complete more than 10% of the survey). G-Power calculations revealed that for a comparison between four groups involving four variables (MANOVA), for 95% power, with a $p < .05$ rejection criteria, and medium effect size ($f'V = .06$), a sample of 144 would be adequate

Of the 155 parents (150 female, 5 male), the mean age was 40.81 (*S.D.* $\pm$ 8.95; range = 22 – 72) years, and 85.5% identified largely as having a white ethnic heritage. 76 (42%) had a university degree, 71 (45%) had high school or trade-related qualifications, 13 (6%) had left school at 16 years of age, and 6 (4%) did not specify. 46 (30%) professional or managerial, 21 (15%) were in skilled or clerical work, 17 (10%) were self-employed, 7 (4%) were volunteers, 4 (2%) were students, 49 (31%) were unemployed, and 12 (8%) did not specify. Table 4-1 shows the characteristics of the sample broken down into those whose children did not reach the psychometric criteria. threshold (T) for either ASD or AD, those children reached the psychometric criteria for ASD alone, AD alone, or both ASD and AD.

The groups are defined as follows: ASDT (those reaching psychometric criteria for ASD, but not AD), ADT (those reaching psychometric criteria for AD, but not ASD), Neither (those not reaching psychometric criteria in both AD & AD) and Both (those reaching psychometric criteria in both ASD and AD)

4.1.2. Measures

Demographics general information was requested about the parent or caregiver (age, ethnicity, marital status, education level, and occupation), and about their child (age, gender, diagnosis, age at diagnosis). The demographics were the same as the previous study in Chapter 3.

Social Communication Questionnaire (SCQ; Rutter, Bailey, & Lord, 2003) is used for the identification of ASD and its symptom levels. See Chapter 2 for details.

Randolph Attachment Disorder Questionnaire (RADQ; Randolph, 2000) is a 30-item scale that screens for attachment disorder, and distinguishes attachment disorder from conduct or other psychiatric disorders See Chapter 2 for details.

Strengths and Difficulties Questionnaire (SDQ; Goodman, 1977) is a brief behavioural screening questionnaire for emotional and behavioural disorders in children and adolescents aged 4-16 years. See Chapter 2 for details.

***Parenting Stress Index* – Short Form** (PSI-SF; Abidin, 1997) (See Appendix G for example form) is a 36-item self- report questionnaire measuring stress in the parent-child system. It consists of three subscales: Parental distress; Difficult Child; and Parent-Child Dysfunctional Interaction. Items are scored on a 5-point scale (1 = Strongly Agree; 5 = Strongly Disagree), and sum to yield a total stress score (36-180), with higher scores indicate greater levels of perceived stress. The PSI-SF has good validity and reliability (Abidin, 1997; Haskett et al., 2006). The internal reliability of the scale (Cronbach α) for the present sample was .939.

Parent-Child Relationship Inventory (PCRI; Gerard, 1994) (See Appendix E for form) is a self-report measuring parents' views on parenting and parenting behaviours. Based on previous research, the Involvement (14 items), Communication (9 items), Limit Setting (12 items) and Satisfaction with Parenting (10 items) scales were included. Each item is responded to on a four-point Likert

Scale (1 = Strongly Agree; 4 = Strongly Disagree). The scores are transformed into T-scores (mean = 50 ± 10) and higher scores indicate positive characteristics. The PCRI has shown good psychometric properties and the mean test-retest .81 (Coffman, Guerin, & Gottfried, 2006). It has been found to correlate significantly with other well-validated tools (see Coffman et al., 2006) and has been used in the context of developmental disorders (Osborne & Reed, 2010). The internal reliability of the scales (Cronbach α) for the present sample ranged between .854 and .903.

4.2. Procedure

If parents wished to participate, they clicked a consent button, and were taken to the online survey. There was no set time limit to complete, but the survey generally took about 30 min. Once completed parents were shown a debrief page on-screen. Prior to analyses, data were cleaned and screened for missing values and outliers. Missing data were replaced using the person-mean substitution method for any questionnaire measure where ≤ 10% of the items were missing (Hawthorne & Elliot, 2005). Visual inspection of histograms and Q-Q plots demonstrated the data were normally distributed on all variables.

Children were divided into four groups. This was based on the parent report of the symptoms associated with ASD (SCQ) and AD (RADQ) – those children who reached criteria for neither condition; those who displayed ASD but not AD; those who displayed AD but not ASD; and those who reached the criteria for both conditions. The data from the parent stress (PSI) and patenting behaviour (PCRI) scales were subject to analysis of variance (ANOVA) and multivariate analysis of variance (MANOVA) to detect group differences. This strategy was adopted as the study was exploratory in nature, and while previous research has adopted discriminate function analysis (Davidson et al., 2015) and utilised in Chapter 3, it was not thought suitable to suggest that parenting behaviour may be a method by which to discriminate between the presence of the disorders. Rather, the intention was to detect potential differences. Finally, a series of mediations analysis (Hayes, 2009) were conducted to determine whether parenting behaviours mediated the relationship between parenting stress and child behaviour problems for the four psychometrically-identified groups.

4.3. Results

There were no statistically significant differences between any of the parent or child characteristics, all Fs < 1. The ASDT ratings (SCQ) did differ significantly between the groups, $F(3,151) = 113.44$, $p < .001$, $\eta^2_p = .693$. Tukey's Honestly Significant Difference (HSD) tests revealed that the Neither group differed from both the ASDT and Both groups; the ASDT group differed from the ADT group; and the Both group differed from the ADT group, all *p*s < .05. The ADT scores (RADQ) differed significantly between the groups, $F(3,151) = 69.06$, $p < .001$, $\eta^2_p = .578$. Tukey's HSD tests revealed hat the Neither group differed from the ADT and Both groups; and the ADT group differed from the ASDT and the Both group, all *p*s < .05. The behaviour difficulties (SDQ) scores differed between the groups, $F(3,151) = 43.30$, $p < .001$, $\eta^2_p = .462$. Tukey's HSD tests revealed hat the Neither group differed from all of the other groups; the ASD group differed from the Both group; and the ADT group differed from the Both group, all *p*s < .05. Cohen's Kappa revealed a moderate agreement between the diagnoses and psychometric classifications of .448, p < .001.

Table 4-1

Characteristics of sample ASD / AD

	Neither	ASDT	ADT	Both
n	30	25	29	71
Age	37.17 (7.06)	41.84 (8.49)	44.72 (10.52)	40.38 (8.60)
Marital	79%	83%	79%	65%
Children	1.92 (.89)	2.27 (.82)	3.22 (1.95)	2.40 (1.24)
Child Age	10.43 (4.05)	11.50 (5.83)	11.07 (3.34)	10.11 (4.36)
Child Gender	52% female	20% female	45% female	27% female
SCQ	6.55 (3.72)	22.73 (5.17)	8.12 (3.46)	22.82 (5.99)
RADQ	49.55 (10.01)	53.91 (8.56)	89.52 (20.39)	97.87 (22.3)

SDQ	13.69 (5.85)	19.88 (4.92)	23.33 (5.46)	26.91 (5.50)

4.4. Parenting Stress

Figure 4-1

Mean levels of parenting stress (PSI) for the four psychometrically defined groups (Neither; ASD alone; AD alone; Both classifications). Error bars = 95% confidence intervals.

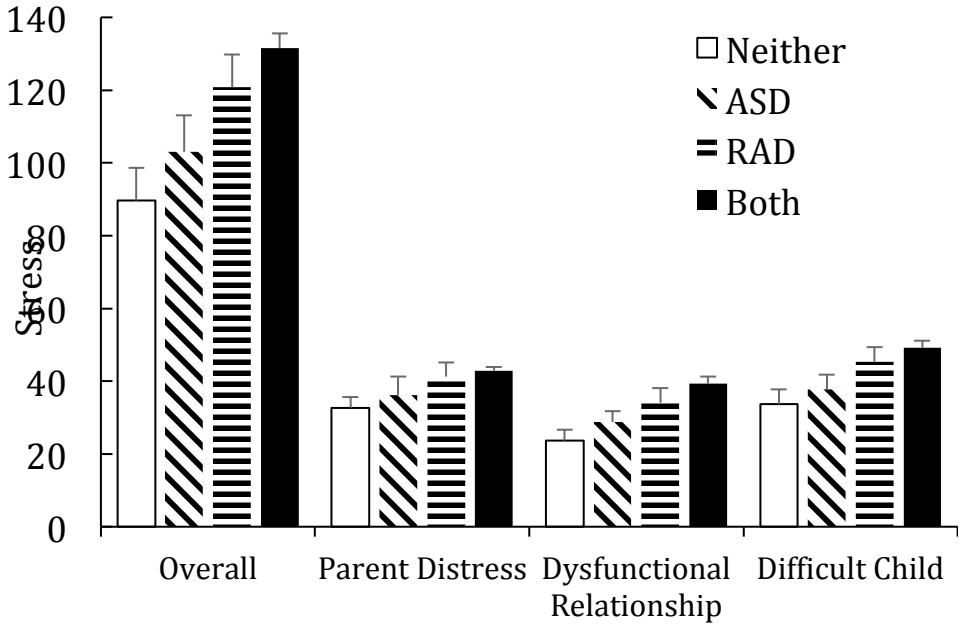


Figure 4-1 ***Mean levels of parenting stress (PSI) for the four psychometrically defined groups (Neither; ASD alone; AD alone; Both classifications). Error bars = 95% confidence intervals.***

Figure 4-1 displays the mean levels of parenting stress (PSI) for the four psychometrically defined groups (Neither; ASDT alone; ADT alone; Both classifications). Inspection of these data reveals that total parenting stress was lowest in the group without either ASDT or ADT, and highest in the group with both classifications. A between-subject ANOVA conducted on the overall parenting stress scores revealed a significant difference between the groups, $F(3,141) = 32.72$, $p < .001$, $\eta^2_p = .410$[95%CI = .279:.502], $p(H_1/D) = .999$. Tukey's HSD tests revealed significant differences between all the groups, all ps < .05.

A multivariate analysis of variance (MANOVA) conducted on the three parenting stress subscales revealed a significant difference between the groups, *Wilk's Lambda* = .567, $F(9,362) = 10.58$, $p < .001$, $\eta^2_p = .208$[.122:.261], $p(H_1/D) = .999$., Individual ANOVAs conducted on each subscale, using a Bonferroni correction ($p < .016$), revealed significant differences between the groups for the Parenting Distress scale, $F(3,151) = 11.07$, $p < .001$, $\eta^2_p = .180$[.072:.275], $p(H_1/D) = .999$. Tukey's HSD tests revealed significant differences between the Neither and the ADT and Both groups; and between the ASDT and Both groups, all *p*s < .05. There was a significant difference between the groups for the Dysfunctional Relationship subscale, $F(3,151) = 27.65$, $p < .001$, $\eta^2_p = .355$[.227:.448], $p(H_1/D) = .999$. Tukey's HSD tests revealed significant differences between the Neither group and each of the other groups; between the ASDT and Both groups; and between the ADT and Both groups, all *p*s < .05. The was a significant group difference for the Difficult Child subscale, $F(3,151) = 31.44$, $p < .001$, $\eta^2_p = .384$[.258:.476], $p(H_1/D) = .999$. Tukey's HSD tests revealed significant differences between the Neither and ADT and Both groups; and between the ASDT and ADT and Both groups, all *p*s < .05.

4.5. Parenting Behaviours

Figure 4-2 displays the mean levels of parenting behaviours (PCRI) for the four psychometrically defined groups (Neither; ASDT alone; ADT alone; Both classifications). A MANOVA conducted on the parenting behaviour scales, revealed a significant difference between the groups, *Wilk's Lambda* = .576, $F(12,391) = 7.00$, $p < .001$, $\eta^2_p = .177$[.091:.220] $p(H_1/D) = .999$. Individual ANOVAs conducted on each scale, using a Bonferroni correction ($p < .013$), revealed significant differences between the groups for Communication, $F(3,151) = 17.65$, $p < .001$, $\eta^2_p = .260$[138:.358], $p(H_1/D) = .999$. Tukey's HSD tests revealed significant differences between the Neither group and each of the other groups; between the ASDT and ADT groups; and between the ADT and Both groups, all *p*s < .05. There was a significant group difference for Limit Setting, $F(3,151) = 12.43$, $p < .001$, $\eta^2_p = .198$[.086:.294], $p(H_1/D) = .999$. Tukey's HSD tests revealed significant differences between the Neither and the ADT and Both groups; the ASDT and ASDT and Both groups; and between the ADT and Both groups, all *p*s < .05. There was no group difference for Satisfaction, $F(3,151) = 3.15$, p = .027, η^2_p

= .059[.000:.129], $p(H_0/D)$ = .946; or Involvement, $F(3,151) = 1.67$, $p = .175$, η^2_p = .032[.000:.088], $p(H_0/D)$ = .994.

Table 4-2 presents the Pearson's correlations between Parenting Stress (PSI), Child Behaviour problems (SDQ), and Parenting Behaviours (PCRI) for the four psychometrically defined groups (Neither; ASDT alone; ADT alone; Both classifications). These correlations suggest a strong positive relationship between parenting stress and child behaviour problems for all groups. There were significant negative relationships between parenting stress and parenting behaviours for all groups. However, only the ASDT group showed large negative correlations between parenting behaviours (limit setting) and child behaviour problems.

Figure 4-2:

Mean parenting behaviours (PCRI) for the four psychometrically defined groups (Neither; ASD alone; AD alone; Both classifications). Error bars = 95% confidence intervals.

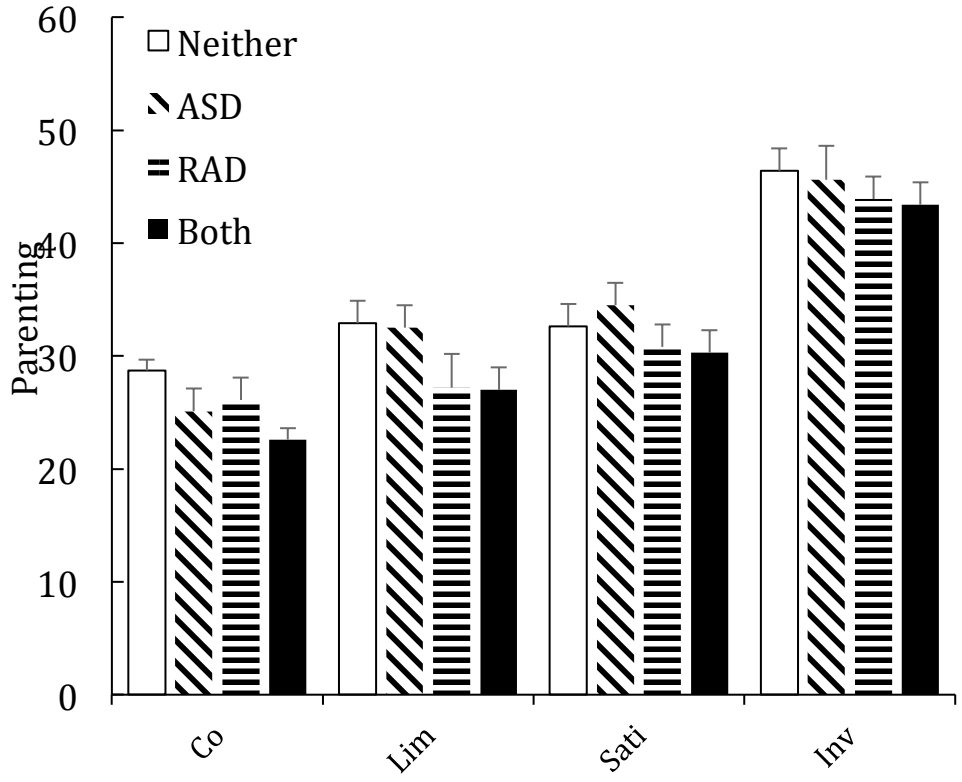


Figure 4-2 *Mean parenting behaviours (PCRI) for the four psychometrically defined groups (Neither; ASDT alone; ADT alone; Both classifications). Error bars = 95% confidence intervals.*

4.6. Impact of Parenting Stress on Behaviour Problems

Table 4-2:

Pearson's correlations between Parenting Stress (PSI), Child Behaviour problems (SDQ), and Parenting Behaviours (PCRI) for the four psychometrically defined groups (Neither; ASD alone; AD alone; Both classifications).

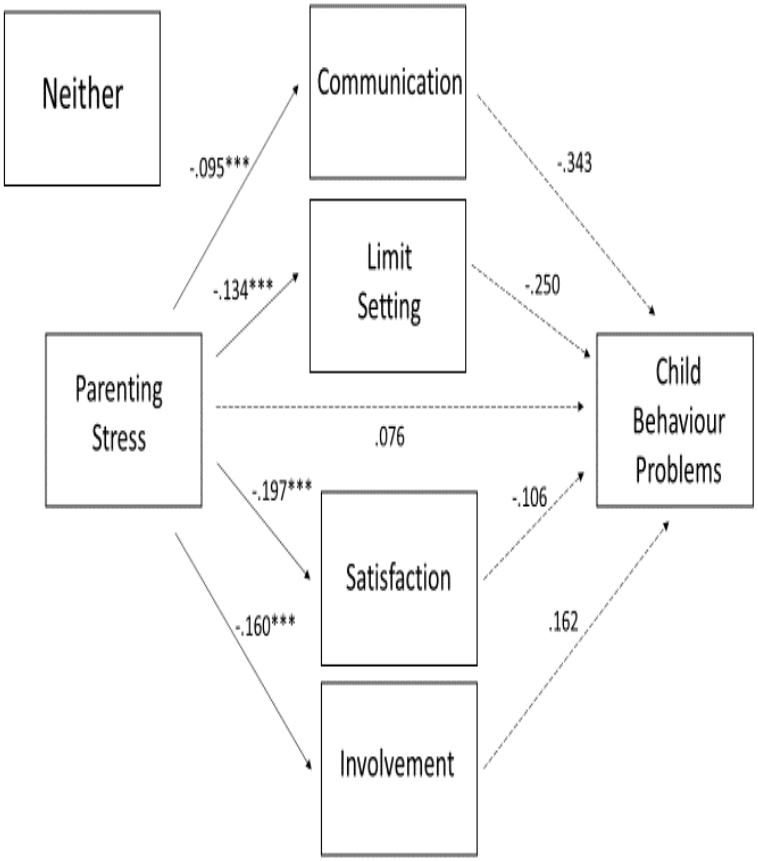
	SDQ	Comm	Limit	Satisfaction	Involvement
Neither					
Stress	.569**	-.701***	-.567***	-.679***	-.630***
Behaviour		-.458*	-.483*	-.420*	-.391*
ASDT					
Stress	551**	-.415	-.601***	-.552**	-.379
Behaviour		.186	-.641***	-.008	-.018
ADT					
Stress	.452*	-.428*	-.725***	-.532**	-.478**
Behaviour		-.024	-.310*	-.168	-.010
Both					
Stress	.392**	-.526***	-.392***	-.735***	-.638***
Behaviour		-.065	-.178	-.194	-.179

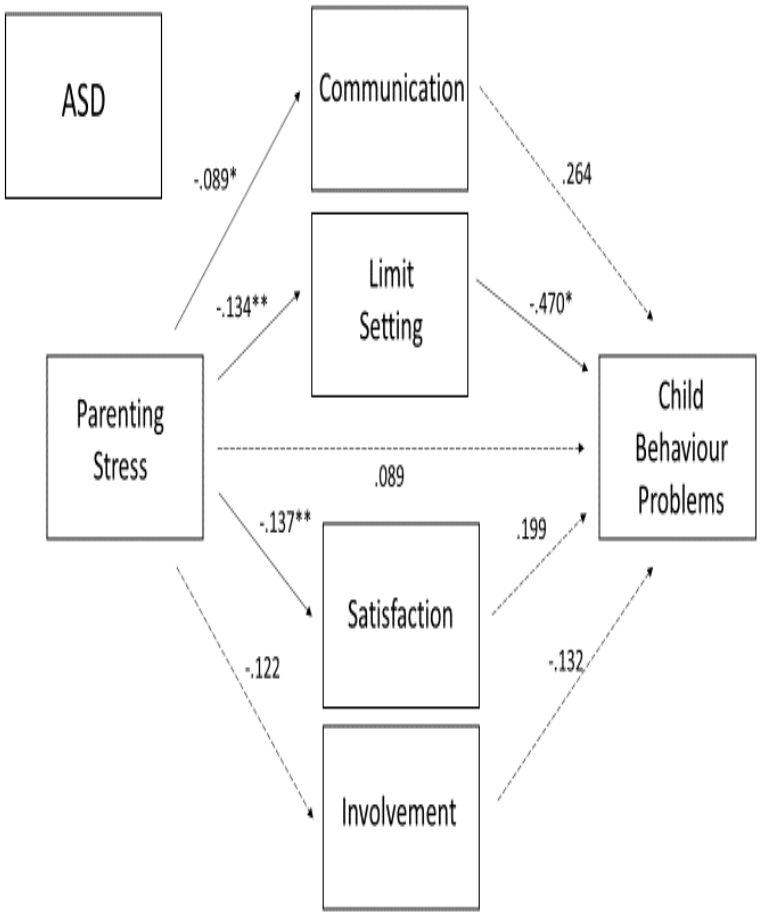
*p < .05; **p < .01; ***p < .001

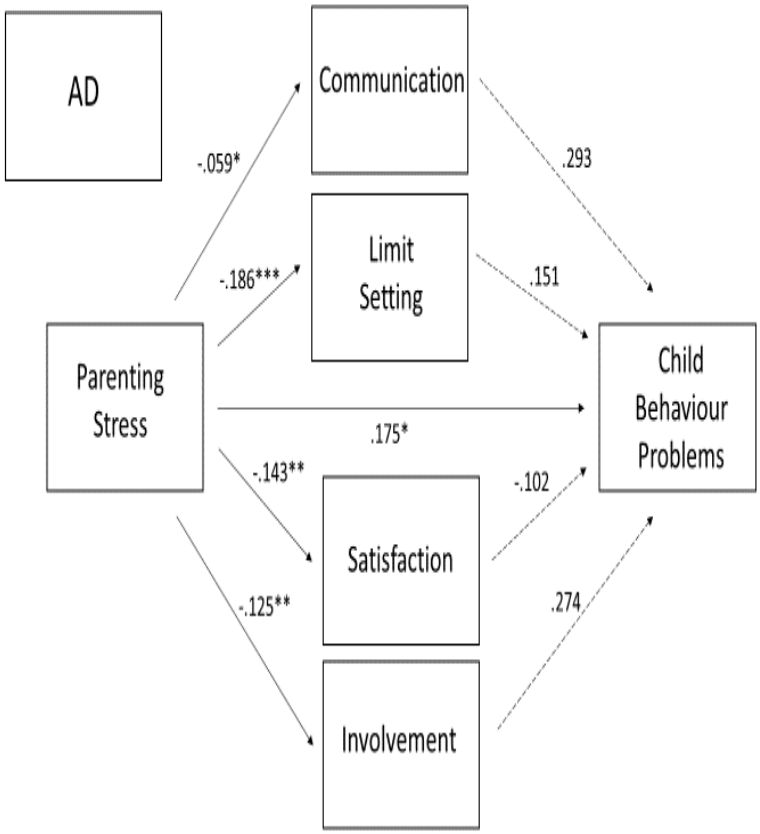
Table 4-2 Pearson's correlations between Parenting Stress (PSI), Child Behaviour problems (SDQ), and Parenting Behaviours (PCRI) for the four psychometrically defined groups (Neither; ASDT alone; ADT alone; Both classifications).

Figure 4-3:

Relationships between parenting stress, child behaviour problems, and parenting behaviours for the four groups: Neither (top left); ASD alone (top right); AD alone (bottom left); and Both (Bottom right).




ASD
Communication
Limit Setting
Parenting Stress
Child Behaviour Problems
Satisfaction
Involvement
-.089*
.264
-.134**
-.470*
.089
-.137**
.199
-.122
-.132


AD
Communication
Limit Setting
Parenting Stress
Child Behaviour Problems
Satisfaction
Involvement
-.059*
.293
-.186***
.151
.175*
-.143**
-.102
-.125**
.274

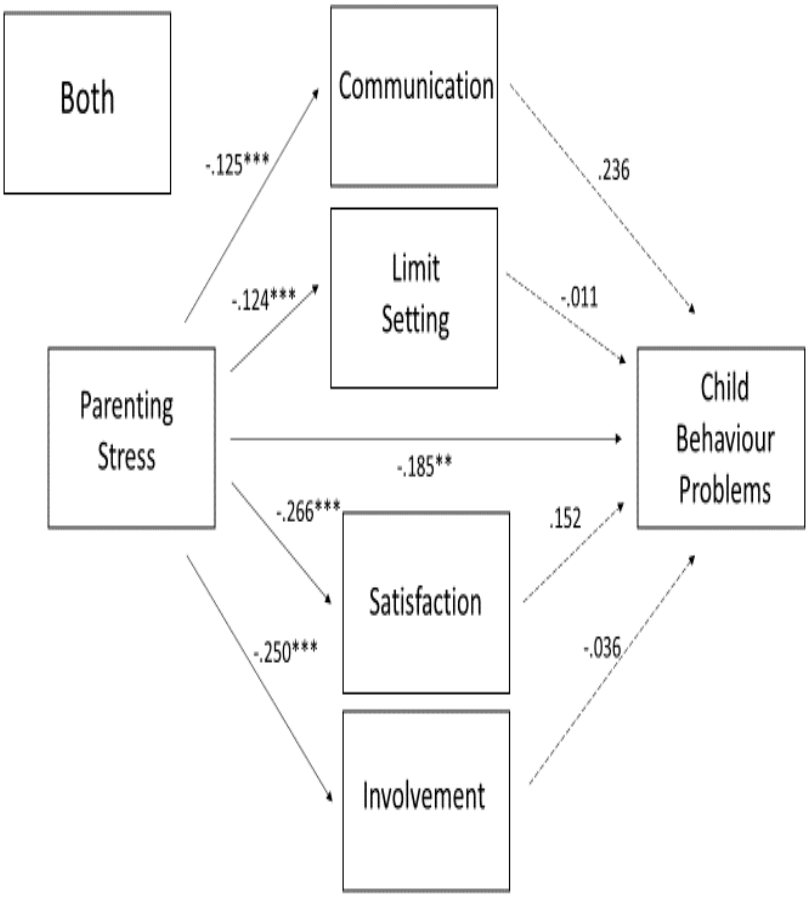


Figure 4-3 *Relationships between parenting stress, child behaviour problems, and parenting behaviours for the four groups: Neither (top left); ASDT alone (top right); ADT alone (bottom left); and Both (Bottom right).*

The top left panel of Figure 4-3 shows there was no direct or mediated relationship between total parenting stress (PSI) and child behaviour problems (SDQ) for the Neither group. Unstandardised effects were computed for 5,000 bootstrapped samples, and the 95% confidence interval was computed by determining the effects at the 2.5th and 97.5th percentiles for all relationships. The top left panel of Figure 4-3 reveals the coefficient between parenting stress and child behaviour problems was not statistically significant (LL-UL: -.07:.22). The coefficient between parenting stress and communication (-.14:-.06), limit setting (-.21:-.06), satisfaction (-.27; -.11), and involvement (-.24; -.09) were significant. The coefficients between communication (-1.42:.74), limit setting (-.67:.17), satisfaction (-.65;.44), and involvement (-.54;.87) and child behaviour problems were not significant.

The top right panel of Figure 4-3 shows that limit setting mediated the relationship between parenting stress and child behaviour problems for the ASDT group. The coefficient between parenting stress and child behaviour problems was not statistically significant (-.02:.19). The coefficients between parenting stress and communication (-.17:-.01), limit setting (-.21:-.06), satisfaction (-.22; -.05), and involvement (-.25; -.01) were significant. The coefficients between limit setting and child behaviour problems (-.87:-.07) were significant, but those between communication (-.18:.71), satisfaction (-.21;.61), and involvement (-.47;.20) and child behaviour problems were not significant.

The bottom left panel of Figure 4-3 shows that direct relationship between parenting stress and child behaviour problems for the ADT group was significant and not mediated by parenting behaviours. The coefficient between parenting stress and child behaviour problems was significant (.02:.32). The coefficients between parenting stress and communication (-.11:-.01), limit setting (-.26:-.12), satisfaction (-.23; -.06), and involvement (-.21; -.03) were significant. The coefficients between communication (-.44:1.03), limit setting (-.36:.65), satisfaction (-.56;.35), and involvement (-.20;.79) and child behaviour problems were not significant.

The bottom right panel of Figure 4-3 shows that direct relationship between parenting stress and child behaviour problems for the Both group was significant and not mediated by parenting behaviours. The coefficient between parenting stress and child behaviour problems was significant (.07:.30). The coefficients between parenting stress and communication (-.18:-.08), limit setting (-.19:-.05), satisfaction (-.32;-.21), and involvement (-.32;-.18) were significant. The coefficients between communication (-.15:.62), limit setting (-.27:.23), satisfaction (-.18;.49), and involvement (-.33;.26) and child behaviour problems were not significant.

4.7. Discussion

The results suggest that parents of children with ADT display higher levels of parenting stress than parents of children with ASDT, with those with a potential dual classification showing the highest levels of parenting stress. Self-rated parenting behaviour skills varied between the groups of parents, with parents of children with

ADT and both conditions reporting worse limit setting than parents of children with ASDT, but parents of children with ASDT reporting worse communication behaviours. The relationship between parenting stress and parenting behaviours to child behaviour problems differed between the sets of parents. For children with ASDT, parental limit setting mediated the relationship between parenting stress and child behaviour problems. In contrast for children with ADT, there was a direct relationship between parenting stress and child behaviour problems. Although exploratory, these data suggest that different patterns of parenting experiences and skills exist for ASDT and ADT, and that these could form the basis of differential support strategies.

The finding of higher levels of parenting stress in parents of children with AD than for ASD or learning disabilities alone is novel, as this aspect of parenting experience has not been explored previously. The previous literature has suggested that parents of children with ASD display higher levels of parenting stress than other disorders (Davis & Carter, 2008; Pisula & Porębowicz-Dörsmann, 2017). However, it has also been noted that, in children older than three, these levels of parenting stress are more strongly related to the level of child behaviour problems than the disorder itself (Osborne & Reed, 2009). The current findings fit with this suggestion, with parents of children with AD and parents of children with both conditions, reporting higher levels of child behaviour problems and parenting stress, than parents of children with ASD. Such high levels of parenting stress have been shown to interfere with child progress under many intervention regimes (Hattangadi et al., 2020; Osborne et al., 2009; Robbins et al.,1991). This being so, it seems important to offer support to the parents of children, for their levels of stress, perhaps in terms of counselling. This would serve to promote child gains, as well as prevent both psychological and physical health problems for the parents (Reed et al., 2016). It is important to note that such support is beyond training in parenting skills, as many parents of children with AD are not birth parents who may have been involved in the original inappropriate experiences that led to the AD (Hornfeck et al., 2019; O'Connor et al., 2009).

The differences in parenting behaviours were also noticeable, and in line with previous theoretical suggestions (Osborne, 2009). Parents of children with all types of condition reported problems with many of the parenting behaviours measured – especially, communication, limit setting, and satisfaction. Scores on the PCRI under 30 represent severe disruptions in those areas of parenting (Gerard, 1994), and such self-ratings have been noted previously for parents of children with ASD (Osborne & Reed, 2010). That communication is most strongly impacted by having a child with ASD compared to other conditions is not surprising given the language problems inherent in that condition (APA, 2013). In contrast, limit setting appears to be a prime issue for parents of children with AD (Hornfeck et al., 2019). These parenting behaviours are associated differentially with child behaviour problems for the conditions; with limit setting being a mediator for ASD but not for AD (Deater-Deckard, 1979; 2002; Osborne & Reed, 2010). The importance of parenting behaviours in mediating between stress and child behaviours problems is amplified for ASD given potentially impaired perception of emotions of children with ASD. Limit setting is key among parenting behaviours, as opposed to communication, given the nature of the ASD condition (Osborne, 2009). This suggests that all parents would benefit from help developing parenting skills, and programme such as Triple-P (a parenting intervention with the main goals of increasing the knowledge, skills, and confidence of parents), could be considered (Sanders, 2008). The impact of these programmes may be more direct on the behaviour of the children for ASD than for other conditions such as AD. In the latter case, the programme may help reduce parenting stress, which would then impact on child behaviour problems.

There are limitations to this study that should be mentioned. Firstly, caution needs to be used in interpreting findings from relatively small samples – while the overall sample was of adequate size for power, when divided into the different conditions, the sub-samples were relatively small. Secondly, when extrapolating from any particular sample to a population of parents of children with disabilities caution is needed. It may be that parents who volunteer for such research studies display different characteristics to those who do not volunteer. Self-selection of participants is a limitation for all such community-based studies, and this problem is not specific to this particular research. It should be mentioned that very few of the identified

families refused to participate, suggesting that self-selection was not a major problem in this study. An older sample of children was examined where the relationship between levels of parenting stress and parenting behaviours may have had time to develop, whereas the relationship between these factors may well be in greater flux in parents of a younger sample of children. Thirdly, the measures employed were all self-report measure, albeit a well-standardised, reliable, validated and widely used. Research employing additional measures would corroborate the current findings, especially those employing direct observation, although this approach would severely limit the sample size.

In summary, parents of children with AD display higher levels of parenting stress and report worse limit setting abilities than parents of children with ASD, but parents of children with ASD reporting worse communication behaviours. For children with ASD, but not parents of children with AD, parental limit setting mediated the relationship between parenting stress and child behaviour problems. Although exploratory, these data suggest that different patterns of parenting experiences and skills exist for ASD and AD and could form the basis of differential support strategies.

Chapter Five : Differences in Executive Functioning for children with additional learning needs and Autism Spectrum Disorder or Attachment Disorder

This study, of the overlap between ASD and AD, is reflective of the challenge in the arena of attachment research in view of the complex interrelation between socio-communication impairments and attachment processes (McKenzie and Dallos, 2017; Vivanti and Nuske, 2017). There are identified mitigating and protective factors around child trauma such as supportive caregiver roles. (Pozzi et al., 2021) suggested that there was an association between positive parenting and future connections in neural networks. It was found through longitudinal data collection that the connectivity of higher order control networks was positively associated with positive maternal interaction. This included sensitivity to reward, positivity and maturing of prefrontal amygdala circuitry (McLaughlin & Lambert, 2017). Given this finding however, it is important to note that in children with higher levels of early life stress, differing patterns of connectivity were found in reward and emotion related regions and that stress during early childhood may results in alterations to reward processing (Morelli et al., 2015). This serves to increase the risk of poor outcomes. Parenting, and attachment-based development of child stress response systems, further contributes to the effective development of frontal brain regions.

Secure attachment relationships support child executive function development, which facilitate the function and development of the neural systems that underpin EF (Glaser, 2000), giving rise to the concern that in the absence of a secure attachment differences and deficits can arise. Prior studies have focused on attachment behaviors in preschoolers with ASD, whereas the study of attachment representations in older children remains mainly unexplored. The most recent systematic review (Teague et al., 2017) highlighted crucial unresolved questions in the study of attachment and ASD with reference to the paucity of data about predictors, correlates and outcomes of attachment in children with ASD.

The direction of this thesis focuses on the overlap between ASD and AD in the domains of executive functioning skills and to seek to elucidate further research in this important, and lesser explored area.

Executive functioning (EF) refers to an array of cognitive processes involved in top-down control of self-regulation, informing future-oriented behaviour (Reolofs et al., 2015) and adaption to the environment (Vries et al., 2015). EF develops most rapidly during the preschool years along with the growth of neural networks in the prefrontal cortex but continues to develop into adulthood (Thompson & Steinbeis, 2020). These processes can be grouped into 'cold' and 'hot' components (Zelazo & Carlson, 2012): with cold components including working memory, planning, mental flexibility, sequencing, set-shifting, attention, problem-solving, verbal reasoning, multitasking and self-monitoring; while the hot components involve emotions, desires and beliefs (Miyake et al., 2000, Reolofs et al., 2015; Salehinejad et al., 2021). Impairments or alterations in aspects of EF can impact the behaviours of the individual and produce distressing consequences (Chan et al., 2008; Colvert et al., 2008). It has also been suggested that examination of potential underlying cognitive functioning of otherwise similarly presenting conditions may be helpful in distinguishing the needs of those individuals (Hovik et al., 2017; Ozonoff & Jensen, 1999).

Alterations to EF abilities have been examined across a range of conditions, including extensive investigation for Autism Spectrum Disorder (Demetriou et al., 2018; Gilotty et al., 2002), and some analysis for Attachment Disorder (Blair et al., 2018; Colvert et al., 2008). Both classifications appear to show some level of alteration in EF, although it is unclear whether alterations differ across these two conditions, as they do between other conditions (Bourke et al., 2020; Hovik et al., 2017) and such differences in EF have been suggested as a way of help to distinguish between disorders (Ozonoff & Jensen, 1999). However, an issue complicating the understanding of differences may be the presence of comorbidities. As well as substantial overlap between presenting characteristics between ASD and AD (Davidson et al., 2015; Sadiq et al., 2012) and further affirmed in Chapter 2, both conditions have moderate to high levels of comorbidity with learning disabilities (Jang & Matson, 2015; Kildahl et al., 2019; Raaska et al., 2012). The presence of comorbid learning disabilities has been subject to little investigation regarding its

impact on differentiation of ASD and AD as reported in Chapter 3, despite this group being of key interest to many special educators (Giltaij et al., 2015).

Altered EF has long been suggested to be associated with ASD and to underlie several of its behavioural presentations (see Geurts, de Vries, & van den Bergh, 2014; Hill, 2004, for reviews). Two large-scale meta-analyses have confirmed and added to this suggestion (Demetriou et al., 2018; Lai et al., 2017). For individuals classed as having higher functioning ASD, Lai et al., (2017) noted children and adolescents were moderately impaired in terms of EF, including verbal and spatial working memory, cognitive flexibility and planning, and generativity. Similarly, Demetriou et al., (2018) analysed over 200 studies, involving in excess of 8,000 participants with ASD, which employed measures of concept formation, mental flexibility, fluency, planning, response inhibition, and/or working memory. The analysis found a moderate effect size for reduced EF, with similar effect sizes in each of the EF domains. However, Russell et al. (1996) reported that in contrast to higher functioning ASD (Bourke et al., 2020), EF differences between those with lower-functioning ASD and controls are much less pronounced.

A relationship between EF and AD also has been mooted but is less well established than that for ASD. Early caregivers are taken to provide models for development and attention (Belsky et al., 2010), and for behavioural modulation and inhibition (Bernier et al., 2010; Nelson & Bloom, 1997). Colvert et al. (2008) suggested that deficits in EF are present for children with attachment problems. The participants were 165 children adopted by UK families and the study reported that EF deficit was higher for children who were institutionally deprived for more than 6 months. Colvert et al. (2008) suggested that EF deficits mediate the development of attachment problems in these individuals and impaired EF has been noted to mediate relationships between disorganised attachment and behaviour problems (Low & Webster, 2016).

However, although associations between EF and both ASD and AD have been explored, there is not enough evidence to judge any correspondences or diversities between these conditions in this regard, especially in groups with comorbid learning

disabilities. A primary aim of the current study was to compare EF abilities across conditions. There have been some reported differences in both child behavioural characteristics and parenting that suggest EF may be differentially affected. Chapter 3 reported that peer problems predict ASD diagnosis and conduct problems predict AD diagnosis. The previous research in Chapter 3 found that children with ASD show more ambivalent attachment styles and those with AD more avoidant and anxious attachment styles, and a significant factor with regards to diagnosing AD is neglect and early childhood abuse (APA, 2013). Given the above suggestions regarding parenting (Bernier et al., 2010; 2012; Colvert et al., 2008) and the presence of greater conduct problems in those with AD, as reported in Chapter 3. One prediction could be that EF is more impaired in children with AD than ASD, especially in relationship to 'hot' EF tasks that modulate behavioural/emotional control (Miyake et al., 2000, Reolofs et al., 2015). However, as several investigations have noted (e.g., Russell et al., 1996) these differences are not always noted, and a null finding remains a possibility.

Thus, the current study provided an initial investigation into the EF abilities of the individuals with ASD and AD, focusing on those with a learning disability. Analysis was performed both on the basis of medical diagnosis and psychometric-defined characteristics. It is unclear what the impact on EF of any overlap in diagnosis/classification would be, and the study in Chapter 3 provided an additional assessment of this comorbidity. Moreover, comorbid learning disabilities may also play a role in the expression of EF function (Russell et al., 1996) and this group was the focus of the study, as it is highly represented in special educational needs placements (Jang & Matson, 2015; Raaska et al., 2012).

5.1. Methods

5.1.1. Participants and Setting

Seventy-nine participants (61 male, 18 female) were recruited, aged 9 - 16 (mean = 14 *SD* $\pm$ 1.78) from a special school, which has 109 pupils in total with statements of educational needs including Learning Difficulties, Autism Spectrum Disorder, and/or children known to Social Services for family issues additionally to any diagnosis.

Given the wide range of children, it was thought that this would be a good sample to use to include sufficient numbers of children with different disorders. To be legally included in the statement of educational needs, confirmation of the diagnosis was needed from an NHS clinician. Additional background information regarding social services involvement was included through the school-based social worker. All children had a diagnosis of learning disabilities. The study was approved by Swansea University Ethics Committee.

5.1.2. Diagnostic procedures

Autism Spectrum Disorder: Diagnosis was made through multi-disciplinary clinical diagnostic assessment, including a range of professionals independent of the current study, such as a paediatrician, speech and language therapist and specialist psychologist. The DSM-5 criteria were employed, with clarification from the NICE Clinical Guideline, supported by psychometric tools, such as the Diagnostic Interview for Social and Communication Disorders, the Autism Diagnostic Interview – Revised, and Autism Diagnostic Observation Schedule. These form the basis for the diagnosis, facilitating the team and clinician's judgement on the final outcome and diagnosis. Assessment included observations across a wide range of settings with an autism-specific developmental and family history. An assessment of the needs and strengths of all family members was included, and full physical examination with tests and assessments for other conditions were conducted as appropriate.

Attachment Disorder: Diagnosis of attachment difficulties was assessed in a range of ways by clinical psychologists, and social workers, who were independent of the current study. The procedure was dependent on the age of the child, along with clarification from NICE guidelines (NICE 2015) and a progressive use of assessment tools (Strange Situation Procedure; Q-Sort; Story Stems; Dynamic Maturational Model of Attachment; Child Attachment Interview), supporting clinical judgement. Diagnosis was also dependent on whether the children were known to Social Services for issues in the home environment, for reasons independent of any other clinical diagnosis. Additional background information

regarding social services involvement was obtained through the school-based social worker.

5.2. Measures

Social Communication Questionnaire (SCQ; Rutter et al.,2003) is used for the identification of ASD and its symptom levels. See Chapter 2 for details.

Strengths and Difficulties Questionnaire (SDQ; Goodman, 1977) is a brief behavioural screening questionnaire for emotional and behavioural disorders in children and adolescents aged 4-16 years. See Chapter 2 for details.

Randolph Attachment Disorder Questionnaire (RADQ; Randolph, 2000) screens for attachment disorder in children between 5 and 18 years and distinguishes children with attachment disorder from those with conduct disorder or other psychiatric disorders. See Chapter 2 for details.

Autism Spectrum Quotient (AQ; Baron-Cohen et al., 2001) (See Appendix F for sample form) is a self-report questionnaire consisting of 50 statements that measure traits associated with ASD. Participants respond on a 4-point scale, using the responses "definitely disagree," "slightly disagree," "slightly agree," and "definitely agree", to each item. Scores can range from 0 to 50, with higher scores indicating more autism traits. A clinically significant cut-off point is taken to be 32. The scale has an internal consistency (alpha) of .80 (Baron-Cohen et al., 2001).

5.3. Apparatus

The Psychology Experiment Building Language (PEBL) software
(Mueller & Piper, 2014) is a programming language interpreter and compiler allowing behavioural tests for psychological experiments. The psychological tests were all taken from the PEBL test battery (Mueller & Piper, 2014), a free battery of tests adapted for computerised use that is widely used for EF research (Cohen et al., 2014; Lipnicki et al., 2009; Nouchi et al., 2013; Piper et al., 2012; Shields et al., 2016) and has been used in studies with individuals with ASD previously (Kouklari

et al., 2019; Maister, et al., 2013). The tests were run on the experimenter's laptop (Acer Aspire V3-571, with a 15.6" screen at 1366 x 768 resolution). Tests are displayed on a monitor allowing control of stimulus presentation, response recording, and data collection. Tasks were chosen on the basis of the literature, and after discussion with the staff at the school, to ensure they would not be detrimental to the participants' well-being. The Hungry Donkey Task was utilised in response to these discussions as was more appropriate to the age of the participants than the Iowa Gambling Task.

Wisconsin Card Sorting Task WCST; Nelson 1976) assesses cognitive flexibility through attention switching ability and working memory. Participants are asked to sort cards by categories (shape, colour, number) and must establish the correct sorting method by trial and error (participants are told if a given choice is correct or not). The method of sorting changes without notification and how long it takes to find the new method of sorting is measured. It was decided to use the switch cost, but not preservative errors, as differences between children with ASD have been observed to be more notable (Van Eylen et al., 2011). The switch cost is the difference between the mean reaction time on switch trials and the mean reaction time on maintain trials, with higher scores indicating less strong performance.

Hungry Donkey Task (Crone & van der Molen, 2004) is a computerised version of the Iowa Gambling Task adapted for children. It is used to assess hot inhibition. The task presents four doors, from which each participant has to choose doors from which the donkey will obtain gains or losses. The aim is to get as many apples as possible, by selecting from the four doors to win apples to feed the hungry donkey. The stimulus display shows a donkey sitting in front of four doors, and each door corresponds to a key on the keyboard. Pressing a key displays an outcome showing the number of green apples won and red apples lost. A vertical bar on the side of the screen presents a performance index and amount of overall gain is displayed under the doors. Two options are characterised by high immediate gain (4 apples) but also high loss, and the other two are characterised by low immediate gain (2 apples) and low loss. Every 10 trials, door A presents five unpredictable losses of 8, 10, 10, 10, and 12 apples, and door B present one unpredictable loss of 50 apples, leading to an

overall loss of 10 apples for each of these doors. Door C leads to five unpredictable losses of 1, 2, 2, 2, and 3 apples in every 10 trials, and door D has one unpredictable loss of 10 apples. Therefore, the net gain on every 10 trials of doors C and D is also equal – 10 apples. The main outcome measure is net gain, with higher gain being indicative of better inhibition. Participants are not told the properties of each door or the number of trials. They are, however, informed that they have to play many times and that they can switch doors as often as they like. The Donkey task has been used successfully with individuals with developmental disorders (Rahimi-Golkhandan et al., 2014).

Stroop Colour Task (Stroop, 1935) is a task in which participants are asked to identify the colour of the text of words, while ignoring the actual word content, and assesses inhibition, cognitive flexibility, and selective attention, particularly cold inhibition with no emotional content (Homack & Riccio, 2004). Faster and more accurate of performance is taken as an index of stronger EF.

Tower of London Task (TOL; Shallice, 1982) is a computerised task assessing planning and executive cognitive abilities. The task comprises a number of discs, and participant rearrange them to match a given configuration, with increased speed of completion and less moves required being indicative of better planning ability (Chang et al., 2011).

5.4. Procedure

Written parental consent was obtained for all participants, the participants were themselves briefed and informed of their right to withdraw at any time. Each participant was individually tested in a quiet room and could be accompanied by a member of school staff if they chose. The room contained a computer a desk, and a chair.

The first part of the experiment aimed the evaluation of EF, with the use of the PEBL software. All tasks were presented without modifying the default settings of the programme. These tasks together measured the ability for attention switching, working memory and cold and hot EF. Participants were asked to complete the

computerised versions of four EF tasks: WCST, Hungry Donkey Task, Stroop Colour Task, and ToL. Each participant was instructed verbally, and every task included written instructions displayed on the screen. The tests were presented to the participants randomly and they were offered the chance of breaks between tasks due to the long nature of the testing session. After the completion of the EF tasks, the participants were debriefed, thanked for participating in the study, and given a lolly as a reward for participation. The, AQ, SDQ, SCQ, and RADQ were completed by staff at the school independently of the EF tasks, but within the same week as the tests were performed. Background information regarding clinical diagnoses was completed from the pupils' statements of educational needs.

5.5. Results

There were 29/79 (36%) of the sample with an ASD clinical diagnosis. The group with ASD diagnosis had a significantly higher SCQ score (12.27 $\pm$ 1.81) than the group without ASD diagnosis (7.26 $\pm$ 1.03), $F(1,77) = 13.13$, $p < .001$, $\eta^2_p =$ .146[.030:.288], $p(H_1/D) = .982$. There was a less pronounced difference between the ASD (66.37 + 30.69) and no ASD (53.84 $\pm$ 23.72) diagnosis groups in terms of the RADQ scores, $F(1,77) = 4.11$, $p = .046$, $\eta^2_p =$ .051[.000:.168], $p(H_1/D) = .468$. There were 40/79 (50%) of the sample satisfying criteria for an AD diagnosis. The group with AD diagnosis had a significantly higher RADQ score (80.05 $\pm$ 18.54) than the group without AD (36.28 $\pm$ 12.13), $F(1,77) = 153.22$, $p < .001$, $\eta^2_p =$ .666[.538:.743], $p(H_1/D) = .999$. There was also a significant difference between the AD (14.82 + 8.69) and no AD (4.71 $\pm$ 5.71) groups in terms of SCQ scores, $F(1,77) = 37.11$, $p < .001$, $\eta^2_p =$ .325[.161:.463], $p(H_1/D) = .999$. There were 30 (38%) with neither ASD or AD, 9 (11%) with ASD alone, 20 (25%) with AD alone, and 20 (25%) with both ASD and AD.

The sample mean score on the SCQ was 9.83 ($\pm$ 8.91), and 27/79 (34%) of the sample scored positive for ASD. The sample mean for the RADQ was 58.44 ($\pm$ 26.99), and 32/79 (41%) scored positive for AD. The Pearson's correlation between the SCQ and RADQ was, $r = .602$, $p < .001$. There were 39 (49%) with neither ASD

or AD, 8 (10%) with ASD alone, 13 (17%) with AD alone, and 19 (24%) with both ASD and AD.

Executive Function and Clinical Diagnosis

Table 5-1:
shows the numbers of participants with clinical diagnosis and psychometrically-defined classifications. Cohen's Kappa revealed a moderate agreement between the diagnoses and psychometric classifications of .472, $p < .001$

		Clinical Diagnosis			
		Neither	ASD	AD	Both
Psychometric Classification	Neither	27	8	4	0
	ASD	3	1	1	3
	AD	0	0	9	4
	Both	0	0	6	13

Table 5-1 Number of participants with clinical diagnosis and psychometrically-defines classifications

Figure 5-1 shows the group mean z scores for the six metrics across the four EF tasks for those with no diagnosis, ASD only, AD only, or both diagnoses. The scores are represented as z-scores as they had very different metrics from one another. Inspection of these data reveals few striking differences and a high degree of variance in the data. This impression is supported by the results of a multivariate analysis of variance (MANOVA) conducted on the four diagnosis groups with the six scores as dependent variables, which revealed no significant difference between the groups, *Wilks' Lambda* = .733, $F(18,198) = 1.28$, $p = .204$, $\eta^2_{p=}$ .104[.000:.107]. However, although not an ideal test statistic, Roy's GCR was significant, GCR = .214, $F(6,72) = 2.57$, $p = .026$, $\eta^2_{p=}$ .176[.000:.273]. Follow-up analysis of variance (ANOVAs) revealed that none of the group comparisons on individual DVs were significant using a Bonferroni correction (.05/6 = .008). However, when this was

relaxed, there was a significant difference between the diagnostic groups for WCST switch cost, $F(3,75) = 2.75$, $p = .049$, $\eta^2_{p=}$ .053[.000:.121], $p(H_1/D) = .075$. Tukey's Honestly Significant Difference (HSD) tests revealed that only the group with both diagnoses differed from the group with neither diagnosis, $p < .05$. The difference between the groups on the ToL moves score approached significance, $F(3,75) = 2.23$, $p = .067$, $\eta^2_{p=}$ .043[.000:.107], $p(H_1/D) = .056$. Tukey's HSD tests revealed that both the group with an ASD and neither diagnosis each differed from AD and both groups, $ps < .05$

Figure 5-1:

Group mean z scores for the six metrics across the four EF tasks for those with no diagnosis, ASD only, AD only, or both diagnoses. Error bars = standard error.

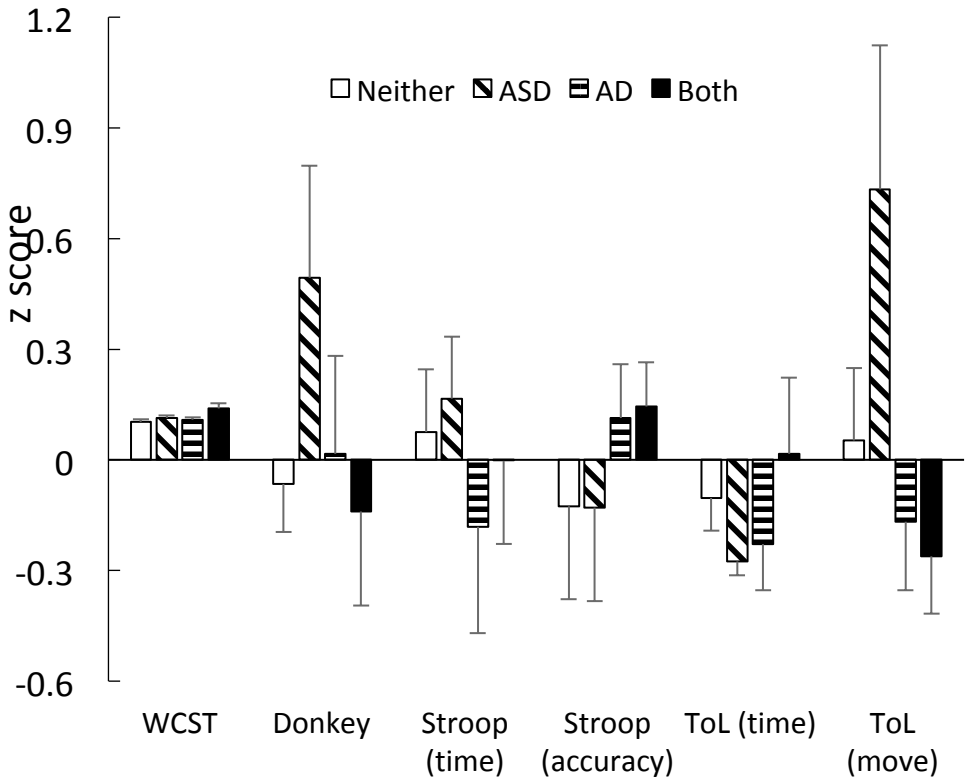


Figure 5-1 Group mean scores for the Executive Function (EF) Tests

Figure 5-2 shows the group-mean z scores for the EF tasks for those with and without an ASD diagnosis (top panel), those with and without an AD diagnosis (middle panel), and those with an ASD or AD diagnosis only (bottom panel). A discriminant function analysis conducted to differentiate ASD and no ASD diagnoses

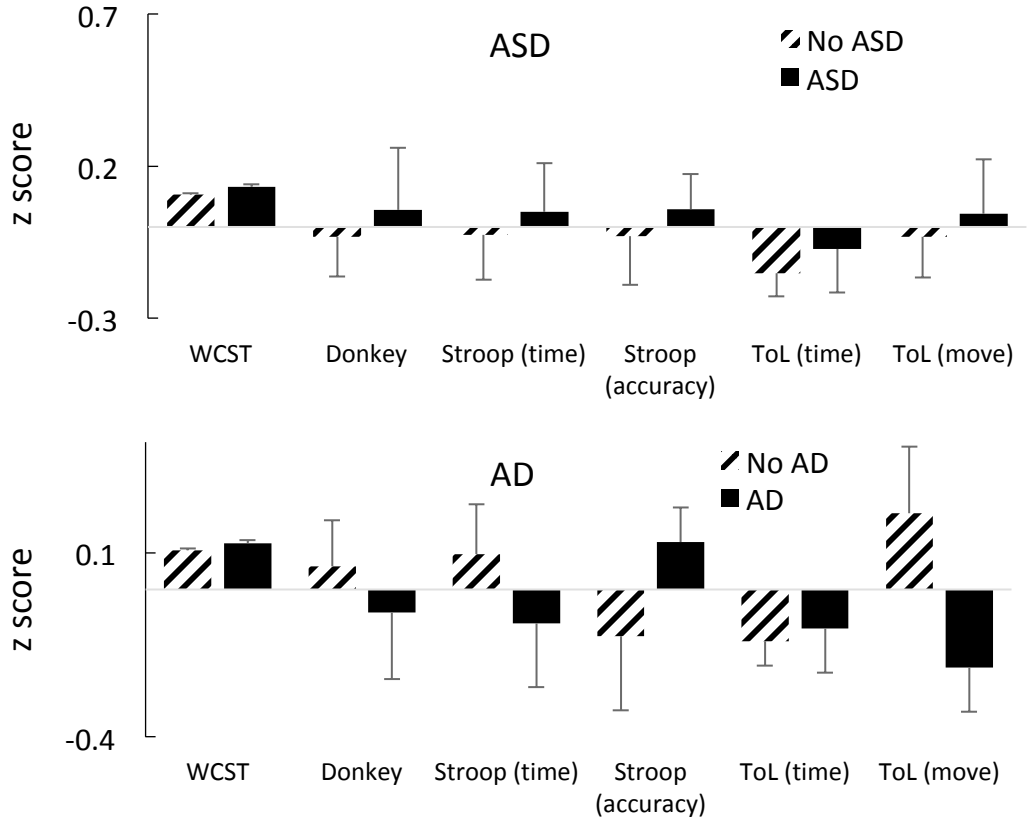
found no function significantly differentiated the groups, *Wilks Lambda* = .915, $X^2(6)$ = 6.555, $p > .30$, $\varphi = .288$. Although, WCST did display some discrimination function (.920), all other EF scores did not (< .30). A discriminant function analysis conducted to differentiate between AD and no AD found the first function approached significance, *Wilks Lambda* = .884, $X^2(6) = 9.121$, $p = .083$, $\varphi = .339$.

According to the structure matrix, the first function included more ToL moves (.613), a lower WCST switch cost (-.572), and lower Stroop accuracy (-.367), with Stroop time (.269), Donkey (.176), and ToL time (-.081) less strongly associated. The function predicted the presence of AD with 65% accuracy. Although a discriminant function analysis conducted to differentiate between ASD and AD found no function significant, *Wilks Lambda* = .752, $X^2(6) = 6.832$, $p = .337$, φ = .294. According to the structure matrix, more ToL moves (.778), and stronger Donkey performance (.358), but not Stroop accuracy (-.297), Stroop time (.279), WCST (.130), and ToL time (-.07381), predicted ASD with 69% accuracy.

Figure 5-3 shows the group mean z scores for the six metrics across the four EF tasks for the psychometrically-defined no classification, ASD only, AD only, or both classifications. Inspection of these data reveals a very similar pattern to that obtained from the clinical diagnosis, with few striking differences, except for Donkey and ToL moves, and a high degree of variance in the data. This impression was supported by the results of a MANOVA conducted on the four classification groups with the six scores as dependent variables, which revealed no significant difference between the groups, *Wilks' Lambda* = .918, $F(18,198) = .92$, $p > .50$, η^2_p = .077[.000:.069]. As with the clinical diagnoses, although not an ideal test statistic, Roy's GCR approached significance, GCR = .164, $F(6,72) = 1.97$, $p = .082$, η^2_p = .141[.000:.230]. Follow-up ANOVAs revealed that none of the group comparisons on individual DVs were significant using a Bonferroni correction (.05/6 = .008). However, when this was relaxed, the difference between the classification groups for the ToL moves score approached significance, $F(3,75) = 2.55$, $p = .062$, η^2_p = .092[.000:.203], $p(H_1/D) = .062$. Tukey's HSD tests revealed that both the group with an ASD and neither diagnosis each differed from AD and both groups, *p*s < .05.

Figure 5-2

Group-mean z scores for the EF tasks for those with and without an ASD diagnosis (top panel), with and without an AD diagnosis (middle panel), and with an ASD or AD diagnosis only (bottom panel). Error bars = standard error.



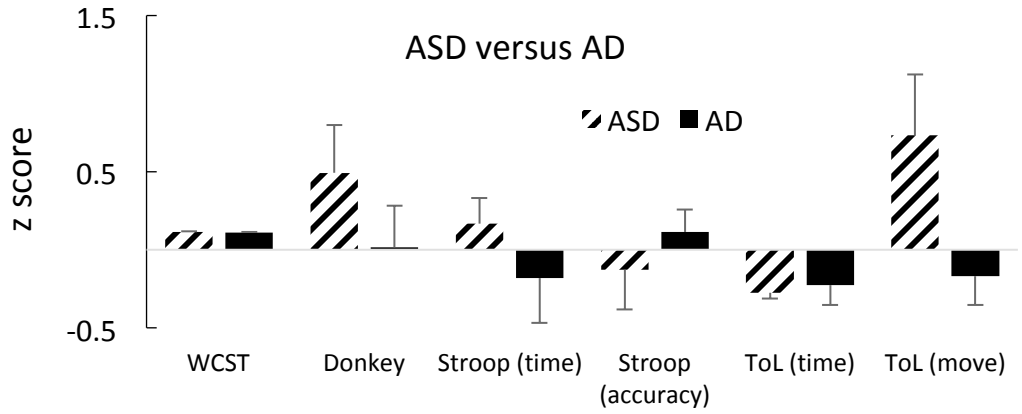


Figure 5-2 Group mean scores for EF tasks for those with/without ASD diagnosis

Executive Function and Psychometric Measures

Figure 5-3:

Group mean z scores for the six metrics across the four EF tasks for those with no classification, ASD only, AD only, or both classifications. Error bars = standard error.

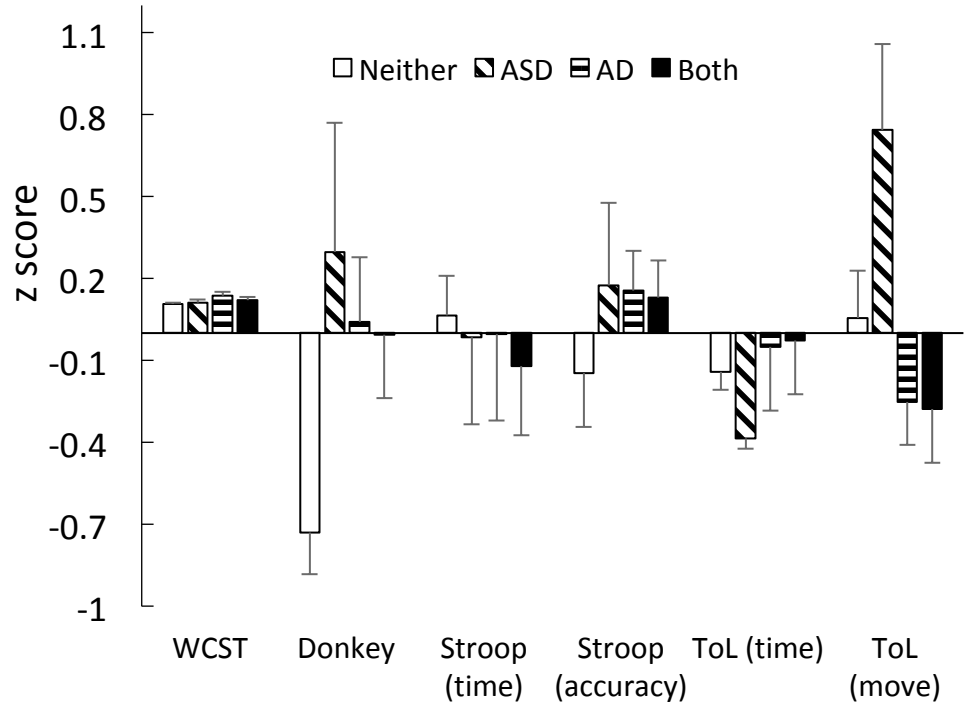
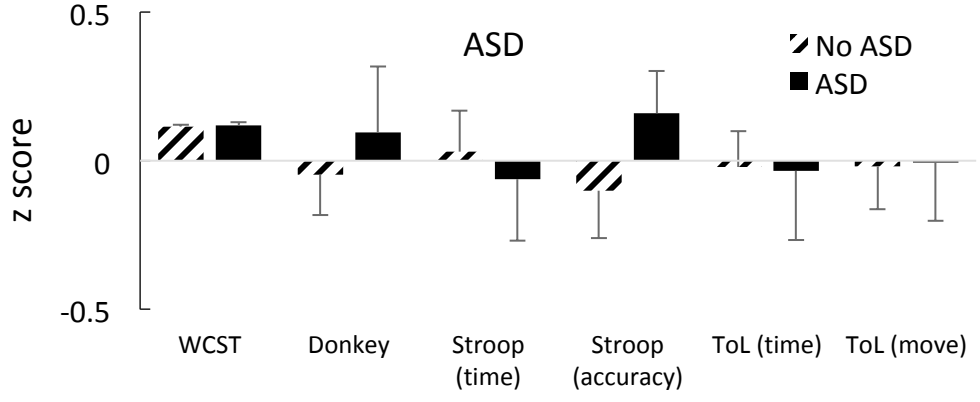


Figure 5-3 Group mean z scores for the six metrics across the four EF tasks for those with no classification, ASD only, AD only, or both classifications. Error bars = standard error.

Figure 5-4 shows the mean z scores for the four EF tasks for above and below the psychometric threshold for ASD (top panel), those above and below the psychometric threshold for AD (middle panel), and those with ASD or AD classifications only (bottom panel). A discriminant function analysis conducted to differentiate psychometrically-defined ASD and no ASD found no function significantly differentiated the groups, *Wilks Lambda* = .976, $X^2(6) = 1.801$, $p > .90$, $\varphi = .150$. Although the functions for greater WCST switch cost (.668), less Stroop time (-.431), and higher Donkey scores (.398) were associated with an ASD classification (other functions < .30). A discriminant function analysis conducted to differentiate between AD and no AD classifications found the first function was not significant, *Wilks Lambda* = .887, $X^2(6) = 8.908$, $p = .179$, $\varphi = .335$. The function for fewer ToL moves (-.640), shorter ToL time (.331), greater WCST switch cost (.576), and greater Stroop accuracy (.329) were associated with AD with a 70% accuracy. Although a discriminant function analysis conducted to differentiate between ASD and AD found no function significant, *Wilks Lambda* = .603, $X^2(6) = 8.087$, $p = .232$, $\varphi = .320$. According to the structure matrix, more ToL moves (.889), greater ToL time (-.312), and greater switch cost (-.308) predicted ASD with 72% accuracy.

Figure 5-4:

Group-mean z scores for the EF tasks for those with and without an ASD classification (top panel), with and without an AD classification (middle panel), and with an ASD or AD classifications only (bottom panel). Error bars = standard error.



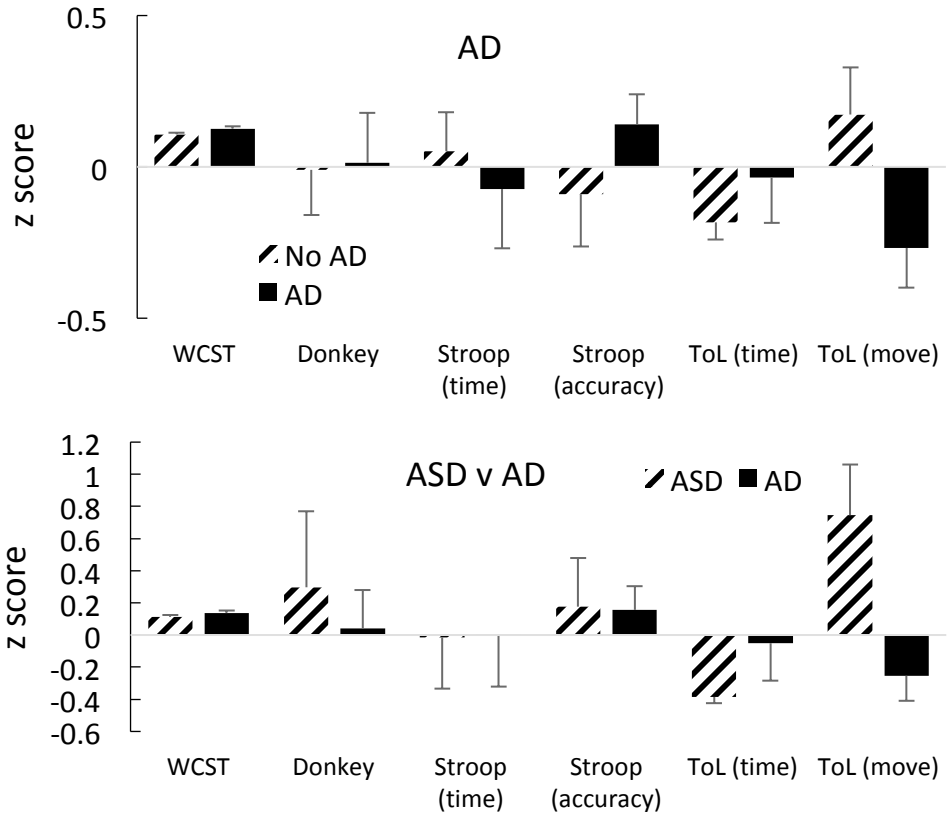


Figure 5-4 Group mean scores for EF Tasks (No classification / ASD only / AD only / both classifications)

5.6. Discussion

The objective of the study was to examine differences between ASD and AD using EF tasks for a sample with learning disabilities. The study found that there was a considerable overlap in the diagnosis of ASD and AD, which was also noted when using psychometric assessments, which replicated previous work (Mayes et al., 2017; Sadiq et al., 2012). Despite adopting as lenient a set of analytic approaches as possible, little difference between the EF performances of individuals with ASD and AD was noted. Certainly, none that would help to serve to differentiate between the conditions for a learning-disabled population, which represents a substantial section of the special school population (Giltaij et al., 2015; Jang & Matson, 2015). The EF abilities of those with AD have not received a great deal of attention (Colvert et al., 2008), but that little difference was noted between those with ASD and a learning disabled control replicates previous reports of a lack of difference (Russell et al., 1996) and stands in some contrast to the findings from a higher-functioning groups (Demetriou et al., 2018; Lai et al., 2017).

These results corroborate the substantial overlap between ASD and AD, both when clinical diagnoses and psychometric methods are employed as found in Chapter 3 and also by both Davidson et al., 2015 and Sadiq et al., 2012. The percentage of children meeting both the psychometric criteria for ASD and AD was about 25%, which was a little lower than previous studies in samples lacking a learning disorder (Davidson et al., 2015; Sadiq et al., 2012), which tended to report about 60% overlap. These current data give strength to the argument that overlap between ASD and AD can exist (Mayes et al., 2017; Sadiq et al., 2012), and is evident in a group of individuals with learning disability.

The EF abilities of those with ASD in the current sample were not significantly different from learning disabled individuals with neither ASD nor AD, which replicates previous findings for this sample (Russell et al., 1996). The numerical pattern of performance was similar to that which might be predicted for this group – better performance on the hot EF tasks (Donkey), and worse performance on the cold EF tasks (WCST, ToL). However, these differences were very small, and, even if a larger sample had been employed to increase power, would not have been strong effects important in clinical or educational terms. Thus, while the data are numerically consistent with previous suggestions Demetriou et al., 2018; Lai et al., 2017; Ozonoff & Jensen, 1999), they are of limited practical utility.

The EF performance of the group with AD was more discriminable from, and stronger than, a group without AD, especially in terms of cold EF tasks such as ToL and WCST. This does not corroborate the previous suggestions of impaired EF in those with attachment problems (Colvert et al., 2008). This difference from previous studies could be due to the comparison in the current study being with individuals with learning disabilities rather than typically developing individuals. In terms of the differences between this group and the group with ASD, there were few of note, suggesting that EF on its own will not discriminate between the conditions. The AD group had numerically worse performance on the hot EF task (Donkey), and slightly better performance on the cold tasks (WCST) than the ASD group, which could be predicted (Miyake et al., 2000, Reolofs et al., 2015). However, these differences were so small as to be of limited use in applied settings.

The current results do not rule out differences in EF in non-learning disabled groups, and perhaps not in those attending mainstream education – those data have not been collected or analysed. The lack of striking differences may be due to power limitations, but it is worth noting that the effect sizes, and Bayes statistics suggest that any effect will be small, and this will limit its potential usefulness. Moreover, extremely lenient statistical approaches were adopted in order to find any semblance of a difference between ASD and AD groups.

It may be that the presence of the condition, itself, does not impact EF. Factors such as caregiving may be equally important in the development and expression of these abilities. Early caregivers are taken to provide models for the development of executive functioning (Belsky et al., 2010; Bernier et al., 2010; Nelson & Bloom, 1997). For example, maternal sensitivity, mind-mindedness, and autonomy support have all been found to predict EF (Bernier et al., 2010; Bernier et al., 2012). It may be that these aspects are more important than the presence of a diagnosis of psychometrically-measured trait for EF expression. Parenting is known to be disrupted in both of these groups, as discussed in Chapter 3, albeit in different ways, and this may be important for future studies to assess.

Although the association between cognitive functioning and EF/memory has been investigated in separated populations, there is not enough evidence supporting the correspondences or diversities between ASD and AD diagnoses. As mentioned before, the significant factor with regards AD is the neglect and early childhood abuse. If this is the case, the diagnosis of ASD would be delimited to children who have been not mistreated (Davidson et al., 2015). Theory has suggested the main difference between these two conditions is the 'emotional sphere' where the therapeutic relationship with children with ASD and AD depends and varies on the rapport (Moran, 2010). This refers to the fact that building rapport with children with ASD is more demanding than with those diagnosed with AD. AD children are also able to establish better relationships, yet, it is challenging to manage personal boundaries (Davidson et al., 2015). Similarly, it has been said that individuals with

AD tend to present characteristics of indiscriminate friendliness, implying differential social patterns in both ASD and AD.

In summary, there was substantial overlap in the diagnosis and classification of ASD and AD. There were few differences between the EF performances of individuals with ASD and AD and any differences would be of limited use in differentiating between the conditions for a learning-disabled population. Such results give rise to a range of discussions, often of misinterpretation and issues of inadequate use of statistical evidence (Aczel, et al., 2018) through to the discussion around null findings as a lack of evidence as opposed to having its own worth (Leppink et al., 2017). Null results, as ways to enhance research findings, have been considered as results unworthy of publishing in terms of their perceived lack of meaningful information (Landis et al., 2014) due to concerns regarding research design or methodological shortcomings that authors may shy against. However, it needs consideration as valid research (Cook & Therrien, 2017), but is also noted that frequently null results are not pursued for publication for these reasons resulting in a lack of available papers for review availability (Iwachiw et al., 2019). These findings suggest ways forward, and further inform the difficulties presented in the findings of overlap between ASD and AD.

Chapter Six : Executive functioning on behaviour problems of those with Attachment Disorder or Autism Spectrum Disorders

This chapter considered whether executive functioning (EF) mediated the relationship between either Autism Spectrum Disorder (ASD) or Attachment Disorder (AD) and behaviour problems for a sample of children with learning disabilities. A sample of 79 pupils with learning disabilities was examined in terms of their AD and ASD traits, their levels of behaviour problems and performance on four EF tasks (WCST, Hungry Donkey, Stroop, and Tower of London) was assessed.

For typically developing children, it has been found that Executive Functioning (EF) ability can mediate between early experiences and the development of later problem behaviours (Buss et al., 2012; Devine et al., 2016). For example, Sulik et al. (2015) reported the association between parenting ability and child externalising behaviour was mediated by the child's EF ability; higher EF ability protecting against the effects of poor parenting skills. Similarly, it has been claimed that EF difficulties are noted with typically developing young people who have experienced poor institutional care (Colvert et al., 2008; McDermott et al., 2012; Merz & McCall, 2011). Children exposed to poor institutional care for long periods show deficits in EF that can persist after removal from the institution (Kreppner et al., 2001; Roy et al., 2004). Colvert et al. (2008) reported greater EF deficit, attachment problems and a 'quasi-autism' effect, with longer institutional deprivation with EF mediating between attachment and behaviour problems.

Although there have been suggestions that EF has relationships to those with additional needs and that it serves the same mediating function in these populations as for the typically developing population (e.g., Lawson et al., 2015), the situation with respect children with comorbid intellectual impairment is unclear. Learning disabilities and intellectual function may play a role in the expression of EF (cf. Mahone et al., 2002; Russell et al., 1996) and this may impact its role in mediating between a condition and behaviour problems. As pupils with learning difficulties in addition to a developmental condition like AD or ASD are highly represented in special educational needs placements (Jang & Matson, 2015; Raaska et al., 2012), this group formed the focus of the current investigation into whether EF mediated

between AD, and ASD and behaviour problems. Behaviour problems were a focus as these can be a key issue for such a group in educational settings.

A relationship between EF and AD has been suggested (Colvert et al., 2008; Gambin et al., 2020; Low & Webster, 2016). For example, Gambin et al., (2020) noted that females with insecure attachment regarding their fathers displayed poorer EF than females with secure father-attachments (this effect was not noted for boys). However, it should be noted that such relationships between EF and AD are sometimes very small in size as found in Chapter 4 and two unpublished theses have reported no such relationship (Foy, 2016; Marr, 2014). Marr (2014) found no statistically significant difference in EF between groups with children with and without AD. Similarly, from a research group independent to that which supervised Marr (2014), Foy (2016) noted no associations between AD and EF. Moreover, it has been suggested that EF mediates the relationship between AD problems and behaviour problems (Colvert et al., 2008; Low & Webster, 2016). Unfortunately, direct evidence regarding the potential mediating role of EF between attachment and behaviour problems is sparse and, sometimes, contradictory; for example, Foy (2016) noted no such association for children with AD. Thus, questions remain over the strength and nature of any relationships between AD and EF.

Altered EF has been associated with those with both higher (Lai et al., 2017) and lower (Demetriou et al., 2018) functioning ASD. However, it has also been noted that reported that EF differences between those with lower-functioning ASD and intellectually matched controls are much less pronounced (Russell et al., 1996). A finding that was also noted in Chapter 3. So, while there should be a relationship between ASD and EF (Demetriou et al., 2018; Lai et al., 2017), its strength, as discussed in Chapter 3, is still debated (Russell et al., 1996) and there is little, if any, evidence as to whether EF mediates the relationship between ASD and behaviour problems, especially in a population with comorbid learning needs.

Given there is limited and contradictory evidence regarding relationships between EF and behaviour problems for both ASD and AD, especially in a population with comorbid learning difficulties, the aim of the current study was to explore these

associations. Given the above suggestions regarding parenting (Colvert et al., 2008), and the presence of greater conduct problems in those with AD, as explored in Chapter 3, one prediction could be that EF is more impaired in children with AD than ASD. However, as reported in Chapter 3, and noted by Russell et al. (1996), these differences are not always prominent, and a null finding remains a possibility. Thus, the current study provided an initial investigation into the EF abilities of the individuals showing AD and ASD traits and a learning disability, as this group is highly represented in special educational needs placements (Jang & Matson, 2015; Raaska et al., 2012). It employed a range of psychometric tools measure attachment disorder and autism traits in this population and related them to performance on a battery of EF tasks.

6.1. Methods

6.1.1. Participants and Setting

Seventy-nine participants (61 male, 18 female) were recruited, aged 9 - 16 (mean = 14 *SD* $\pm$ 1.78) from a special school, which has 110 pupils in total with statements of educational needs including Learning Difficulties, Autism Spectrum Disorder, and/or children known to Social Services for family issues additionally to any diagnosis. Given the wide range of children, it was thought that this would be a good sample to use to include sufficient numbers of children with different disorders. To be legally included in the statement of educational needs, confirmation of a diagnosis was needed from an independent NHS clinician. All children had a diagnosis of learning disabilities. G-Power calculations suggest that for 80%, with a rejection criterion of $p < .05$, and a medium effect size ($r = .3$), that 64 participants would be needed to detect a significant relationship between variables. The study was approved by Swansea University Ethics Committee.

6.1.2. Measures

Social Communication Questionnaire (SCQ; Rutter et al., 2003) is used for the identification of ASD and its symptom levels. See Chapter 2 for details.

Strengths and Difficulties Questionnaire (SDQ; Goodman, 1977) is a brief behavioural screening questionnaire for emotional and behavioural disorders in children and adolescents aged 4-16 years. See Chapter 2 for details.

Randolph Attachment Disorder Questionnaire (RADQ; Randolph, 2000) screens for attachment disorder in children between 5 and 18 years, and distinguishes children with attachment disorder from those with conduct disorder or other psychiatric disorders. See Chapter 2 for details.

Autism Spectrum Quotient (AQ; Baron-Cohen et al., 2001) is a self-report questionnaire consisting of 50 statements that measure traits associated with ASD. See Chapter 5 for details.

6.1.3. Apparatus

The Psychology Experiment Building Language (PEBL) software (Mueller & Piper, 2014) is a programming language interpreter and compiler allowing behavioural tests for psychological experiments. The tests were run on the experimenter's laptop (Acer Aspire V3-571, with a 15.6" screen at 1366 x 768 resolution). Tests are displayed on a monitor allowing control of stimulus presentation, response recording, and data collection. Tasks were chosen on the basis of the literature, and after discussion with the staff at the school, to ensure they would not be detrimental to the participants' well-being. The Hungry Donkey Task was utilised in response to these discussions as was more appropriate to the age of the participants than the Iowa Gambling Task.

Wisconsin Card Sorting Task (WCST; Nelson 1976) assesses cognitive flexibility through attention switching ability and working memory. Participants are asked to sort cards by categories (shape, colour, number) and must establish the correct sorting method by trial and error (participants are told if a given choice is correct or not). The method of sorting changes without notification, and how long it takes to find the new method of sorting is measured. It was decided to use the switch cost, but not preservative errors, as differences between children with ASD have been

observed to be more notable (Van Eylen et al., 2011). The switch cost is the difference between the mean reaction time on switch trials and the mean reaction time on maintain trials, with higher scores indicating less strong performance.

Hungry Donkey Task (Crone & van der Molen, 2004) is a computerised version of the Iowa Gambling Task adapted for children. It is used to assess hot inhibition. The task presents four doors, from which each participant has to choose doors from which the donkey will obtain gains or losses. The aim is to get as many apples as possible, by selecting from the four doors to win apples to feed the hungry donkey. The stimulus display shows a donkey sitting in front of four doors, and each door corresponds to a key on the keyboard. Pressing a key displays an outcome showing the number of green apples won and red apples lost. A vertical bar on the side of the screen presents a performance index and amount of overall gain is displayed under the doors. Two options are characterised by high immediate gain (4 apples) but also high loss, and the other two are characterised by low immediate gain (2 apples) and low loss. Every 10 trials, door A presents five unpredictable losses of 8, 10, 10, 10, and 12 apples, and door B present one unpredictable loss of 50 apples, leading to an overall loss of 10 apples for each of these doors. Door C leads to five unpredictable losses of 1, 2, 2, 2, and 3 apples in every 10 trials, and door D has one unpredictable loss of 10 apples. Therefore, the net gain on every 10 trials of doors C and D is also equal – 10 apples. The main outcome measure is net gain, with higher gain being indicative of better inhibition. Participants are not told the properties of each door or the number of trials. They are, however, informed that they have to play many times and that they can switch doors as often as they like. The Donkey task has been used successfully with individuals with developmental disorders (Rahimi-Golkhandan et al., 2014).

Stroop Colour Task (Stroop, 1935) is a task in which participants are asked to identify the colour of the text of words, while ignoring the actual word content, and assesses inhibition, cognitive flexibility, and selective attention, particularly cold inhibition with no emotional content (Homack & Riccio, 2004). Faster and more accurate of performance is taken as an index of stronger EF.

Tower of London Task (TOL; Shallice, 1982) is a computerised task assessing planning and executive cognitive abilities. The task comprises a number of discs, and participant rearrange them to match a given configuration, with increased speed of completion and less moves required being indicative of better planning ability (Chang et al., 2011).

6.2. Procedure

Written parental consent was obtained for all participants, the participants were themselves briefed and informed of their right to withdraw at any time. Each participant was individually tested in a quiet room and could be accompanied by a member of school staff if they chose. The room contained a computer, a desk, and a chair.

The first part of the experiment aimed the evaluation of EF, with the use of the PEBL software. All tasks were presented without modifying the default settings of the programme). These tasks together measured the ability for attention switching, working memory, and cold and hot EF. Participants were asked to complete the computerised versions of four EF tasks: WCST, Hungry Donkey Task, Stroop Colour Task, and ToL. Each participant was instructed verbally, and every task included written instructions displayed on the screen. The tests were presented to the participants randomly and they were offered the chance of breaks between tasks due to the long nature of the testing session.

After the completion of the EF tasks, the participants were debriefed, thanked for participating in the study, and given a lolly as a reward for participation. The AQ, SDQ, SCQ, and RADQ were completed by staff at the school independently of the EF tasks, but within the same week as the tests were performed.

6.3. Results

The sample mean for attachment problems (RADQ) was 58.44 ($\pm$ 26.99; range = 0 – 119), with 22 pupils scoring above the cut-off for attachment problems. For ASD (SCQ) the mean score was 8.84 ($\pm$ 6.19; range = 0 – 34), with 32 pupils scoring

above the cut-off. For ASD symptoms (AQ) it was 20.83 (± 5.57; range = 9 – 32), with 8 scoring above the cut off. Examining the overlap in those scoring above cut-off for both AD (RADQ) and ASD (SCQ), shows that 39/79 (43%) scored below cut-off for both condition, 9/79 (11%) scored above cut-off for AD but not ASD, 9/79 (11%) scored above cut-off for ASD but not AD, and 23/79 (29%) scored above cut-off for both, $X^2(1) = 21.962$, $p < .001$, $\varphi = .527$. As numbers scoring above cut-off for AQ were small, these data were not analysed.

To examine EF the scores from each of the four tests: Donkey, Stroop (time and accuracy), ToL (time and moves), and WCST, performance on the tasks was converted into a z-score for that task to ensure that all tasks were measured on the same scale. Where necessary, the z-scores were reversed, so that a positive z-score reflected better EF functioning. The mean of these 6 scores was then taken for each participant to create an overall EF functioning score. The mean overall EF score for those scoring above the AD (RADQ) cut-off was .06 (± .41; range = -.64 - .63), and this was -.02 (± .36; range = -.90 - .71) for those below cut-off for AD. A t-test (with Bayes statistics displayed for the appropriate hypothesis) revealed that these scores were not significantly different, $t(77) = 1.98$, $p = .142$, $d = .24$, $p(H_0/D) = .608$. For those above the cut-off for ASD (SCQ) the overall EF mean was .05 (+ .37; range -.82 - .67), and this was -.01 (± .38; range -.90 - .71) for those below cut-off for AD, $t < 1$, $p > .40$, $d = .17$. $p(H_0/D) = .691$.

Figure 6-1 shows the Pearson's correlations between these scales for the entire sample, along with histograms showing the distribution of scores, and scatterplots showing 95% confidence limits for each relationship. As can be seen from these data, all of these measures were significantly positively related to one another, and the correlations showed medium strength relationships between the variables.

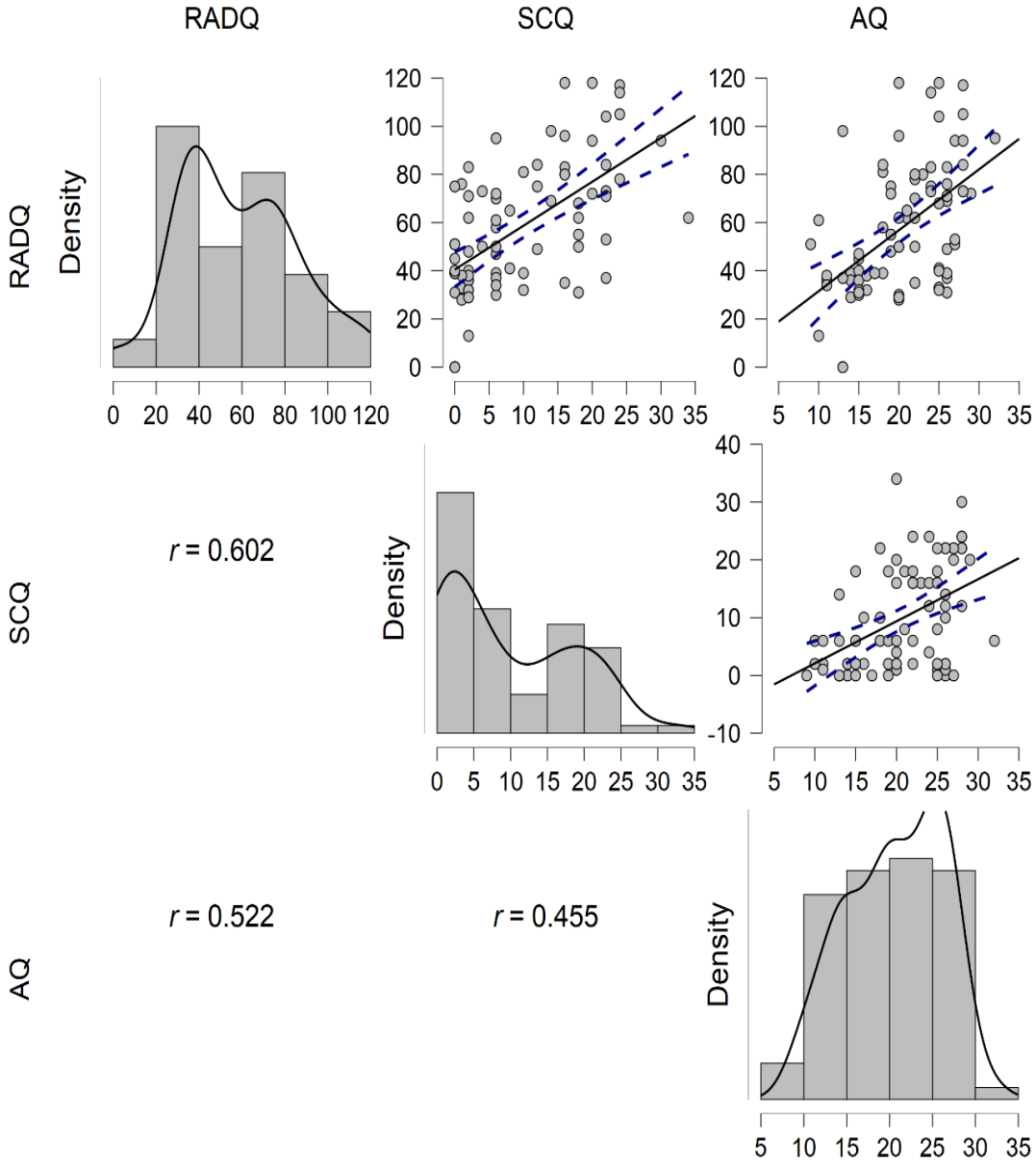
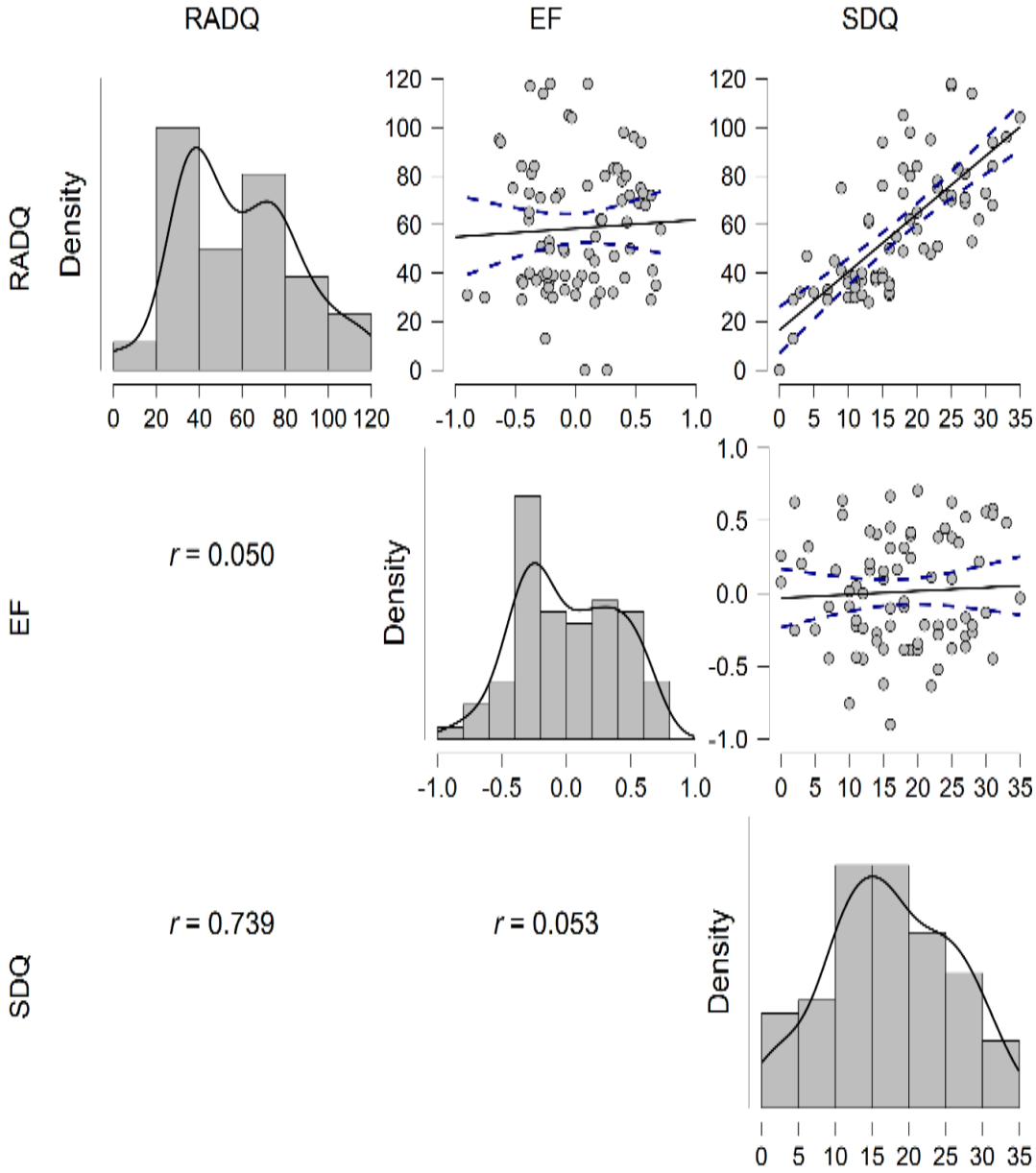
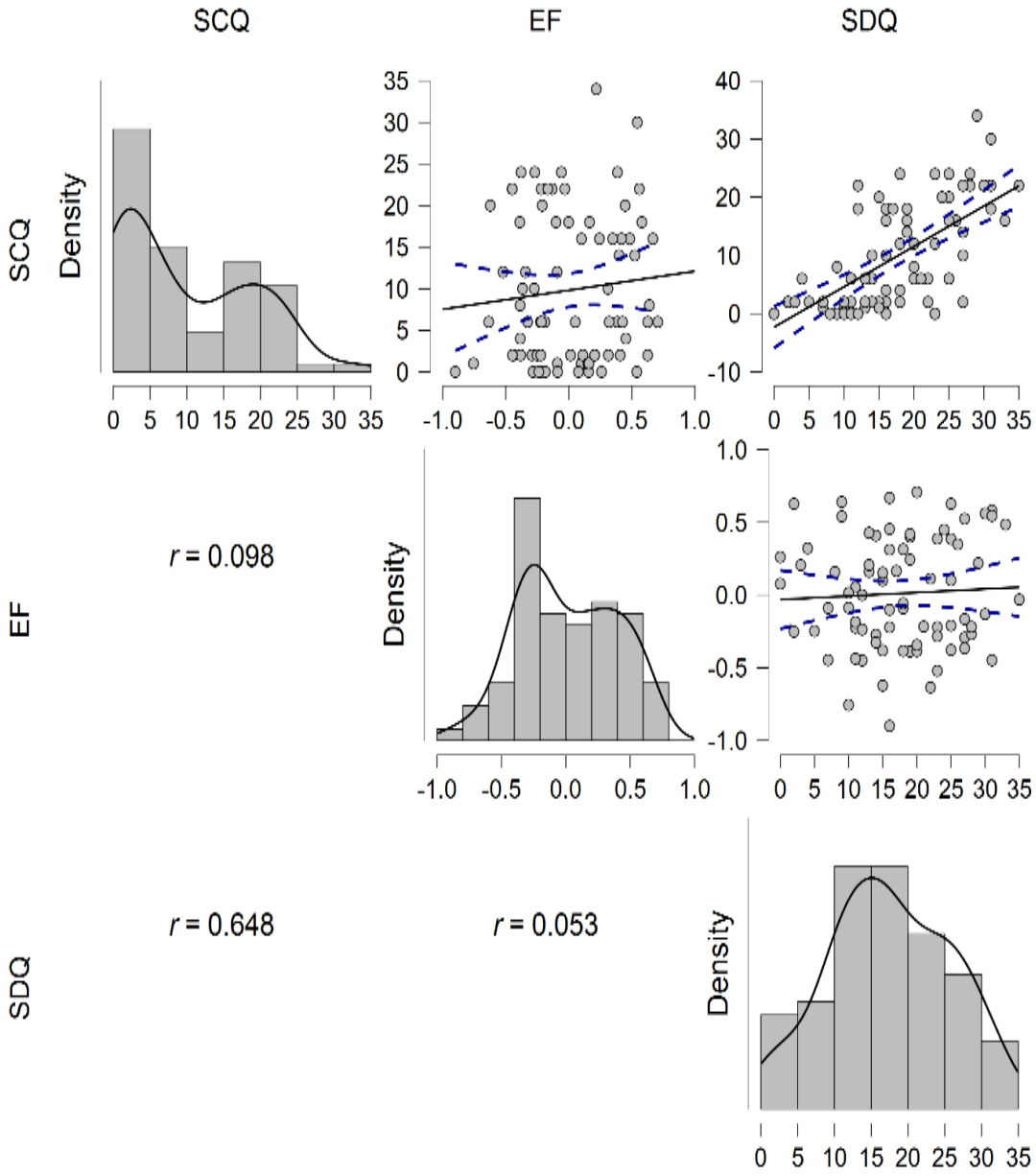


Figure 6-1 Pearson's correlations between these scales for the entire sample, along with histograms showing the distribution of scores, and scatterplots showing 95% confidence limits for each relationship.


RADQ
EF
SDQ
RADQ
Density
EF
Density
SDQ
Density
r = 0.050
r = 0.739
r = 0.053


SCQ
EF
SDQ
SCQ
EF
SDQ
Density
Density
Density
r = 0.098
r = 0.648
r = 0.053

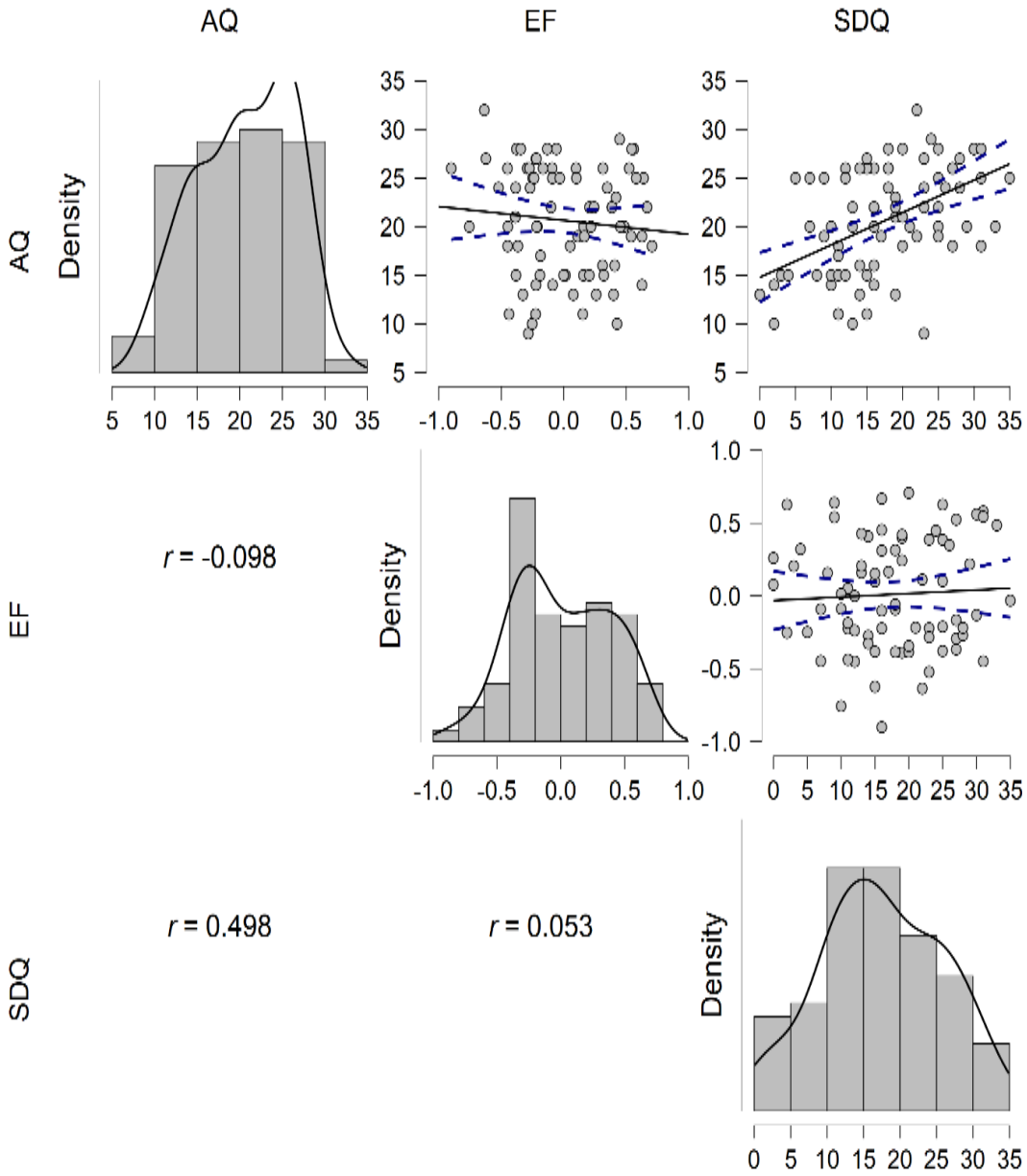


Figure 6-2 Pearson's correlations between attachment (RADQ; top panel), autism (SCQ; middle panel), and autism traits (AQ; bottom panel) and EF and behaviour problems (SDQ), along with histograms for the distribution, and scatterplots showing 95% confidence limits

Error! Reference source not found. Figure 6-2 shows the Pearson's correlations between attachment (RADQ; top panel), autism (SCQ; middle panel), and autism traits (AQ; bottom panel) with both the overall EF score and behaviour problems (SDQ), along with histograms showing the distribution of scores, and scatterplots showing 95% confidence limits for each relationship. Inspection of these data shows that attachment, ASD, and autism traits all correlated positively with behaviour

problems. However, none of these three scales correlated with overall EF functioning and EF functioning did not correlate with behaviour problems (SDQ).

Table 6-1 shows the Pearson's correlations between attachment (RADQ), ASD (SCQ), and autism traits (AQ) and each of the scores for the EF tasks. Inspection of these data shows only a small negative correlation between the AQ score and performance on the Donkey task.

Table 6-1:

Pearson's correlations between attachment (RADQ), ASD (SCQ), and autism traits (AQ) and each of the scores for the EF tasks.

Variable	RADQ	SCQ	AQ
Donkey	-.011	.003	-.231*
Stroop Time	.018	.080	.148
Stroop Accuracy	.019	.066	.034
Tower of London Time	.056	.127	.082
Tower of London Moves	.171	.045	.123
WCST Switch Cost	-.043	.057	-.114

*p<.05; **p<.01; ***p<.001

Table 6-1 Pearson's correlations between attachment (RADQ), ASD (SCQ), and autism traits (AQ) and each of the scores for the EF tasks.

6.4. Discussion

The current study investigated whether the EF abilities mediated between attachment problems, autism traits, and behaviour problems for individuals with a learning disability as there is limited and contradictory evidence regarding these relationships for a population with comorbid learning difficulties. The study revealed that there were positive associations between attachment problems (RADQ), autism traits (both SCQ and AQ) and behaviour problems. There were also high levels of association between each of these measures and each other. However, there were no differences in EF associated with either attachment problems (RADQ) or autism traits (SCQ) in this sample. Moreover, EF did not mediate between either attachment or autism and behaviour problems.

That attachment and ASD problems were highly related to one another and that there was significant overlap between those scoring above psychometrically-defined cut-off for both conditions, corroborates previous investigations of this relationship as reported in Chapter 2 and 3. Similarly, that there were strong relationships between each of the conditions and behaviour problems is consistent with previous demonstrations of this relationship (Bates & Bayles, 1988; Osborne & Reed, 2009). These data suggest that differentiation of AD and ASD may be difficult on the basis of either psychometric evaluation, or as discussed in Chapter 2, on the presence of overt behaviour problems (Mayes et al., 2017).

The lack of any strong relationship between attachment problems and EF is in line with several previous demonstrations of such a null result as reported in Chapter 4 (Foy, 2016; Marr, 2014). Although some previous studies have noted such a relationship (Colvert et al., 2008; Gambin et al., 2020; Low & Webster, 2016), these tend to be with typically developing children rather than those with a comorbid learning need. Similarly, the current data are in agreement with those reported in an unpublished thesis by Foy (2016) that found EF did not mediate the relationship between AD problems and behaviour problems. This stands in contrast to data from populations lacking an additional need (Colvert et al., 2008; Low & Webster, 2016). Likewise, there was no relationship between ASD and EF and no mediation of the relationship between ASD and behaviour problems by EF. This replicates previous findings for this population in Chapter 4 (Russell et al., 1996) and suggests that the additional needs reduce the relationship between ASD and EF (Demetriou et al., 2018; Lai et al., 2017).

The role of learning disabilities and intellectual function has been suggested as critical when considering the impact of EF (Mahone et al., 2002; Russell et al., 1996). The precise mechanism of action of learning difficulties on EF is unclear, but since pupils with learning difficulties in addition to a developmental condition like AD or ASD are highly represented in special educational needs placements (Jang & Matson, 2015; Raaska et al., 2012), this may be a significant consideration in

employing EF either as a diagnostic tool or as the focus of any intervention for such a group (Otero et al., 2014; Wallace et al., 2016).

These current data do not rule out an important role for EF in non-learning disabled groups or those attending mainstream education. It should also be acknowledged that the lack of striking differences may be due to power limitations, but it is worth noting that the effect sizes, and Bayes statistics suggest that any effect will be small, and this will limit its potential usefulness as a diagnostic or intervention.

In summary, there were positive correlations between levels of ASD and AD, and between both of these traits and behaviour problems. However, there was no relationship between these traits and EF, and no relationship between EF and behaviour problems. That there was little influence of EF as a mediator between these conditions and behaviour problems for a sample with learning disabilities suggests that EF has limited usefulness as a target for educational intervention in such a sample.

Chapter Seven : General Discussion

7.1 Introduction

Despite the implications of the accumulative causal triggers to behavioural presentation, such as childhood stress and trauma, previous research identifying the overlapping reasons of ASD and AD has been limited. While there is significant focus on individual triggers for aberrant behavioural patterns, it is only recently that we find an emerging body of interest and work developing towards furthering the understanding of diagnostic differentials. This academic focus has started to analyse the differential in overlapping symptomology (Davidson, 2015; McCullough et al., 2014; Moran 2010; Rutter et al., 1999; Sadiq, et al., 2012), and this thesis has sought to further this understanding by measuring a range of presenting behaviours and cognitive functions.

This thesis has explored aspects of overlapping behaviours and cognition between ASD and AD. Previous research has identified the overlap in domains of inflexibility, atypical play, poor social interaction, deficits in Theory of Mind, communication difficulties, emotional regulation deficits, executive function difficulties and sensory integration needs (Demetriou et al., 2019; Harrison, et al., 2021; Moran, 2010; Salehinejad et al., 2021), without successfully attributing clear differentials. While there is an established process to evaluate the presence of ASD and AD through assessment of presented aberrant behaviours, the findings of this thesis, indicated that ASD and AD could not easily be discriminated from one another, either when predicting clinical diagnosis or during psychometric classification. This study identified the presence of a considerable overlap in assessment outcomes for ASD and AD, as found in previous studies. This research makes further contribution to the findings of potential comorbidity or an internal consistency in the individual conditions. This thesis has demonstrated that there are areas of presentation that warrant further consideration. Within the diagnostic differentials, there are findings from this study that add depth to the understanding of ASD and AD.

7.2 Summary of Findings

Three research questions were raised at the start of this thesis:

1. What is the degree to which there is overlap in the diagnosis of ASD and AD?

2. What is the degree of overlap when screening tools are used to assess these disorders?

3. Are there any behaviours or cognitive processes that will discriminate between the two disorders?

Chapter 2 explored the extent that the overlap presented in children with ASD meeting the criteria for AD. This research found that it was possible to discriminate between the presence or absence of ASD and AD, by the presence of all behavioural problems but ASD and AD could not be discriminated from one another either when predicting clinical diagnosis or psychometric classification. Chapter 3 extended the sampling parameters to an on-line population and further considered the overlap and differences using both parental reports and clinically reported diagnoses of ASD and AD. In this study the profiles of children fulfilling criteria for ASD and AD were examined in terms of behaviour problems and attachment styles. The outcomes reported in Chapter 2, regarding the large overlap in the reported diagnoses and classifications of ASD and AD were also identified in this study. In addition, peer problems were found to predict a reported ASD diagnosis, whereas conduct problems predicted a reported AD diagnosis. Chapter 3 identified how attachment styles were also indicative of diagnosis, differentiated the diagnosis between ASD and AD, with those with ASD showing more ambivalent attachment styles, and those with AD demonstrating more avoidant and anxious, attachment styles.

Chapter 4 further examined the research questions, comparing the similarities and differences in parenting stress and reported behaviours in parent-completed psychometrics for ASD and AD, and self-reported stress measures. It was found that the parents of children with AD reported greater levels of parenting stress than parents of children with ASD and those parents reaching criteria for both disorders reported the greatest levels of parenting stress overall. It was also found that the use of limit setting behavioural strategies were less effective with children with AD than those with ASD, and also created increased levels of parental stress. In support of

data identifying overlaps in diagnostic results (See Chapter 2 and 3) it was also found that parents of children meeting criteria for both disorders also reported the greatest levels of parenting stress.

Due to the established diagnostic tools inability to find differentiation between ASD and AD (see Chapters 2, 3 and 4), Chapter 5 focused on the impact of executive function and its potential to offer support to differentiate between ASD and AD. This was assessed using four EF tasks (WCST, Hungry Donkey, Stroop, and Tower of London), which looked at both hot (i.e. Reward or affective related) and cold (i.e. purely cognitive) EF. This research found limited difference between the EF performances of individuals with ASD and AD, in that there was slightly better AD performance on cold EF tasks and slightly better performance for ASD on hot tasks, however as identified in previous chapters, there were limited differences between ASD and AD groups.

In response to the Chapter 3 findings of identifiable behavioural differences, Chapter 6 examined whether executive functioning (EF) mediated the relationship between either ASD or AD and behaviour problems as research has previously implied (Demetriou et al., 2019). This was examined in terms of their AD and ASD traits, their levels of behaviour problems, and performance on the four EF tasks (WCST, Hungry Donkey, Stroop and Tower of London). There were positive correlations between levels of ASD and AD (as found in previous chapters) and between both of these traits and behaviour problems in both ASD and AD. However, there was no relationship between these traits and EF, and no relationship between EF and behaviour problems, further confirming the previous chapter's research.

The findings of this thesis, adding to the growing body of research confirming the significant overlap in presentation, have raised questions around the additional results of behavioural and cognitive differentials. There is clearly a demand to examine further how ASD and AD can present as comorbid diagnosis, or to extrapolate differences that require novel intervention and support. These findings suggest that an understanding of the presentation of both ASD and AD requires examination of underlying theories.

7.3 Underlying Theories and Impact of Overlapping Presentations

ASD is defined as a developmental disorder characterised by a broad spectrum of behavioural presentations. These can be characterised into diagnostic domains of social interaction, communication, stereotypies and rigidity deficits (DSM-5, 2016). AD however, is a psychosocial disorder with evidence of social neglect, deprivation, lack of attention to the child's needs for comfort, repeated changes of primary caregiver, and experience of being reared in an institutional setting, necessary for a diagnosis (WHO, 2020). The following section looks at the relationship between the findings of this thesis and previous research in a number of areas of concern to this work. Firstly, examining the implications for diagnosis due to the lack of discriminability based on clinical and psychometric diagnoses, and the overlap in behavioural expression. Secondly, exploring what the similarity in cognitions between ASD and AD may mean for theories of ASD and AD. Finally, exploring the impact on parental functioning, and the relationship between this and child functioning. There is clearly overlap in these areas, but for ease of exposition, they will be discussed separately.

7.3.1 Implications of Behavioural Presentations on Diagnostic outcomes.

As ascertained in this thesis, securing a diagnosis of either ASD or AD is reliant on observable behaviours. The clinical diagnosis for AD is reliant on reports of adverse conditions within a child's history. The psychometrics utilised in this thesis found little evidence that the assessment tools available were able to offer confident diagnostic outcomes. Therefore the discrimination of behavioural differences does not provide clear diagnostic results.

Accurately predicting whether a behavioural presentation is ASD or AD remains a serious challenge. Discriminating between the presence of ASD or AD when using all measured behavioural problems in this research, ASD and AD could not be discriminated from one another. This is also true when the classification was made on the basis of clinical diagnosis and on the basis of a psychometric screening tool. There was an indication that, when using the clinical diagnosis criteria, hyperactivity

was more predictive of AD than ASD, but this was not statistically reliable. Thus, the current results tend to support the discussion that there is little discrimination between the two disorders using general behaviour problems. Specific behaviours following clinical criteria can still be utilised for a diagnosis, as suggested by Davidson et al., (2015) and Mayes et al., (2017), although the degree of the overlap in the clinical diagnosis noted in this study lends itself to caution for a secure diagnosis. The lack of obvious discriminating behaviours presents a challenge for diagnostic pathways, with the skill base for early identification by school professionals being unavailable (Allen, 2016).

The integrity of the diagnostic pathway is wholly reliant on the combination of diagnostic tools, the professional making the diagnosis, and adequate reports regarding the child's history. As such, this level of reliance on behavioural observation and accurate historical report leads to the potential of diagnostic error in terms of available skills and knowledge, the high overlap of symptomology also adds to the confusion of outcome as found in chapters 3 and 4 of this thesis. In addition to human level misinterpretation, the assessment tools have also been subjected to criticism for lack of clarity within the terminology employed, offering ineffectual descriptions of presenting behaviours (O'Connor & Zeanah, 2003). There is also an identified culture of utilising the broad stroke of attachment difficulties to understand children who have experienced developmental trauma, and to effectively deny this group of children the opportunity of full assessment for neurodevelopmental difficulties (Allen, 2016).

The understanding of ASD and AD as separate or combined diagnosis is confusing for both parents and professionals. Duschinsky (2020) conducted a literature review seeking to ascertain the explanation of AD which was being directed towards clinicians, concluding that this was explained in a confusing manner. Duschinsky encouraged more specific semantics of the discourse, as current language around ASD and AD is a contributory factor in the perceived overlap of differentials (Duschinsky, 2020). Minnis, (2006) previously reported AD as an under-researched and little used clinical category, and this persists in clinical settings. In support of this discrepancy in the understanding of ASD and AD, Coughlan et al., (2021) found

that the technical theory of attachment research had been altered from Bowlby's prior and more simplified account and use of language (Coughlan et al., 2021). Chaffin et al. (2006) criticised the definitions of attachment terminology, with a lack of consensus of definitions. Kiel et al. (2017) attributed that a level of vague boundaries has ensued as a result. The results from this thesis could encourage closer inspection of attachment styles to be used in clinical settings. The semantics around diagnostic lexicon issues significantly inform child outcomes.

7.3.2 Implications of Underlying Theories

Trauma in childhood and traumatic stress experiences are related to deficits in a wide range of developmental aspects. This includes cognitive capacity, attention and executive functioning (EF) in childhood; as well as neural development, brain and clinical symptomology correlating with non-neurotypical brain regions (Wilson et al., 2011). The aim of Chapter 5 of this research was to compare EF abilities across conditions. There have been some reported differences in both child behavioural characteristics and parenting that suggest EF may be differentially affected. The prediction that EF is more impaired in children with AD than ASD, especially in relationship to 'hot' EF tasks that modulate behavioural/emotional control (Miyake et al., 2000; Reolofs et al., 2015). This thesis however, found a limited difference between the EF performances of individuals with ASD and AD. There was found to be only slightly better AD performance on 'cold' EF tasks, and slightly better performance for ASD on 'hot' tasks however, as identified in previous chapters little difference was present between these groups, replicating the previous findings (Russell et al., 1996) and sits in contrast to findings from higher-functioning groups (Demetriou et al., 2018; Lai et al., 2017).

Understanding the limited differences requires further examination of the impact of trauma. When EF task performance has been compared between the population with no traumatic experience and those with traumatic backgrounds, there was an indication that the children who have been exposed to trauma performed less well on EF tasks overall (Colvert et al., 2008). In a review of the relationship between EF and maltreatment, Vasilevski et al. (2016) found that there was strong evidence between trauma and EF deficits in children and the longitudinal impact following

increased frequency or severity of exposure to traumatic events in childhood show reduced EF task performance and lower inhibitory control (Skowron et al., 2014). This thesis confirms this with the ASD group demonstrating better performance in this domain (Chapter 4). Critically, the impact on EF development from trauma has not been fully explored and more significantly the impact of trauma on children with neurodiversity such as ASD and the additional impact on developmental outcomes is also less understood. Parenting is known to be disrupted in both groups of ASD and AD, and more so in the presence of both disorders (Chapter 4). The accumulation of challenges existing though the dual presentation, results in confusing outcomes for carers and professionals alike.

Heritability and the impact of parent EF skill is a known contributor to the development of child EF skills such as impulse control and attention management (Belsky et al., 2010; Bernier et al., 2010; Nelson & Bloom, 1997). Scaffolding the EF skills such as planning, managing flexible shifting and inhibition control require a proficient parental skill. Parenting requires that caregivers are cognitively available for such demands. Caregiving that demonstrates better EF skills in parents are directly correlated to higher EF outcomes in children (St. John et al., 2018). Bridgett et al. (2015) found that when EF skills in a parent is weakened, in particular self-regulation, children are at increased risk of being exposed to stressful childhood experiences which may start prenatally (Bridgett et al., 2015). It may be that the quality of caregiving is the factor that needs greater consideration, with maternal sensitivity, mind-mindedness and autonomy support all acting as predictors for improved EF outcomes (Bernier et al., 2010; 2012). Caregivers' own trauma exposure and trauma-related symptomatology may also be a compromising factor for their own EF and their children's EF alike. It is suggested that this may then affect the children's EF skills (Augusti et al., 2013).

Developmental trauma occurring during a child's formative period disrupts normative structure and function and these deficits are further compounded if there is a presence of prolonged stress of chronic maltreatment during the early years of life (Gregorowski et al., 2013; Van de Kolk, 2005). Children who have experienced trauma during infancy have significantly poorer inhibitory control and working

memory performance than children without a history of trauma (Cowell et al., 2015). In addition to this, genetic factors are indicated. Epigenetic outcomes due to adverse or differing caregiving contexts, alter gene expression that results in differences in neurobiological patterns of self-regulation (Meaney, 2010). Dysregulated behaviour and emotional conduct outcomes can transcend generations, caregiving effect on epigenetic modifications that alter gene expression by silencing genes or enhancing outcomes (Meaney, 2010). Biological processes could reveal how individual differences in EF can cause an increase in children's diverse outcomes, through adult trauma symptoms and impairments in EF (Polak et al., 2012), which could further offer explanation to the detrimental impact of the duality of ASD and AD (as found in chapter 4 of this thesis), where the potential accumulative impact of heritability of causation with neurodiversity, compounded by trauma, could serve to explain outcomes and presentation of behavioural differences and similarities. The additional impact on the ASD brain to process trauma has to be considered in light of the existing developmental impact of ASD. The lack of ability to recognise and report emotional states, with lack of insight into regulatory capacity and reduced emotional regulation is a known pre-existing factor. The impact of trauma could be absorbed into the in presenting neurodevelopmental impact of the pre-existing neurodevelopmental difficulties. This could conceal the impact of trauma and make the clinical diagnosis of either challenging.

Cowell (2015), suggests that the impact is individual to each child's experience due to the developmental timing, duration and the frequency and type of maltreatment of the child. Cowell et al. (2015) found that the impact on neurocognitive function in a group of maltreated children exhibited both working memory and inhibition control poorly in comparison with non- maltreated children. It was further suggested that timing associated with infancy, or early years of life, and those who had experienced a longer duration of exposure to maltreatment had significantly poorer outcomes (Cowell et al., 2015; Dunn et al., 2018). The neurobiological impact of the trauma within the same parameters of development and functional outcomes was confirmed by Cross et al. (2017), who found comparable similarities of structural and functional outcomes within the areas of the brain associated with EF and emotional regulation. A review of 23 studies conducted by Kavanaugh et al. (2017) also found that

childhood trauma is a significant risk factor of developmental and neurocognitive conditions with debilitating impact across life spans. Impairments of EF were cited as the more frequently reported difficulty, with the timing of the trauma and the duration of trauma experienced presenting as factors to be explored within the umbrella term of trauma in understanding the implications and impact on the child (Kavanaugh et al., 2017). The nature or timing of trauma was not part of this research, but may be important for consideration in future studies, alongside longitudinal studies with a focus on ASD and AD presentations.

This research sought to ascertain whether the cognitive process of EF was associated with ASD or AD, and has added to the body of work around the differing viewpoints of cognitive processes. Previous thinking around deficits in mentalisation or Theory of Mind (ToM) has hypothesised that ToM is a contributing factor in the diagnosis of neurodevelopmental difficulties (Baron-Cohen et al., 1985). Theory of Mind (ToM) as a concept suggested by Premack and Woodruff (1978) proposed the theory that the ability to understand both one's own thinking, and that of others, was related to frontal functioning. This brain area is associated with Executive Function (EF) support, broadly considered as processes that control and organise cognition and behaviour. ToM considers the ability to understand that other people may have differing thoughts and motivations from oneself. This predisposes an understanding that other people may have thoughts and actions that are independent to them. This understanding may inform future predictions based on behaviour and is obviously vital to successful social interactions. Baron-Cohen et al. (1985) proposed that individuals with ASD fail to develop theory of mind successfully thus leading to the characteristic social impairments associated with ASD. There is an argument however that ToM has been reframed as a causal component of ASD, and not a consequential deficit (Reed, 2016). It has also been suggested that an intact working memory (Davis & Pratt, 1995) and effective inhibitory control (Carlson et al., 2002) are required to develop an effective working theory of mind. The executive dysfunction account (Ozonoff, 1997) proposes that the symptomology of ASD is a manifestation of a failure of executive functions (EF). This research thesis sought to identify EF as a measure of difference between ASD and AD or to find if there were features of comorbidity to be found within the diagnostic overlap.

Demetriou et al. (2018) conducted a meta-analysis of 235 studies investigating executive dysfunction in ASD. They concluded that overall, individuals with ASD show impairments across the executive function areas of concept formation, mental flexibility, fluency, planning, response inhibition and working memory and that the impairment in all these areas was roughly equal. They also found that executive function impairment was lower in adults than children and adolescents with ASD and attributed this to either learnt compensatory strategies or developmental maturity. Xie et al. (2020) performed a meta-analysis, looking at the domains of inhibition, working memory, flexibility, planning and fluency and found evidence for a broad executive dysfunction in adults with ASD, with the predominant impairments being flexibility and planning.

The research evidence overall suggests that individuals with ASD tend to show impairment in executive function, with less academic support for these impairments as being causal rather than symptomatic (Reed, 2016). For children with AD however, rather than EF being in deficit, it is suggested from this thesis that this could be a delayed aspect of development. The research findings of Chapter 5 identified that EF performance in the AD group was in fact more discernable than the group without AD, which further supports the argument of delayed EF in contrast to impairment (Colvert et al., 2008). However, the process of identifying this requires a period of time and ongoing analysis. An absence of mentalising and reflection skills, which could present as ToM in terms of social and reciprocal communication, can be argued presents as consequence of early maltreatment and lack of effective social engagement, as opposed to being a deficit that can not be changed or developed (Korkmaz, 2011). McCullough et al. (2014) further questioned the idea of whether maltreated children develop limitations in their ability to understand the mental states of others, or if anxiety and stress are defensive reactions that can present clinically as social and communication differences within the diagnostic bracket of ASD (DSM-5, 2016). McCullough et al. (2014) found that the provocative nature of the assessment situation gave a heightened state of arousal, which served to overwhelm the child's capacity to read intention of others, and which would give rise to inaccuracies in social understanding. McCullough suggested that this could lead to responses which

could be considered symptomatic of autistic behaviour, but which may have a very different aetiology (McCullough et al., 2014). To counteract this suggestion, the psychometrics used in this thesis study were conducted in settings that would not evoke a stress response in the child being assessed. This experimental control goes some way to counter this argument, further supporting the identification of the comorbidity of ASD and AD with the findings of this research suggesting that EF will not offer the discrimination needed between condition, and further contributes to the viewpoint that there is a comorbid deficit that offers commonality between the diagnosis.

7.3.4. Impact of Neurodevelopmental Difficulties on Parents and Children

This thesis identified the levels of parental stress as being higher in ASD and AD children, this combined with increased levels of illness and anxiety found in families with disabilities (Dykens et al., 2015) adds further pressure to families navigating adversity and difficult situations. Understanding the underlying reasons that contribute to the impact of difficulties on caregivers is integral to planning interventions.

Knowing how a baby develops and how to interact effectively with a child is often regarded as an innate process only requiring monitoring in the UK. However, when there is impairment or a fracture in the communicative flow between caregiver and child, the underlying developmental theories of ASD impairment and the ensuing attachment outcomes are important to consider when discussing ASD and AD. Tronick (1989) recognised that the starting age of bidirectional communication is 3 months of age. This is a mutually coordinated event. It is not solely effect of adult social communication. There are directed modifications already evident in the harmonisation of the flow and pace within this early point of interaction. Tronick (1998) timed the pattern of mis-coordination and coordination and identified that the pace of once every 3 – 5 seconds, defined as an interactive error, was closely followed with interactive repair. Tronick mooted the idea that the chronic experience of infants who were not exposed to reciprocal care giving, became increasingly self-regulatory, with avoidant positioning, changes in postural presentation and with

increased oral self-comfort and holding self-comforting behaviours. Contingency with caregiver and infant are significantly reduced, and expressed though increased infant distress (Tronick, 1989). A cycle of on-going interruption in flow between child and caregiver was identified in response to the characteristics of the infant as an active communicative agent. This cycle perpetuated a succession of infant irritability, associated with less parental warmth, increased harshness of parenting, and as a result the infant behaviour is reciprocally reduced (Bates et al., 2012; Rhoades et al., 2011).

Bidirectional communication within the ASD profile is further impacted by the impairments of communication and the stress associated with this, as reported in Chapter 4 of this thesis. The effortful communication required by the caregiver to repair directions and to manage the impact of interpreting varied communicative intents of the ASD child is challenging. Reciprocal communication is difficult without the flow of responsiveness and essential feedback loops that effect motivation, and this means maintaining parental effort and exchange can be lacking or absent altogether. When seeking to manage interventions for trauma impacted children, affective and cognitive approaches to self-regulation, and the bidirectional impact of these interventions on the family settings is essential. The genesis of disruption can stem from these formative interactions (Meuwissen & Carlson, 2013). Infants with neurodevelopmental differences will additionally be less responsive within socio-emotive development, their ability to attend and offer reciprocal vocalisations may be compromised and their responses to cues and offering of cues may be varied in quality and quantity. The interruption of the dyadic system and the impact of the reparation of repair of communication can be significant and have a direct impact on the parenting responses and in time the quality of caregiver communication based on the offering of appropriate cues (Okimoto et al., 2000).

Individual differences in infants as early as 4 months of age can evoke different dyadic coordination (Giusti, 2018), giving rise to the understanding that in fact characteristics are essential in understanding the complexities of the caregiver- infant exchange process. Giusti (2018) measured this impact using the Face to Face Still Face (FFSF) experiment with infants with neurodevelopmental difficulties. FFSF is

an experiment, which demonstrates the role of both contributors in early social emotional interactions. The experiment is structured into three 2-minute segments, 2 minutes of play, 2 minutes of the familiar caregiver holding a completely still face and then 2 minutes of reparative communication. FFSF demonstrates that when the caregiver holds the still face, the infant will demonstrate a heightened emotive response and avoidant behaviours to manage their distress. Reparative interactions following this continue to see the infant demonstrating these behaviours despite the communicative intent returning from their caregiver. However, with attuned infants reciprocal levelling is usually achieved within 2 minutes (Weinberg & Tronick, 1996).

The bidirectional exchange of communicative signalling is impacted by ASD impairments and the dyadic co-regulative effect can impair the communicative flow. It may be unclear to the caregiver how the communicative intent of the child is being expressed and cues may be missed, making it hard for carers to identify the intentional communication of their child (Giusti et al., 2018).

Patterns of atypical exchange, once embedded, decreased co-regulation capacity. Reflective function interchanges; affect regulation, impulse control, self-monitoring, self-agency and the organisation of self can become impacted by the developmental positioning of the infant in response to the pattern of irreparable communication attempts (Giusti et al., 2018). Reflective Function, the capacity to hold in mind the concept that individuals are separate with their own thoughts and feelings (Cooley, 1902), allows for the development of a range of skills, attachment tools and processes. This includes the allowance and ability for mind reading, or theory of mind to develop. Reflective Functioning (RF) makes behaviour in self and others meaningful. Efficient reflective functioning encourages participants to be flexible in responses to each other, reactions based on a repertoire of interpersonal transactions. Resource banks develop, from which responses can be selected. Significant lack of RF skill is evident in parents lacking sensitivity (Camoirano, 2017). Maternal RF ability promotes the child's attachment security, whereas low maternal RF is associated with ambivalent and disorganised child attachment patterns (Slade et al., 2015). The attachment patterns found in the children in this thesis, indicated that

ambivalent attachment was a predictor of a diagnosis of ASD, whereas children with AD had anxious attachment, further building on the argument that RF could be associated with caregiver outcomes.

RF capacity is further associated with resilience (Berthelot et al., 2014; Ensink et al., 2015; Fonagy et al.,1991), and as such it is an essential factor when discussing the findings of this thesis. Parents who are abusive, or do not have the capacity to imagine the child's internal experience, may be unable to navigate any fluent discourse about mental states. This may hinder or impair the development of reflective function due to the caregivers' own inability to develop reflective discourse. Reflective functioning may not be a tool that is readily available in their parenting repertoire. This could be additionally detrimental to a child, through failing to offer a child characteristic feedback. This may result in a child adopting a deviant perspective, which may result in the child resorting to further avoidance skills to maintain an attachment relationship for their survival (Allen, Fonagy, & Bateman, 2008; Fonagy & Luyten, 2009) which again is reflected in the findings of this thesis which reported avoidant and anxious attachment patterns as a predictor of AD.

The first significant other in a child's environment is the mother or primary caregiver. The mental function of organising the child's environment into self and others stems from the constructs first formed through the development of interactions as an infant. It is an automatic feature, which is unconsciously invoked in interpreting interactions. However, once established, this becomes a skill set that is also more challenging to correct (Fonagy & Target, 1997). The innate learning mechanism of the brain in terms of social learning is responsive to the nature of interactions within the family. The quality of parental self-control and the depth of parental discourse in effective responses is strongly associated with good theory of mind acquisition (Fonagy & Target, 1997). The transformation of a child's pre-reflective state into reflective understanding is dependent on their relationship with their caregivers.

The caregiver's sensitivity and ability to recognise the state of the child, though facial expressions and the formation of a basic schemata of anticipated responses, form the pre-symbolic and initially non-mentalistic responses of the infant (Camoirano, 2017). The child, at this point, will not have the ability to represent

internally the thoughts and feelings of the caregiver. However, this is developed through on-going dyadic interactions which, when effective, are underpinned by the modelling of controlled and predictable actions by the caregiver.

The model mirroring by the caregiver (by communicating back to the child what they may be feeling) constructs their self-awareness. Through this process they learn to know what they are feeling. However, mirror matching (Trevarthen, 2001) must be effective, because should the communicative emotions expressed by the caregiver be too precise, the perception of feeling can evoke a sense of fear, and as such the symbolic intention becomes lost in the emotive process. If the caregiver is not available to the child, then the result can become an overwhelmingly compromised state (Scott et al., 2012). The development of self-awareness is available to the infant by 6-18 months of age, when the child will be able to match the mental state of the caregiver and will be able to request joint attention and offer deliberate communication. The Mutual Regulation Model (MRM) informs the dyadic system of regulation that occurs in this process (Gianino et al., 1988) both the caregiver and infant have an active role and this is reciprocal in nature, working on a moment to moment basic and dependent on the bidirectional feedback of each participant. The communication and affect regulation within this is the core for the co-constructed foundation of an attachment relationship, and is also the foundation for the infant to develop and respond to emotional affect and changes through their existence with their caregiver. The very process of learning via matching and mismatching of feelings informs the mechanism of synchrony (Tronick & Beeghly, 2011).

The ability to react to modelled learning is further dependent on the stimulation of available mirror neurons during the child's development. These neurons are thought to be responsible for the accommodation of observed behaviours. In the absence of available effective modelling, or the absence of mirror neuron function in the child, the attachment outcomes with ASD will in effect be different from neurotypical children for reasons other than trauma (Laurita et al., 2019). This research suggests that the attempt to parent children with ASD, in a neurotypical framework, could lead to detrimental child outcomes with discordant outcomes. This could result in a more challenging learning process due to the rate of environmental changes and demands (IJzendoorn et al., (2007).

An improved reflective capacity in parents needs to be supported. This is a particularly important when managing aggression with children with ASD (Ensink et al., 2016). The affect regulation of a child with ASD can often demand a higher parenting skill level, and this could be reflected in outcomes of attachment profiles in terms of stress levels and child attachment profiles. Parents with a reduced personal reflective regard, may impact on the effective level of parenting, and may also impact on the child's ability to self-control aggression within parenting play and other social interactions. Therefore, secure parental reflective regard is the pathway to forming secure base attachments and organised affect regulation (Ensink et al., 2016). While this type of parenting may be easily available to caregivers with secure attachment styles, others may need to develop these types of interactions., again highlighting the need to consider the neurodevelopmental position of the parents themselves when assessing child development (Hsiao et al., 2015).

The repetition of discordant lack of communicative synchrony is a self-depreciating pattern impacting on attachment outcomes. This thesis measured the attachment patterns of children with ASD, finding that they were predicted by lower avoidant and anxious attachment styles, but by higher ambivalent styles. This is the first research-based suggestion that attachment styles may differ between ASD and AD. As previously stated in the body of this thesis, great caution has to be exercised in the interpretation of this result, due to the measures being taken from subscales of the RADQ. However, these findings were broadly consistent across a number of ways of assessing these differentiating attachment styles. Previous reports have noted only weak associations between attachment styles with either ASD or AD (Minnis et al., 2009; Van Ijzendoorn et al., 2007). However, these studies have examined the relationship for disorders in isolation from one another rather than comparing the two directly. It is also possible that these attachment styles are related to parenting behaviour differences between the disorders, rather than the disorder itself. For example, insecure attachment styles of most types have been related to a lack of parental sensitivity and insight (Kahane & El-Tahir, 2015), authoritarian parenting (van Steijn et al., 2013) and insensitive parenting and frightening parental behaviour are known to contribute to poorer attachment outcomes, with the more complex disorganised attachment style the product of disconnected and insensitive parenting

skills (Out et al., 2009). It is not known if this was the case with the current sample, and should be a consideration for future research studies.

The stress experienced by parents of children with neurodevelopmental difficulties was identified in Chapter 4 of this thesis, with parents of children with AD reporting greater levels of stress than those with ASD, and parents of children with ASD and AD reporting the highest levels of stress. Osborne & Reed (2008), identified a range of stressors for parents caused by parenting a child with an ASD diagnosis in place; the stress of obtaining a clinical diagnosis had in effect evoked additional emotional cost for the parents. Osborne and Reed (2008), highlighted how the process towards diagnosis lacked clarity; there was a lack of perceived and shared structure or content, and professionals managing the clinical pathway lacked the skills to effectively manage and contain the anxiety of the parents during and after the diagnostic experience. It was also noted that information sharing was inadequate in terms of written advice, providing the visual support and offsetting unhelpful information sources that are less reliable at that point in time (Osborne and Reed, 2008). This has to be further considered when parents presenting with children with the potential of both ASD and AD seek a diagnosis for support, and the levels of parenting stress reported as being higher in the ASD and AD group in Chapter 4, could lean towards this explanation.

The research outcomes of Chapter 5 further explored parental stress and the mediating effect of limit setting, further reinforcing this concept of parenting strategies impacting a cyclical model of stress reduction and reinforcement. Limit setting was found to be effective for the ASD group, less so for the AD group and for the ASD and AD group, the level of parental stress was found to be the highest. The results of the ASD and AD patterns of response to cognitive processes in the ‘cold’ tasks or the reward-based incentives with the ‘hot’ tasks are well known in the ASD parenting repertoire (Osborne et al., 2007), however there is a paucity of intervention for comorbid presentation. The accumulative impact of parental stress and higher reported behavioural problems has to be given serious consideration for parental support strategies. High parental stress levels have been shown to interfere with child progress and outcomes despite intervention strategies (Hattangadi et al., 2020;

Osborne et al., 2009; Robbins et al., 1991), and to support this counselling may be required prior to parenting courses. Directing interventions that are focused solely on parenting methodology is not the most effective way forward, as many of the parents are not birth parents of children with AD and are unlikely to have been involved in the developmental trauma events that have led to AD (Hornfeck et al., 2019; O'Connor et al., 2009). Limit setting presents as a prime issue for children with AD (Hornfeck et al., 2019) this thesis confirmed this with limit setting being a mediator for ASD and not AD. In contrast, there was a direct relationship between parenting stress and child behaviour problems for children with AD, with more difficulty with limit setting. Parental capacity to support a child's posttraumatic exposure is also associated with the development of the child's processing of trauma experience. The parenting of children with AD is frequently managed by non birth parents (Hornfeck et al., 2019). The development of later symptomology, in relation to the influence of parenting interventions can be indicative of parental abilities to co-regulate and manage behaviours effectively (Williamson et al., 2017). The level of parental EF is effectively the shield between the child and the impact of trauma in the long term.

The slightly better AD performance on 'cold', or cognitive EF tasks and the slightly better performance for ASD on hot tasks, or reward based responses reinforces the research of Mizuno et al., (2015), who found that reward sensitivity was diminished in children with AD (Mizuno et al., 2015), clearly this has to be recognised in the methodology behind parenting interventions with either diagnosis, and new ways forward with AD or a comorbid diagnosis based on these research findings. The accumulative impact of communication difficulties and reward sensitivity can be challenging to navigate for parents. Ways forward with appropriate interventions have to be based on evidence and research based outcomes, formulation-based approaches, where formulation is evidence based, collaborative and individualised (British Psychological Society (BPS), 2011), could be an effective way forward for children with developmental trauma, but the diagnostic validity of AD, ASD or a dual diagnosis also has to be incorporated into this outcome based on the clear findings of this research.

7.4. Summary

The current thesis replicated a number of features of previous investigations of the overlap between ASD and AD classifications. It found that there was a potential for a large overlap in the diagnoses and classification and that some behavioural problems can be used to differentiate between the disorders – especially peer problems for ASD and conduct problems for AD. It also noted that attachment styles differentiated between the diagnosis, with those with ASD showing more ambivalent and those with AD more avoidant and anxious styles.

Further research to gain insight into supporting understanding of presenting behaviours to support the parents of children with AD, where higher levels of parenting stress and report worse limit setting abilities were evident. Supporting these families with research-based interventions is imperative for effective family outcomes. For children with ASD, parental limit setting mediated the relationship between parenting stress and child behaviour problems. Behavioural interventions for children with ASD and family support is gaining strength with more widely available services (Bieleninlk et al, 2021) although this continues to remain uncertain in terms of how well this meets individual need. The data from this research suggest that different patterns of parenting experiences and skills exist and are required for ASD and AD and that these could form the basis of differential support strategies, in addition to understanding further how attachment patterns could impact on ASD interventions.

Traumatic stress as a proposed cause of neurodevelopmental disorders should be strongly considered due to the fact that trauma can evoke neurodevelopmental disruptions that can have neuropsychological impact with chronic lifetime detrimental impact. Trauma occurring during infancy, where significant brain development occurs in terms of functional development, social skills and self-regulation, can disrupt normative structure (Cowell et al., 2016). However, intergenerational models of self-regulation also suggest that caregiver EF fosters the development of child EF, but that bidirectional relations are also possible. Self-control in limit setting and effective parenting develops though increased self-regulatory capacity of the parent in response to a more regulated child (Cuevas et al.,

2014). Clearly this is essential in relation to the findings of this thesis, given the devastating outcomes of child behaviour on the family stress levels.

7.5. Implications for Practice

Planning for effective intervention requires that the full range of potential underlying neurodevelopmental and developmental trauma impacts have to be considered. The constellation of impactful difficulties, that can be experienced by the children and their caregivers has to lead to access to services and interventions. Access to such services in the statutory sector, are dependent on diagnostic outcomes as access to treatment outcomes may otherwise be unavailable. The results of the current thesis have some implications for considerations of services and interventions.

The diagnostic process focuses on the deficit model, and the biomedical approach is limited as few of the drugs that could make an impact are not currently licensed for the use by children (NCCMH, 2005). NICE guidelines operate as potential barriers to accessing the clinical support that is needed for children with comorbidities of ASD and AD. Access to clinical interventions can be difficult for children with AD and backgrounds of developmental trauma, the perceived genesis for many clinicians is the trauma and this becomes the set pathway with reduced consideration for ASD as a co-occurring medical condition.

Allen, (2016) suggests that clinical child psychiatry has utilised the concept of attachment with some out seeking empirical validation and evidence, the consequence resulting in attachment problems being treated, they should have been giving treatment for ASD or ADHD. Taresh et al., (2020) identified how teachers lacked skills in identifying ASD, attributing it to parenting deficits, the child being 'spoilt' or hyperactive. The teachers in this study also attributed inappropriate disorders to the child, such as attention deficit hyperactivity disorder or language disorders (Taresh et al., 2020).

7.5.1. Implications for Diagnosis

The impact of diagnosis in terms of the parenting outcomes (specifically, increased stress levels), is compounded by the duration of time that it takes to get a child's

needs identified and assessed. Up to a year can elapse for a child with ASD before a parent will ask for help on a professional level once they have had suspicions that there is an issue; then from this expression of concern to diagnosis can take between three to five years. In 2020, NHS waiting times from referral to diagnosis were reported as 352 days for children under the age of 18 (NHS Digital, 2021), with a rising age at the point of diagnosis in infancy and childhood (Russell et al., 2021). Just over half of parents reported dissatisfaction with the diagnostic process, reporting increased levels of stress and also dissatisfaction with the post diagnostic support provided (Crane et al., 2016). There is no available comparable research data for AD.

Normally occurring catalysts for language development provided through social interaction may be deficient or ineffectual for children who experience developmental trauma (Ciccetti, 2003; Pears and Fisher, 2005; Fonagy et al., 2007). It is therefore likely that this group of children will present as having a delay in emotional understanding as a result of a reduction of reflective discourse, and consequentially as language supports the development of ToM, there will be a broader impact on the child (Pears and Fisher, 2005; Pollack, 2000). Pragmatic language profiling evidenced a specific area of concern for children with AD (Sadiq et al., 2012). This research identified social disadvantage in children with AD as their scope of social use of language was impacted, and as such targeted interventions to address these concerns were identified as essential (Sadiq et al., 2012). The significance of this in relation to the impact of comorbid presentation of ASD and AD found within this thesis, highlights interventions targeting presenting behaviours as necessary. Implementing the understanding of the impact of a dual diagnosis could remove the potential barriers faced by children accessing resources based on their clinical diagnosis.

The impact of a diagnosis is also strongly connected to outcomes for parents. The percentage of parents with mental health issues is higher in families with a child with ASD by 17%, in comparison to parents or carers of other disabilities with 10% of these parents reporting as presenting with mental health concerns (Bilson et al., 2020). The outcomes for mothers with autism have been further identified as poorer

than for non-ASD mothers when compared by Pohl et al., (2020). Mothers with ASD were more likely to have experienced psychiatric conditions, including pre- or post-partum depression. Greater difficulties were reported with multi-tasking, managing household chores and engaging with and the organisation of social occasions for their child. A sense of being misunderstood by professionals was more likely with ASD mothers and as such this group reported greater anxiety, higher rates of selective mutism and not knowing which details were appropriate to share with professionals. The lack of social engagement resulted in parenting being an isolating experience, with increased worries around parental capacity and feeling judged. Mothers with ASD in this study felt less able to turn to others for support (Pohl, 2020).

Renzo et al. (2020) conducted research into the connection between acceptance of a child's diagnosis of ASD and their attachment behaviours toward the child. This research sought to analyse the perceived child thoughts and feelings from a parent's perspective. The findings showed that parents that were able to accept that their child had a diagnosis of ASD, demonstrated more effective attachment. Parents that were less able to acknowledge or accept this, presented as being more rigid and showed less emotional involvement with their child. The parent's perception of the child showed increased levels of negativity. There was also a discrepancy between the attachment capacity of mothers and fathers of children with ASD; mothers displayed more attuned responses, behaviours and acceptance in comparison with fathers (Di Renzo et al., 2020).

Mothers with ASD were found to have a sense of increased inadequacy at parenting, with a perception of being negatively judged (Weiss 2014). This belief system fuelled a sense of inadequacy, resulting in a fear that their child would be taken into care and would have to face the additional unwelcome involvement from support services, or face the admission of struggling (Burton, 2016). Barth et al. (2005) made the suggestion that attachment theory was the most attributed parental causation theory of difficult child behaviours used by professionals and clinicians (Barth et al., 2005).

Children in the UK with disabilities, in comparison with children that are typically developing, have an increased likelihood of being involved in the child protection (CP) category for neglect over emotional harm. Children with ASD as a characteristic have an even greater level of increased risk. Parents with disabilities are overrepresented in the CP system. There is the additional, associated risk of being from impoverished households, due to the accumulating factor of child and adult disabilities; this is known to be associated with less available resources (De La Sablonnière-Griffin et al., 2021). There is a significant rate of child removal in England and Wales; current available figures demonstrate that in England in the year 2016/17, 35 babies in every 10,000 live births in England (1 in every 285 live births) were taken into care within their first week of life. In Wales this figure is higher at 83 babies every 10,000 live births (1 in every 120 live births) in 2017/18, with very low rates of reunification (Bilson et al., 2020).

The majority of children removed in England and Wales (53% in England and 51% in Wales) were assessed as being 'at risk' with parents who had not been through any prior court proceedings, but had not been proven as not being able to provide care deemed good enough for a child (Bilson et al., 2020). This data also reveals that 50% of parents, who have a child removed in the first week, have not previously had a child removed. Bilson further highlights that this statistic is demonstrative of a predictive judgment being made, and not evidential. The decision-making matrix of removing a child, or leaving the child with the birth parent, has a significant echo with the difficulties faced by parents with disabilities. The level of difficulties mothers with ASD face are significant, and even more significantly, the level of undiagnosed mothers with unmet needs (Pohl, 2020; Tacler et al., 2021).

The risk factors associated with child removal are significant, many diagnostic characteristics of ASD and AD can be found in the reasons for removal of a child. The lack of empathy for the child was found in 60.7% of cases of removal (Breen et al 2020). Other risk factors for removal were identified as a perceived poor parenting capacity, mental illness, childhood abuse and lack of compliance from the parents. This was based on the overall risk to the newborn posed by mothers and not their parenting abilities. Predictive as opposed to evidential assessment must be made

for these removals due to the level of child vulnerability as a newborn, requiring social compliance, cooperation and understanding.

7.5.2 Impact of Neurodiversity within Families

Parents of children with ASD are more likely to have characteristics of ASD themselves. Children with an autistic parent or siblings have nine times greater liability of having autism (Xie, et al., 2019). Parental characteristics were not measured as part of this research thesis, however following measures of child attachment profiles, behavioural outcomes and parental stress, it offers valid discussion regarding overlapping symptomology. Mothers with characteristics of ASD are already faced with increased challenges prior to having children (Hull, 2017). For this group of women, there is increased proclivity to relational difficulties due to their ASD characteristics, such as reduced flexibility in their thinking, behavioural presentations, and are inclined towards increased anxiety and depression (Kulasinghe et al., 2020).

Women with ASD are frequently misdiagnosed or undiagnosed. This often results in a later life diagnosis where outcomes due to undiagnosed symptomology result in economic and relational challenges (Hull, 2017). Pohl et al. (2020) found that 60% of mothers with an ASD diagnosis were not diagnosed until after their children were born. Diagnostic psychometrics tend to lack the sensitivity to identify female autistic traits. These tend to be mediated via highly sophisticated, compensatory and masquerading capacities, which also come with the cost of mental health decline (Hull, 2017). Burton (2016) suggested that for mothers giving birth with ASD, an environment that emphasised privacy, the use of adapted communication, and staff training was essential. However, for many women with ASD, accessing this support is challenging due to the level of diagnosis and under-diagnosis of women. Gardner et al. (2016) focused on eight women with Asperger Syndrome who had given birth, identifying significant themes of sensory differences of touch, light, sounds, smell and interaction. These sensory differences were identified as additional barriers for the mothers to tolerate the hospital environment. The tactile aspects of the prenatal check-ups, with touch and the clinical use of gel for scanning needs were highlighted

as areas of significant concern (Gardner et al., 2016). When considering the forming of attachments and bonds with a child, it has to be understood within this bracket of additional difficulties. Sensory barriers can increase anxiety and discomfort, further impacting on the mother's ability to process information and manage social interactions (Corbett & Simon, 2010).

Sensory differences have to be considered when discussing the bonding and attachment behaviours of mothers with ASD traits. Mothers with ASD, experience more extreme and pervasive challenges, as their sensory profiles increase their stress responses. This in turn impacts on mental health, fatigue and the mother's capacity to plan and implement organisation (Talcer et al., 2021). For new parents, the balance of auditory and tactile responses is challenging. This is more significant in regard the sensory profile for parents with ASD. Meeting caregiving demands of a child requires constant auditory awareness and social responsiveness to the child, this is further compounded with the stimulating sounds of baby toys and can be a huge challenge for new mothers with an ASD profile. Breastfeeding will present tactile demands of the child, resulting in decreased tactile availability for other members of the family with a particular impact on close relationships and other children (Pohl et al., 2020). Noxious sensory stimuli can result, becoming a vicious cycle of threat and entrapment, resulting in full sensory avalanche (Sharp, 2013).

7.5.3 Interventions and Strategies to Support

As per DSM-5 and ICD-10 classification systems, ASD and AD are two distinct developmental disorders that can exist without overlap. While it has been established in this thesis, both the disorders display similar symptoms, some therapists have stated a difference in the therapeutic relationship (Richter & Volkmar, 1994) with an identifying factor in children with ASD and AD which could be a potential way forward in ascertaining differentials in individuals. Richter and Volkmar (1994) suggested that the response to treatment could be an important distinguishing characteristic in the differential diagnosis of ASD and AD. Children with AD develop a relationship with an 'emotional feel' whereas children with ASD develop a 'matter of fact' feel with the therapists (Richter & Volkmar, 1994). This capacity for emotional responsiveness can also impact on behaviour based intervention

programmes, which are found to be very effective for children diagnosed with ASD, however for AD intervention strategies can be challenging for this group of children as confirmed with the research findings in chapter 4, where parents reported increased levels of stress in relation to limit setting with children with AD.

Children's EF was associated with cognitive functioning, the associations between children's performance on the EF task and their scores on standardised tests of cognitive functioning suggest that EF may be an appropriate target of interventions for families of young children exposed to trauma, results from the current study suggest that improvements in EF may promote healthy adaptation in these domains following trauma exposure. Parents' support of children following trauma exposure may play a key role in children's development of trauma-related symptomatology following exposure to trauma (Williamson et al., 2017). The intervention window of opportunity is narrow and developmentally sensitive however, and this has to be taken into account when looking at the increased child characteristic profile of both ASD and AD and parental stress when looking at adverse outcomes.

Parental attachment style and parenting skills have also been associated with the development of difficulties in children with ASD, impacting on developmental trajectories. Parents demonstrating a secure attachment presentation were found to be more able to conduct dyadic communication, including increased skill with gesture-based communication and supporting social adaptation and helping with imaginative play and more symbolic interactions. Higher functional communication was also found to be an indicator of a more secure parental attachment style with more developmentally appropriate interactions noted and increased requesting behaviours. There is an association noted in this research between reflective function capacity and securely attached parents, which could explain the differences in child communication and behavioural outcomes (Seskin et al., 2010). Results of a family-based parenting intervention for parents of children aged around 2, with a strengths-based focus found improved inhibitory control in middle childhood and both adolescent internalising and externalizing problems. This shows the gains of developmentally sensitive family intervention, produce future impact on self-

regulation processes, which can further reduce the risk for behavioural and emotional discord in adolescence (Hentges et al., 2020).

Therapies such as dyadic psychotherapy and psychoeducation treatments have been used in the treatment of AD although the research done on the effectiveness of these methods are few (Mukaddes et al., 2004). More adverse therapies were controversially employed, such as holding therapy and rage reduction approaches (Cline, 1979; Zaslow & Menta, 1975), methods that resulted in serious physical injury and even death (Mercer et al., 2003). Understanding the parenting stress as discussed in chapter 4, furthers this position, as interventions for ASD and AD combined are not available due to the current clinical diagnostic approach, as there remains considerable lack of professional consensus on management of this complex group of children, with attachment theory being inappropriately attributed to a range of child behavioural presentations (Allen, 2016).

Family intervention and reducing parental stress is necessary regardless of diagnostic labelling. Children with disabilities tend to have higher levels of behavioural regulation issues than other children; developmental trajectories are further impacted by maternal depressive symptoms. Maternal sensitivity is an identified factor in reducing the externalising difficulties of child behaviour, early intervention programs to the family system are essential to reduce further stress and dysfunction (Dykens et al., 2015). It is clear that there are groups of parents and children who present with specific characteristics, be these genetic, environmental, trauma or the behavioural presentation of the child, that require support and professional intervention.

The relationship between parent and professional interactions are clearly the way forward into developing effective and sustainable interventions for children who are additionally at risk of developmental differences. Interventions have to take into account the neurodevelopmental capacities of the caregivers and the stresses and needs that are already in place for these adults who may or may not have their own neuro-diverse differences to navigate. Interventions and early intervention addressing both ASD and AD are woefully missing for families due to the overlapping presentations of both conditions, resulting in significant stress and parenting

strategies that are lacking effectiveness. This research identified that limit setting for children with ASD reduced parental stress, however this parenting strategy when used for the AD group of children raised parental stressors and for the ASD and AD group parental stress was reported highest.

7.6 Limitations and future studies

There are limitations to this thesis that should be mentioned. Firstly, caution needs to be used in interpreting findings from relatively small samples – while the overall samples were of adequate size for power, when divided into the different conditions, the sub-samples could be relatively small. Secondly, the measures employed were all self-report measure, albeit a well-standardised, reliable, validated and widely used. Research employing additional measures would corroborate the current findings, especially those employing direct observation, although this approach would severely limit the sample size. Thirdly, the level of ASD symptomology was not measured in this study, psychometrics were fully used, however, this could be a further contributory aspect that needs further exploration. IQ was also not measured. Permissions around accessing children in the locality of the research had restrictions in terms of test – retest concerns with local policy. Future research would benefit from considering the additional co-morbidities and measuring the impact of these on overlapping presentations. A final limitation to this thesis was the reported level of parenting stress, this can increase ratings of behavioural problems, even when rating behaviours that are the same (Fong, 1991; Reed & Osborne, 2013). Additional to this limitation being that parents, with experience of rating one child, will perceive greater levels of behavioural problems, than teachers or clinicians, who are rating many (Reed & Osborne, 2013). It is also worthy to note that the parents' capacity for introspection, or the ability to perceive their own mental and emotional process, could have an impact on reporting given that they are biological parents of children, and there is a high degree of heritability of ASD (Bai et al., 2019). ASD characteristics of caregivers has not been explored within this study and prospective studies could further this finding. There is considerable research opportunity into the neurodevelopmental status of parents, and particularly the rate of undiagnosed ASD in parents for children who have been removed from their care. Lastly, future research direction needs to include measurement of the differences in attachment

styles between ASD and AD and comorbid presentations, using scales specifically designed to examine attachment styles. The findings in this study of attachment outcomes were broadly consistent across a number of ways of assessing these differentiating attachment styles, therefore this can provide the impetus to explore this finding more fully.

7.7 Conclusion

In conclusion, accurately predicting whether a behavioural presentation is ASD or AD remains a challenge. Discriminating between the presence of ASD or AD when using all measured behavioural problems, ASD and AD could not be discriminated from one another. This is also true when the classification was made on the basis of clinical diagnosis, and on the basis of a psychometric screening tool. Specific behaviours following clinical criteria can still be utilised for a diagnosis, although the degree of the overlap in the clinical diagnosis noted in this study lends itself to caution for a secure diagnosis. There is a potential for a large overlap in the diagnoses and classification, some behavioural problems can be used to differentiate between the disorders – especially peer problems for ASD and conduct problems for AD. Child assessment needs to assess for all neurodevelopmental disorders including ADHD, ASD as well as anxiety and depression in a formal way. The presence of developmental trauma should not override the efforts to seek a full and considered child assessment.

The findings of this thesis, adding to the growing body of research confirming the significant overlap in presentation, have raised questions around the additional results of behavioural and cognitive differentials. There is clearly a demand to examine further how ASD and AD can present as comorbid diagnosis, or to extrapolate differences that require novel intervention and support.

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Appendices

Appendix A

Questionnaires

Demographic Sheet

Please answer the following:

1) What is your name? .....2) How old are you? .....years

Please answer the following by ticking the correct box:

3) What is your gender? Male

White/White British

Mixed/ Multiple/ ethnic groups

5) What is your marital status?

Single, never married

6) What is the highest degree or level of school you have completed?

None/primary/some High school

Trade/technical/ vocational training /high school, but no diploma /graduate

7) Are you currently employed?

Yes No

Female Asian/Asian British Prefer not to say

Black/African/Caribbean/Black British

Other: .....

Married/Domestic partnership

Separated

Divorced Widowed

Bachelor's/Master's/ Doctorate/Professional degree

8) What is the name of your child who has a statement of educational need?
.....

9) Does he/she have a diagnosis of Autism Spectrum Disorder? (if the answer is no, please go to Q12)
Yes No

10) When was the diagnosis made? ..... (dd/mm/yyyy)

11) At what age did he/she receive his/her diagnosis? .....years

12) Does he/she have any other diagnoses? (if the answer is no, please go to Q16) Yes No

13) If the answer is yes, please can you tell us what other diagnoses he/she has received:

.....

14) When was this diagnosis made?

..... (dd/mm/yyyy) 15) At what age did he/she receive this diagnosis?

.....years

16) What is your relationship to the child?

Biological parent Foster or adoptive Other: ..... parent

17) At what age did he/she come into your care? (ignore if biological parent)
0-11 months 12-23 months 24-36 months Older than 36 months

18) Are you supported by social services? Yes No

Appendix B

Strengths and Difficulties Questionnaire

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 or this school year.

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	☐	☐	☐

Signature ..... Date .....

Parent/Teacher/Other (please specify:)

Thank you very much for your help

Appendix C

Social Communication Questionnaire (SCQ)

1. Is she/he now able to talk using short phrases or sentences? If *no*, skip to question 8. ..... yes no
2. Can you have a to and fro "conversation" with her/him that involves taking turns or building on what you have said? ..... yes no
3. Has she/he ever used odd phrases or said the same thing over and over in almost exactly the same way (either phrases that she/he has heard other people use or ones that she/he has made up)? ..... yes no
4. Has she/he ever used socially inappropriate questions or statements? For example, has she/he ever regularly asked personal questions or made personal comments at awkward times? ..... yes no
5. Has she/he ever got her/his pronouns mixed up (e.g., saying *you* or *she/he* for *I*)? ..... yes no
6. Has she/he ever used words that she/he seemed to have invented or made up her/himself; put things in odd, indirect ways; or used metaphorical ways of saying things (e.g., saying *hot rain* for *steam*)? ..... yes no
7. Has she/he ever said the same thing over and over in exactly the same way or insisted that you say the same thing over and over again? ..... yes no
8. Has she/he ever had things that she/he seemed to have to do in a very particular way or order or rituals that she/he insisted that you go through? ..... yes no
9. Has her/his facial expression usually seemed appropriate to the particular situation, as far as you could tell? ..... yes no
10. Has she/he ever used your hand like a tool or as if it were part of her/his own body (e.g., pointing with your finger, putting your hand on a doorknob to get you to open the door)? ..... yes no
11. Has she/he ever had any interests that preoccupy her/him and might seem odd to other people (e.g., traffic lights, drainpipes, or timetables)? ..... yes no
12. Has she/he ever seemed to be more interested in parts of a toy or an object (e.g., spinning the wheels of a car), rather than using the object as it was intended? ..... yes no
13. Has she/he ever had any special interests that were *unusual* in their intensity but otherwise appropriate for her/his age and peer group (e.g., trains, dinosaurs)? ..... yes no
14. Has she/he ever seemed to be *unusually* interested in the sight, feel, sound, taste, or smell of things or people? ..... yes no
15. Has she/he ever had any mannerisms or odd ways of moving her/his hands or fingers, such as flapping or moving her/his fingers in front of her/his eyes? ..... yes no
16. Has she/he ever had any complicated movements of her/his whole body, such as spinning or repeatedly bouncing up and down? ..... yes no
17. Has she/he ever injured her/himself deliberately, such as by biting her/his arm or banging her/his head? ..... yes no
18. Has she/he ever had any objects (*other* than a soft toy or comfort blanket) that she/he *had* to carry around? ..... yes no
19. Does she/he have any particular friends or a best friend? ..... yes no

LIFETIME

Social Communication Questionnaire (SCQ)

AutoScore™ Form

Michael Rutter, M.D., F.R.S., Anthony Bailey, M.D., Sibel Kazak Berument, Ph.D., Catherine Lord, Ph.D., and Andrew Pickles, Ph.D.

WPS
Test with Confidence

Name of Subject

Date of Birth

Date of Interview

Chronological Age ____ F ____ M Gender

Name of Respondent

Relation to Subject

Clinician Name

School/Clinic

Directions

Thank you for taking the time to complete this questionnaire. Please answer each question by circling *yes* or *no*. A few questions ask about several related types of behavior; please circle *yes* if *any* of these behaviors have ever been present. Although you may be uncertain about whether some behaviors were ever present or not, please answer *yes* or *no* to every question on the basis of what you think.

Additional copies of this form may be purchased from WPS.
Please contact us at 800-648-8857 or wpspublish.com.

W-381B
4 5 6 7 8 9
Printed in U.S.A.

For the following behaviors, please focus on the time period between the child's fourth and fifth birthdays. You may find it easier to remember how things were at that time by focusing on key events, such as starting school, moving house, Christmastime, or other specific events that are particularly memorable for you as a family. If your child is not yet 4 years old, please consider her or his behavior in the past 12 months.

20. When she/he was 4 to 5, did she/he ever talk with you just to be friendly (rather than to get something)? ..... yes no

21. When she/he was 4 to 5, did she/he ever *spontaneously* copy you (or other people) or what you were doing (such as vacuuming, gardening, or mending things)? ..... yes no

22. When she/he was 4 to 5, did she/he ever spontaneously point at things around her/him just to show you things (not because she/he wanted them)? ..... yes no

23. When she/he was 4 to 5, did she/he ever use gestures, other than pointing or pulling your hand, to let you know what she/he wanted? ..... yes no

24. When she/he was 4 to 5, did she/he nod her/his head to mean *yes*? ..... yes no

25. When she/he was 4 to 5, did she/he shake her/his head to mean *no*? ..... yes no

26. When she/he was 4 to 5, did she/he usually look at you directly in the face when doing things with you or talking with you? ..... yes no

27. When she/he was 4 to 5, did she/he smile back if someone smiled at her/him? ..... yes no

28. When she/he was 4 to 5, did she/he ever show you things that interested her/him to engage your attention? ..... yes no

29. When she/he was 4 to 5, did she/he ever offer to share things other than food with you? ..... yes no

30. When she/he was 4 to 5, did she/he ever seem to want you to join in her/his enjoyment of something? ..... yes no

31. When she/he was 4 to 5, did she/he ever try to comfort you if you were sad or hurt? ..... yes no

32. When she/he was 4 to 5, when she/he wanted something or wanted help, did she/he look at you and use gestures with sounds or words to get your attention? ..... yes no

33. When she/he was 4 to 5, did she/he show a normal range of facial expressions? ..... yes no

34. When she/he was 4 to 5, did she/he ever spontaneously join in and try to copy the actions in social games, such as *The Mulberry Bush* or *London Bridge Is Falling Down*? ..... yes no

35. When she/he was 4 to 5, did she/he play any pretend or make-believe games? ..... yes no

36. When she/he was 4 to 5, did she/he seem interested in other children of approximately the same age whom she/he did not know? ..... yes no

37. When she/he was 4 to 5, did she/he respond positively when another child approached her/him? ..... yes no

38. When she/he was 4 to 5, if you came into a room and started talking to her/him without calling her/his name, did she/he usually look up and pay attention to you? ..... yes no

39. When she/he was 4 to 5, did she/he ever play imaginative games with another child in such a way that you could tell that they each understood what the other was pretending? ..... yes no

40. When she/he was 4 to 5, did she/he play cooperatively in games that required joining in with a group of other children, such as hide-and-seek or ball games? ..... yes no

Appendix D

RADQ Score Sheet for Conduct

RADQ SCORE SHEET FOR CONDUCT

Child's Name _____ Age _____ Date _____

Before interpreting the significance of the RADQ score, answer these questions first:

Is the total RADQ score 65 or higher?	Yes ___	No ___
Were most of these behavior problems present before age 5?	Yes ___	No ___
Does the child have a history of events that can cause AD during the first two years of life? *	Yes ___	No ___

If the answer to any one of these questions is no, **STOP**. This child does not have Attachment Disorder (AD), but he/she may have attachment problems or issues**.

The following scales can help to distinguish children with Conduct Disorder from children with AD, as these disorders can sometimes look similar (especially in adolescence), or parents may have over-rated the severity of a child's problems out of frustration or to get help. Write the number circled on the answer sheet on its respective dash below, and then total the numbers on each dash for that scale. Then, subtract the value indicated from the total to obtain a sub-scale total.

MSC

3 ___
6 ___
15 ___
21 ___
22 ___
24 ___
total ___
-6
MSC score ___

DSC

1 ___ 10 ___
2 ___ 20 ___
6 ___ 21 ___
8 ___ 22 ___
15 ___ 24 ___
total ___
-10
DSC score ___

MSC ___ +
DSC ___ =
SSC ___

Is the SSC score above 33?	Yes ___	No ___	Is the SSC score below 33?	Yes ___	No ___
Is the RADQ score above 64?	Yes ___	No ___	Is the RADQ score below 65?	Yes ___	No ___

If the answer is Yes to both questions on the left, the child probably has AD. If the answer is yes to both questions on the right, the child probably does not have AD. If the results to these questions are mixed, the child probably has attachment problems that fall short of AD, or may have Conduct Disorder with symptoms that mimic AD (as can happen in adolescents). Regardless of the answers to these questions, if severe behavior problems were not present prior to age 5, Attachment Disorder is *NOT* present.

---

* Events that can cause AD include maltreatment (especially neglect); severe, chronic pain; hospitalization of the mother and/or child; 1 or more changes in caregiver or day care provider; prematurity; being in day care prior to 4 weeks of age; separations of more than 2 days from the mother; and/or living in an orphanage.

** A child must be between ages 5 and 17 for the RADQ to be a valid measure of AD.

RADQ SCORE SHEET FOR MALTREATMENT

Child's Name _____ Age _____ Date _____

Before interpreting the significance of the RADQ score, answer these questions first:

Is the total RADQ score 65 or higher?	Yes ____	No ____
Were most of these behavior problems present before age 5?	Yes ____	No ____
Does the child have a history of events that can cause AD during the first two years of life? *	Yes ____	No ____

If the answer to any one of these questions is no, **STOP**. This child does not have Attachment Disorder (AD), but he/she may have attachment problems or issues**.

The following scales can help to distinguish severely maltreated children with Attachment Disorder (AD) from those who have attachment problems that fall short of AD. Write the number circled on the answer sheet on its respective dash below, and then total the numbers on each dash for that scale. Then, subtract the value indicated from the total to obtain a sub-scale total.

MSM		DSM	
2 ____	15 ____	2 ____	19 ____
6 ____	18 ____	3 ____	20 ____
7 ____	19 ____	5 ____	21 ____
10 ____	20 ____	6 ____	22 ____
12 ____	22 ____	9 ____	24 ____
total _____		total _____	
-10		-10	
MSM score _____		DSM score _____	

MSM _____ +

DSM _____ =

SSM _____

Is the SSM score above 47?	Yes ___	No ___	Is the SSM score below 47?	Yes ___	No ___
Is the RADQ score above 64?	Yes ___	No ___	Is the RADQ score below 65?	Yes ___	No ___

If the answer to both of the questions on the left is yes, the child probably has AD. If the answer to both of the questions on the right is yes, the child probably does not have AD. If the answers to these questions are mixed, and the child has a RADQ score between 45 and 64, the child is likely to have attachment problems that fall short of AD. Regardless of the answers to these questions and the total RADQ score, if severe behavior problems were not present prior to age 5, Attachment Disorder is *NOT* present.

---

* Events that can cause AD include maltreatment (especially neglect); severe, chronic pain; hospitalization of the mother and/or child; 1 or more changes in caregiver or day care provider; prematurity; being in day care prior to 4 weeks of age; separations of more than 2 days from the mother; and/or living in an orphanage.

** A child must be between ages 5 and 17 for the RADQ to be a valid measure of AD.

RADQ Score Sheet for Attachment Disorder Sub-type

RADQ SCORE SHEET FOR ATTACHMENT DISORDER SUB-TYPE

Child's Name _____ Age _____ Date _____

Before completing this sheet, you MUST have first determined that Attachment Disorder (AD) is present using the guidelines on the conduct and maltreatment scoring sheets. *DO NOT COMPLETE THIS SCORING SHEET UNLESS YOU HAVE ALREADY DETERMINED THAT AD IS PRESENT IN THE CHILD BEING EVALUATED.*

The following sub-scales can assist in determining the sub-type of AD a child has. Write the number circled on the answer sheet on its respective dash below. If there are two dashes next to an item number on this sheet, and an R on the second dash, you need to reverse the value on the dash next to it. If the score is a 5, reverse it to a 1. If it is a 4, reverse it to a 2. Leave the 3 as a 3. If it is a 2, reverse it to a 4. If it is a 1, reverse it to a 5. Then total the numbers on the set of dashes for that scale. Subtract the value indicated from the total to obtain a sub-scale total.

AVD1		ANX1		AMB1	
	1 ____	5 ____		8 ____	8R ____
2 ____	2R ____	10 ____		9 ____	9R ____
	3 ____	17 ____		11 ____	11R ____
	15 ____	22 ____		13 ____	13R ____
	16 ____	23 ____		18 ____	18R ____
				20 ____	20R ____
total	____		____		____
	-5		-5		-6
AVD1 score	____	ANX1 score	____	AMB1 score	____

AVD2		ANX2		AMB2	
	1 ____	1 ____	1R ____	8 ____	8R ____
	3 ____	3 ____	3R ____	9 ____	9R ____
5 ____	5R ____		18 ____	11 ____	11R ____
	15 ____		20 ____	16 ____	16R ____
	16 ____		22 ____	20 ____	20R ____
22 ____	22R ____			27 ____	27R ____
total	____	total	____	total	____
	-6		-5		-6
AVD2 score	____	ANX2 score	____	AMB2 score	____

To determine AD sub-type, determine the lowest score for each set of sub-scale scores. If both sub- scale sets show the same sub-type, the child most likely has that sub-type of AD. If the findings are mixed, the child probably has symptoms of a mixed sub-type. *NOTE: The RADQ can not be used to determine the Disorganized sub-type of AD.*

Appendix E

Parent-Child Relationship Inventory (PCRI)

The statements below describe different ways some parents feel about their children. For each statement, please tick the box that is closest to how you feel. Please try to respond to all of the statements. If you are not sure how you feel, mark the response that comes closest to your feelings at this time. *There are no right or wrong answers.*

SA A NS D SD

1) My child normally tells me when something is bothering him or her. 2) I have trouble disciplining my child.
3) I get as much satisfaction from having children as other parents do. 4) I have a hard time getting through to my child.
5) I spend a lot of time with my child.
6) My feelings about being a parent change from day to day.
7) If I have to say no to my child, I try to explain why.
8) My child is more difficult to care for than most children are.
9) I can tell by my child's face how he or she is feeling.
10) Being a parent comes naturally to me.
11) I sometimes give in to my children to avoid a tantrum.
12) I love my child just the way he or she is.
13) My child is never jealous of others.
14) I often wonder what the rewards are in raising children.
15) My child tells me about his or her friends.
16) I wish I could set firmer limits with my child.
17) I get a great deal of satisfaction from having children.
18) I regret having children.
19) My child is out of control most of the time.
20) Being a parent isn't as rewarding as I thought it would be.
22) I never worry about my child.
23) I wish my child would not interrupt when I'm talking to someone else.
24) I generally feel good about myself as a parent.
25) I feel very close to my child.
26) I have never had any problems with my child.
27) My child would say that I am a good listener.
28) I often lose my temper with my child.
29) I am very involved with my child's sports or other activities.
30) I have never been embarrassed by anything my child has said or done.
31) My child really knows how to make me angry.
32) When my child has a problem, he or she usually comes to me to talk things over.
33) My child never puts off doing things that should be done right away. 34) Being a parent is one of the most important things in my life.
35) I feel I don't really know my child.
36) I sometimes find it hard to say no to my child.
37) I wonder if I did the right thing having children.
38) I would rather do a lot of other things than spend time with my child.
39) Sometimes I wonder how I would survive if anything were to happen to my child.
40) My child hardly ever talks to me unless he or she wants something. 41) It's better to reason with children than just to tell them what to do. 42) I spend very little time talking with my child.
43) I feel there is a great distance between me and my child.
44) I often threaten to punish my child but never do.
45) If I had to do it over, I would probably not have children.
46) Some people would say that my child is a bit spoilt.
47) I hardly ever have time to spend with my child.
48) I carry a photograph of my child in my wallet or purse.
49) I feel I don't know how to talk with my child in a way that he or she really understands.
50) It's a parent's responsibility to protect his or her child from harm.

Appendix F

Adolescent Autism Quotient
From Baron-Cohen, Hoekstra, Knickmeyer & Wheelwright (2006)

Your Name: Child's Name: Child's Age:

Put a √ or *X* next to the response that best describes the child:

	Definitely Agree	Slightly Agree	Disagree	Definitely disagree
1. S/he prefers to do things with others rather than on her/his own.				
2. S/he prefers to do things the same way over and over again.				
3. If s/he tries to imagine something, s/he finds it very easy to create a picture in her/his mind.				
4. S/he frequently gets so strongly absorbed in one thing that s/he loses sight of other things.				
5. S/he often notices small sounds when others do not.				
6. S/he usually notices car number plates or similar strings of information.				
7. Other people frequently tell her/him that what s/he has said is impolite, even though s/he thinks it is polite.				
8. When s/he is reading a story, s/he can easily imagine what the characters might look like.				
9. S/he is fascinated by dates.				
10. In a social group, s/he can easily keep track of several different people's conversations.				
11. S/he finds social situations easy.				
12. S/he tends to notice details that others do not.				
13. S/he would rather go to a library than a party.				
14. S/he finds making up stories easy.				
15. S/he finds her/himself drawn more strongly to people than to things.				
	Definitely Agree	Slightly Agree	Disagree	Definitely disagree
16. S/he tends to have very strong interests, which s/he gets				

upset about if s/he can't pursue.				
17. S/he enjoys social chit-chat.				
18. When s/he talks, it isn't always easy for others to get a word in edgeways.				
19. S/he is fascinated by numbers.				
20. When s/he is reading a story, s/he finds it difficult to work out the characters' intentions.				
21. S/he doesn't particularly enjoy reading fiction.				
22. S/he finds it hard to make new friends.				
23. S/he notices patterns in things all the time.				
24. S/he would rather go to the theatre than a museum.				
25. It does not upset him/her if his/her daily routine is disturbed.				
26. S/he frequently finds that s/he doesn't know how to keep a conversation going.				
27. S/he finds it easy to ''read between the lines'' when someone is talking to her/him.				
28. S/he usually concentrates more on the whole picture, rather than the small details.				
29. S/he is not very good at remembering phone numbers.				
30. S/he doesn't usually notice small changes in a situation, or a person's appearance.				
31. S/he knows how to tell if someone listening to him/her is getting bored.				
32. S/he finds it easy to do more than one thing at once.				
33. When s/he talks on the phone, s/he is not sure when it's her/his turn to speak.				
34. S/he enjoys doing things spontaneously.				
35. S/he is often the last to understand the point of a joke.				
	Definitely Agree	Slightly Agree	Disagree	Definitely disagree
36. S/he finds it easy to work out what someone is thinking or feeling just by looking at their face.				

37. If there is an interruption, s/he can switch back to what s/he was doing very quickly.				
38. S/he is good at social chit-chat.				
39. People often tell her/him that s/he keeps going on and on about the same thing.				
40. When s/he was younger, s/he used to enjoy playing games involving pretending with other children.				
41. S/he likes to collect information about categories of things (e.g. types of car, types of bird, types of train, types of plant, etc.).				
42. S/he finds it difficult to imagine what it would be like to be someone else.				
43. S/he likes to plan any activities s/he participates in carefully.				
44. S/he enjoys social occasions.				
45. S/he finds it difficult to work out people's intentions.				
46. New situations make him/her anxious.				
47. S/he enjoys meeting new people.				
48. S/he is a good diplomat.				
49. S/he is not very good at remembering people's date of birth.				
50. S/he finds it very to easy to play games with children that involve pretending				

Appendix G
Perceived Stress Scale (PSS)
Please tick the box next to how often you have felt or thought a certain way during the last month. Although the questions are similar, there are differences between them. Please treat each question as a separate question. Please don't take too long over your replies; tick the answer that seems reasonable rather than counting up the number of ways you felt this way.

1) In the last month, how often have you been upset because of something that happened unexpectedly?
2) In the last month, how often have you felt that you were unable to control important things in your life?
3) In the last month, how often have you felt nervous and "stressed"?
4) In the last month, how often have you dealt successfully with daily problems and annoyances?
5) In the last month, how often have you felt that you were able to cope with important changes that were happening in your life?
6) In the last month, how often have you felt confident about being able to handle your personal problems?
7) In the last month, how often have you felt that things were going your way?
8) In the last month, how often have you found that you could not cope with all the things that you had to do?
9) In the last month, how often have you been able to control irritations in your life?
10) In the last month, how often have you felt that you were on top of things?
11) In the last month, how often have you been angry because of things that happened that were outside of your control?
12) In the last month, how often have you found yourself thinking about things that you have to do?
13) In the last month, how often have you been able to control the way you spend your time?
14) In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
Parenting Stress Index – Short Form
For each statement, please tick the box that it closest to how you feel. Please try to respond to all of the statements. There are no right or wrong answers.
1) I often have the feeling that I cannot handle things very well.
2) I give up more of my life to meet my child's needs than I ever thought I would have to.
3) I feel trapped by my responsibilities as a parent.
4) Since having this child, I have been unable to do new things and different things that I like to do.
5) Since having a child, I feel that I am almost never able to do things that I like to do.
6) I am unhappy with the last purchase of clothing I made for myself.
7) There are quite a few things that bother me about my life.
8) Having a child has caused me more problems than I thought it would in my relationship with my spouse (or male/female friend).
9) I feel alone and without friends.
10) When I go to a party, I usually think that I will not enjoy myself.
11) I am not as interested in people as I used to be.

12) I don't enjoy things as I used to.
13) My child hardly ever does things for me that make me feel good.
14) Sometimes I feel my child doesn't like me and doesn't want to be close to me.
15) My child smiles at me much less than I thought my child would.
16) When I do things for my child, I don't think that my child is thankful.
17) When playing, my child doesn't often giggle or laugh.
18) My child doesn't seem to learn as quickly as most children.
19) My child doesn't seem to smile as much as most children.
20) My child is not able to do as much as I expected.
21) It takes a long time and it is very hard for my child to get used to new things.
22) For the next statement, choose your response from the choices "1" to "5" below.
I feel I am:
1) not very good at being a parent
2) a person who has some trouble being a parent 3) an average parent
4) a better than average parent
5) a very good parent
23) I thought that I would have warmer feelings for my child than I do and this bothers me.
24) Sometimes my child does things that bother me just to be mean.
25) My child seems to cry or fuss more often than most children.
26) My child generally wakes up in a bad mood.
27) I feel that my child is very moody and easily upset.
28) My child does a few things which bother me a lot.
29) My child reacts very strongly when something happens that my child doesn't like.
30) My child gets upset easily over the smallest things.
31) My child's sleeping or eating routine was much harder to create than I thought it would be.
32) For the next statement, choose your response from the choices "1" to "5" below.
I have found that getting my child to do something or stop doing something is:
1) much harder than I thought it would be
2) somewhat harder than I thought it would be 3) about as hard as I thought it would be
4) somewhat easier than I thought it would be 5) much easier than I thought it would be
33) For the next statement, choose your response from the choices "10+" to "1-3" below.
Think carefully and count the number of things which your child does that bother you. For example: dawdles, refuses to listen, overactive, cries, interrupts fights, whines etc.
34) There are some things my child does that really bother me a lot.35) My child turned out to be more of a problem than I thought my child would be.
36) My child makes more demands on me than most children.