Offending in Individuals with Autistic Spectrum Disorder: A Study of Risk and Need

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Abstract

Offending in people with Autistic Spectrum Disorder (ASD) though rare requires specialist knowledge of the risk factors involved, to adapt interventions effectively. A review of the somewhat sparse literature suggests that empathy impairments and social skills deficits are frequently cited risk factors, indicating that attachment security may be a mediating factor. Due to 'common' impairments in empathising abilities, offenders with ASD and Psychopathic Disorder are sometimes thought of similarly, but evidence suggests they show differing cognitive and affective empathy deficits (Blair, 2010). The Interpersonal Reactivity Index (IRI: Davis, 1983) was used to measure cognitive and affective empathy in this study. Linear multiple regression analysis was carried out to investigate how the empathy levels and attachment styles varied with psychopathic and autistic traits in a community sample of 46 male and 34 female participants, of whom 13 had a diagnosis of an ASD and 17 had committed offences. A secure website was designed and created to access participants and collect data over the Internet. Higher levels of autistic traits were found to be significantly predicted by higher levels of personal distress mediated by anxious and avoidant attachment. Also, higher levels of primary psychopathic traits at lower levels of empathic concern significantly predicted higher levels of autistic traits. Logistical regression demonstrated that higher levels of empathic concern and secondary psychopathy increased the likelihood of having committed an offence. Mediation analysis found that the likelihood of having committed an offence was increased indirectly by higher levels of autistic traits through higher levels of personal distress and secondary psychopathy. These results are discussed with regard to implications for risk and risk management in offenders with ASD.

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CHAPTER 1

Introduction

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Empathy in Psychology

Theories of empathy in psychology were originally the work of philosophers such as Stein (1917; 1989). Psychologists, such as Mead (1934) and Piaget (1967) later contributed to the area of empathy with a focus on cognition. Self-other differentiation was considered by Mead to be essential in the empathic process. He stressed that social and ethical development was determined by the capacity to take on the 'role' of others. Piaget further emphasised empathy to be involved in the ability to imagine being in the position of another and therefore as fundamentally a cognitive act. The study of empathy has unsurprisingly merged with the study of moral development.

Later Hoffmann (2000) studied the affective and cognitive components of empathy, how they develop and interact to result in morality. He studied the way moral principles reduce empathic bias and emotional over-arousal and suggested that empathy is a driving force for pro-social behaviour. Hoffmann believed affective empathy to be an evolutionarily adaptive ability that humans developed to facilitate altruistic behaviour. He considered perspective taking (the cognitive component of empathy) to drive functional social interaction. When these two abilities merge, the result is an empathic response. Eisenberg (2000) similarly studied pro-social behaviour in children. Her research indicated that children who experience sympathy show less physiological arousal than those who experience distress when observing another's anguish. The

'sympathetic' children were also more likely to help others than those who were distressed. Further research was aimed to ascertain which factors may cause personal distress and which may result in sympathy when in a sufficiently provoking situation (Eisenberg, 2002). It was found that emotional intensity and emotion regulation (i.e. being able to tolerate the emotions of another without being overwhelmed) could account for the different response patterns (Okun, Shepard, & Eisenberg, 2000; Eisenberg, 2002).

Hoffmann (2000) attempted to explain how the affective and cognitive features of empathy develop and interact in morality. He studied the way moral principles reduce empathic bias and emotional over-arousal and suggested that empathy is a driving force for pro-social behaviour. For Hoffmann, affective empathy is an evolutionarily adaptive ability that humans have developed to facilitate altruistic behaviour whilst perspective taking (the cognitive component of empathy) enables functional social interaction. When these two abilities interact they produce an empathic response. In a similar vein, Eisenberg (2002) suggested that the intensity of emotions experienced and the ability to tolerate the emotions of another without being overwhelmed determine whether an individual reacts sympathetically (i.e. to alleviate distress) or displays 'escape' behaviour.

There have been numerous definitions of empathy within psychology and related disciplines. It has been proposed that empathy is an affective state which is elicited by the imagined and similar emotional state of another, with the knowledge that one's emotional state is a response to, and therefore separate to, that of the other (Singer &

Lamm, 2009). Emotional contagion occurs as an effective response to the other in the absence of self-other distinction. This is thought to be a primitive form of empathy that is present in newborns. Whilst empathy is thought to require a parallel response to the emotions of another sympathy is not (McCall & Singer, 2013).

Davis believed empathy to be a reaction to the observed experiences of others (1983). He further defined 'dispositional empathy' as a stable empathy related character trait, as opposed to situational empathy, which is a situation specific empathic state (Davis 1983 - individual differences in empathy paper). Whilst 'general' or 'trait' empathy describes the overall process and outcomes of the affective experience and response to another's emotions, a distinction has been made between cognitive and affective empathy supported by neuro-scientific evidence (Shamay-Tsoory & Arhon-Perez et al., 2009). Cognitive empathy is akin to perspective taking, 'theory of mind', or the ability to attribute mental states to others, whilst affective empathy is regarded as the ability to 'take on' the emotions or resonate with the feelings of others (Perry & Shamay-Tsoory, 2013). However, whilst many theorists attempt to develop unifying models of empathy they tend to use the terms 'state' and 'trait' interchangeably leaving this area of research somewhat confounded.

It is thought that there are 10 areas of the brain involved with the empathy system (Baron-Cohen, 2011). At the heart of empathic processing is a sub-cortical structure, the amygdala, part of the limbic system, involved in the regulation of emotions and the learning of emotion related information. Also lying beneath the cortex are the middle

cingulate cortex (MCC) and the anterior insular (AC) which have been implicated in self-awareness and the perception of pain in others.

At the cortical level the dorsal and ventral medial prefrontal cortices are essential to the neurobiological processes involved in the empathic experience. The dorsal medial prefrontal cortex is primarily involved in the processing of other peoples thoughts and feelings, whilst the ventral medial prefrontal cortex is involved in the processing of one's own thoughts and feelings and self-awareness. In close proximity to the vMPFC are the orbits-frontal cortex (OFC) and the frontal operculum (FO). These areas are involved in social judgment and understanding the intentions of others respectively. The FO is also involved with self-expression through language. Connected to the F0 and inferior frontal gyrus is the inferior parietal lobule (IPL). These are part of the mirror neuron system and are activated when an individual observes another performing the same action that they are performing. In addition, the IFG is associated with facial emotion recognition. The inferior parietal sulcus is also part of the mirror neuron system and also involved in tracking The gaze of others. It is thought that systems such as the mirror neuron system are essential for the normal development of recognition, imitation, ToM, affective and motor empathy and language. Hence, the social and communication deficits in people with ASD may be due to impairments in systems such as the mirror neuron system.

Baron-Cohen (2011) further describes the neurobiological route to ‘theory of mind’, which may be associated with the right tempero-parietal junction (RTPJ). The posteriorly superior temporal sulcus is adjacent to this and is activated when one

attempts to judge and follow another's gaze, in addition to analysing a person's emotions regarding the focus of their gaze. The somatosensory cortex is unsurprisingly linked to the perception of one's own and others sensory experiences.

Autistic Spectrum Disorder

Autism spectrum disorders (ASDs) are a group of neurodevelopmental conditions caused by the interaction of genetic and environmental influences upon the brain (Grandin & Panek, 2013). This results in a broad range of strengths and deficits in affected individuals but largely causes impairments in the development of communication, imagination or Theory of Mind (ToM; Baron-Cohen, Leslie & Frith, 1985) and social interaction (Frith, 1991). Impaired socio-linguistic skills, sensory sensitivity and a restricted range of interests and pursuits also often characterise this condition (Tantam, 2013). Theory of mind refers to the cognitive ability to imagine being in the position of another (Baron-Cohen, 1988; Frith, 1989); hence, it is sometimes thought of as the ability to empathise cognitively. However, males and females may differ considerably in their autistic presentations. Women tend to adopt better coping strategies, especially socially (Attwood, 2007) and therefore are less noticeable as different or odd.

Due to the nature of their impairments, people with ASD tend to find the world unpredictable, confusing and often frightening. This can result in extreme anxiety, depression, social isolation and, occasionally, aggression. Individuals with high functioning ASD and Asperger's Syndrome, a form of ASD (Frith, 1991) have at least average, and often, above average, IQ (Frith, 1991). Higher IQ and the ability to learn can increase resilience in people with ASD with regard to the problems experienced in

adapting to the world around them. However, the consequence of such efficient masking of ASD may be that others are unaware of their difficulties and sometimes this acts as a barrier to diagnosis (Attwood, 2007) leaving many undiagnosed.

It is believed that approximately 1% of the general population has a diagnosed ASD (Baird et al., 2006). The prevalence rates in England for adult males have been estimated at 1.8% and 0.2% for females (Brugha et al., 2009). However, a more accurate combined estimate could be as high as 16.5% for males and females (Brugha, McManus, Bankart, Scott, Purdon & Smith et al., 2011) if undiagnosed cases were included, changes in diagnostic criteria and better awareness of the condition were accounted for. Consequently, many individuals remain undiagnosed, especially in forensic environments such as prisons (Browning & Caulfield, 2011). People with ASD often experience difficulties working in groups due to their social skills difficulties. They also tend to have difficulties expressing their thoughts and feelings and therefore require adapted treatment and interventions (Dubin, 2009). In an environment that is not sympathetic to the needs of people with ASD, sensory sensitivity may result in an exacerbation of these problems. This may have a significant impact upon their success in treatment and rehabilitation (Louks & Talbot, 2007).

The Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV; American Psychiatric Association, 1994) and International Classification of Diseases tenth edition (ICD-10; World Health Organization, 1992) describe overarching categories of ASD as: autistic disorder (childhood autism), Asperger's disorder (or Asperger's syndrome; AS), pervasive developmental disorder not otherwise specified

(PDD-NOS or atypical autism) and childhood disintegrative disorder. DSM-V (American Psychiatric Association, 2013) has proposed a change in the categorization of autistic conditions into one overarching category of ASD with varying severities, and the loss of the Asperger's Syndrome, PDD-NOS and childhood disintegrative disorder categories. The term Autistic Spectrum Disorder (ASD) is used hereon in, unless otherwise specified, to refer collectively to the described autistic conditions, although many studies cited refer to distinct categories of ASD.

Research has shown that many people with autistic spectrum disorder show reduced activity in many areas of the brain involved in empathy (Baron-Cohen, 2011). Because the brain regions involved in empathy are also involved in understanding one's own thoughts and feelings, people with ASD also often suffer from alexithymia. In addition the regions involved with empathic experience show poor connection to other brain regions in people with ASD (Lombardo et al., 2010), compared to those of typically developing people. However, research has shown that different patterns of activity occur when people with autism experience empathy for others, rather than a lack of activity per se (Tantam, 2012). Hence people with ASD may have a different phenomenological experience of empathy and typically developing people.

It is also thought that the amygdala may be over active in people with autism (Dalton et al., 2005). Social interactions may result in withdrawal due to extreme overstimulation experienced as painful. Hence, greater levels of emotional or affective empathy in people with autism may originate from this. In a sample of typically developing young people higher levels of autistic traits compared to higher antisocial traits have been

associated with thinner cortex mainly in the right superior temporal sulcus (Wallace et al., 2012). Conversely this study found higher levels of antisocial traits to be associated with thinner cortex in the bilateral anterior prefrontal cortices compared to young people with higher levels of autistic traits.

Therefore, since brain development involves the interaction of genes and environment, every individual with Autistic Spectrum disorder will have a different combination of genes and environment. Even identical twins show differences in behaviour, such as empathic ability, despite the high heritability component (Chakrabarti & Baron-Cohen, 2013). Hence, this results in a different pattern of brain morphology and physiology for each autistic individual. When experimental conditions and the nature of participant samples are also taken into consideration, a definitive agreement on the neurobiological underpinnings of autism is impossible to reach.

Smith purports that in people with ASD, cognitive empathy is impaired whilst they have a surfeit of emotional empathy, the so-called empathy imbalance hypothesis (EIH; Smith, 2009). Smith asserts that there are four empathy disorders distinguished by at variation in cognitive and emotional empathy. Autism is one of these disorders as described above, and antisocial personality disorder is another, characterised by a deficit in emotional empathy and intact cognitive empathy. This theory is in accordance with ToM deficit as described earlier. Smith explains that those with cognitive empathy deficit may prefer the company of those whose behaviour is predictable whilst finding other social interactions confusing and aversive.

The EIH May explain the underlying dynamics of the motivational conflict hypothesis (Tinbergen & Tinbergen, 1983). This hypothesis suggests that in autistic people there is a conflict between extreme anxiety and a desire for social connection. When anxiety levels are too high the individual withdraws. This would make sense for an individual with cognitive empathy deficits who has difficulty understanding, cognitively, the thoughts and emotions of others, yet experiences those emotions perhaps in the sense of emotional contagion.

Smith (date) also cites amygdala hyper-functioning as supporting the EIH. Accordingly, extremes of emotional empathy may be accounted for by an over responsive amygdala with insufficient top-down regulatory processing (equating to insufficient cognitive empathy). Thus, underlying these processes in ASD are local microcircuits, which become hyperactive, dominating neighboring neural circuits causing hyper-functioning and hyper-plasticity in the affected pathways. Cognitive and affective processing is intensified leading to over-activation of perception, attention and memories linked to heightened emotional processing, such that attention is focused on minute detail at the expense of perceiving the whole. Hyperplasticity may result in rapid embedding of these over-activated neural pathways leading to heightened learning and memory of exaggerated experiences that are generalised to related experiences. Hence, the affected individual lives in a world characterised by fragments of stimuli experienced as painfully intense. This is better known as the Intense World Hypothesis of autism (Markram and Markram, 2007).

The “intense world” hypothesis is based upon a model showing how rats are affected by valproate acid, commonly used in humans as an anti-epileptic and mood stabilising medication. Exposure to Valproic acid in-utero has also been linked to autism in humans (Christenson et al., 2013). However it is debatable to what extent a rat model may be applied to humans. Nonetheless, The intense world hypothesis also makes sense of executive dysfunction in autism, or the ability to plan organise and inhibit behaviour (Markram & Markram, 2007). Also the theory of “weak central coherence” in autism, which suggests an intense focus on detail at the expense of an ability to integrate that detail into a coherent whole, underlies autism. In addition, Baron-Cohen (2002; 2010) highlights areas of strength in people with ASD related to the ability for systemising, or recognising and categorising patterns into systems through the application of rules. This ability could also be the result of hyper-functionality and hyper-plasticity of neural circuits.

Hence, higher functioning Autism, at the behavioural level, may be explained by deficits in the ability to empathise whilst having an average or heightened ability to systemise. The systemising component may underlie repetitive behaviours, resistance to change and narrow or restricted interests whilst empathy deficits underlie social difficulties (Baron-Cohen, 2010). However, it should be noted that many individuals who do not have ASD possess these abilities. Nonetheless Baron-Cohen goes on to describe this theory as the “extreme male brain” theory of autism (2010), suggesting that most females have a greater ability to empathise at the expense of systemising whilst males display opposite attributes. Although interesting, the “extreme male brain” theory does not take into account the epigenetic effects of socio-cultural expectations

and practices that are placed upon males and females, which may influence the development of these abilities in the respective groups.

Failures in Empathy: Models of Offending

Numerous models of empathy have been applied to offender populations. However offenders are a diverse group, with respect to characteristics such as age, offence type and psychosocial functioning. In addition, offenders are often of lower socio-economic status and IQ. Hence, models of empathy aimed at offenders in general are likely to be less accurate as a reflection of these differences and similarities (Joliffe and Farrington, 2006).

In addition, empathy theorists disagree upon whether empathic behaviour should necessarily follow the empathic process. For example, Marshall, Hudson, Jones and Fernandez (1995) believe that empathy should end with the amelioration of another's distress. Hansen and Scott (1995) suggest that being empathic involves experiencing compassion for others. However Polaschek (2003) has insisted that whether or not an individual acts upon empathic feelings is determined by numerous factors such as situational constraints or personal priorities. Conversely, empathic behaviour may be driven by a sense of duty (Barnett & Mann, 2013) or even personal gain. Indeed, caring behaviour, according to ethics of care theorists, does not necessarily originate from care for others (e.g. Ward & Salmon, 2011).

A highly studied group of offenders are those who are perpetrators of sexual crimes towards adults and children. Numerous models of offending place empathy deficits as

central to the offence process in this group of offenders. For example, Marshall and colleagues (1995) developed a four-stage general model of empathy for sexual offending. Stage one involves emotional recognition, such as distress, in the victim. The second stage is related to the ability to see the world from another's perspective. Marshall and colleagues suggest stage two is more difficult to achieve when there is greater disparity between the characteristics of victim and perpetrator. Stage three, emotional replication, involves an emotional response, which is parallel to that of the victim and occurs if stages one and two have been successful. 'Response decision' is stage four, which involves empathic responding, when the previous stages have taken place accurately and successfully. Polaschek (2006) remarks that this theory is useful in that it brings together numerous theoretical ideas and reflects clinical practice. However, it is criticised on the basis that the model starts by assuming the presence of a victim when in reality many of the intrinsic beliefs of sex offenders reflect a failure in empathy long before the perpetration of an offence. Polaschek suggests this empathic failure is more likely to be related to the presence of cognitive distortions regarding the effects of offender behaviour on victims.

Alternatively Keenan and Ward (2000) attribute sexual offending to an underlying impairment in theory of mind. The authors suggest that this may be due to a number of factors. Thus, a delay in theory of mind development may result in impairments in psychosocial maturity, failure to develop appropriate peer relationships or conduct disorder. A failure to acquire theory of mind may be reflected by a complete inability to take another's perspective and may be due to genetic neurological or environmental problems (e.g. abuse or neglect). Alternatively this impairment may be characterised by

deficits in specific theories such as the dynamics of certain relationships (Ward at al., 1999). In addition, an impaired theory of mind is likely to result in difficulties taking on the feelings of others leading to an inaccurate affective response to another's experiences. However, research indicates that an intact theory of mind does not necessarily result in an accurate effective response and neither does an effective response require intact theory of mind (Blair, 2005). Keenan and Ward (2000) further describe how an intact theory of mind may not be employed in a given situation. This may be due to conflicting factors such as sexual arousal or negative emotional states, which may block aversive affective barriers whilst maintaining focus on concrete features to facilitate offending (i.e. cognitive deconstruction; Ward & Hudson, 1995).

Hanson (2003) also placed and ability for perspective taking as central to his four stage model of empathy leading to offending. The nature of the relationship between those involved i.e. detached, caring or adversarial is regarded as the starting point leading to the behavioural outcome (stage 1). Hence ones' general attitude to another may dominate the empathic process through emotional resonance with others, which may be impaired in some individuals e.g. psychopaths. At stage 2, the ability to take on the perspective of the other then leads to stage 3 such that good perspective taking may facilitate manipulation or alternatively act as a barrier to offending. Hanson emphasised in this model that the ability to manage the emotions of others, or ability to tolerate one's personal distress (stage 3), would impact upon the resulting reaction i.e. pro-social or anti-social behaviour (stage 4).

Cantor and Young (2012) have put forward a victim role assignments model of violent and sexual offending. They suggest that the roles assigned to victims reflect the perpetrator's reluctance to empathise or sympathise with the victim, such that the type of role assigned reflects the nature of the empathy deficit. The type of control exerted upon the victim merges with a particular empathy deficit to shape the nature of the offence committed. Thus, the 'victim as object' role involves physical control and subjugation where the empathy deficit regards the victim to lack in any form of humanity. The victim is an object to be used for the offender's purposes. Where the victim is abused and exploited and this is linked to a lack of compassion, the victim takes the role of 'vehicle' becoming a body for exploitation, which is symbolic for the offender's needs to be expressed. In the 'victim as person' role the offender's behaviour is coercive and manipulative and lacking in any feelings of value for the victim. The offence is thus a violent extreme of what the offender believes to be 'normal behaviour'. Cantor and Young provide empirical evidence for the testing of their model based upon rape, stalking and serial murder. However, although this model is useful in the identification of offender types the dynamics of the empathic process are absent and the nature of empathy deficits described are vague and not based upon previous theories of empathic functioning.

Alternatively, Barnett and Mann (2013) propose a temporal empathic model of sexual offending (the model of the empathic process or MEP), which brings together trait and State characteristics from previously developed models described above. They suggest five factors contribute to an empathic outcome such that the observer (perpetrator) experiences a compassionate or sympathetic response to the individual observed

(victim). Accordingly each stage of the process has to be successful in order for an empathic response to be experienced. Hence, empathy emerges from a convergence of trait features, such as perspective taking ability, emotional responsivity, a belief that others deserve compassion and an ability to tolerate the resultant emotions, with state features, such as mood and clarity of thought. Barnett and Mann suggest that potential barriers to empathic behaviour are theory of mind deficits, intense sexual arousal, cognitive destabilizes, such as drugs or alcohol, poor tolerance of distressing emotions, cognitive distortions and a limited emotional repertoire.

Although Barnett and Mann (2013) have developed a coherent model that may be applied to sexual offenders it may not be applicable to all offender types. In addition this model proposes that the empathic process must culminate with an appropriately matched emotional response to that of the victim. However the notion of 'schadenfreude', or the pleasure experienced at another's misfortune, argues against this, since the empathic process may be completely intact, but the response is one of pleasure. The resultant behaviour may feign concern or alternatively intensify the suffering. Although Barnett and Mann argue that desistance from offending may be motivated by a sense of duty rather than empathy, this is not clear in their model. It is possible that desistance from offending, similar to caring behaviour (Ward & Salmon, 2011), is motivated by behaviour other than an appropriate empathic response to another, such as fear of conviction. Also it is possible that whilst ever theories and models of empathy and offending focus upon the empathic reaction towards distress in others with an absence of consideration of the response to positive emotions such as joy and pride, the role of empathy in offending will appear to be relatively linear, one-

dimensional and not as informative as they initially appear. Clearly empathy alone cannot explain the act of offending and neither can offending alone inform models of empathy.

ASD and Offending Behaviour: The Problem of Empathy

A number of factors have been associated with offending in people with autistic spectrum disorder. Howlin (2004) suggests that 4 factors are most likely to contribute to offending or aggression in people with autism. These are: manipulation by others to commit crimes due to social naiveté; a lack of understanding and misinterpretation of social rules; disruption of routines that can result in extreme distress and aggressive behaviour; and obsessional interests pursued to the extreme or interests that can border on criminal activity, such as computer hacking or weaponry. However, challenging behaviour and aggression can be the result of social exclusion and social isolation (Clements & Zarkowska, 2001). Where individuals with ASD are excluded and bullied, be they children or adults, they may isolate themselves through fear and shame. When placed in situations of social conflict or difficulty, high levels of anxiety and distress may then result in aggressive behaviour. Also, social withdrawal may exacerbate social skills deficits leading to socially inappropriate and/or illegal behaviour such as substance misuse, sexual harassment and child abuse (Attwood, 2007).

Dein and Woodbury-Smith (2010) suggest a number of factors that may potentially mediate offending in ASD e.g. Poor educational achievement, truancy hyperactivity, social exclusion and neuropsychological impairment (such as empathy deficits). However, many of the factors cited, such as poor educational achievement, truancy,

social exclusion, and the like, are all possibly related and may conceal common underlying deficits, not least difficulties understanding social rules and how to overcome social difficulties. Further, difficulties understanding the thoughts and feelings of others i.e. empathy impairments may underlie social skills deficits. Also comorbid psychiatric illness is regarded as a risk factor for violent offending in people with ASD (Newmann & Ghaziuddin, 2008; Wachtel & Shorter, 2013). Deficits in theory of mind (ToM), emotional, dysregulation and problems with moral reasoning have also been highlighted as potential risk factors for offending in people with ASD (Lerner, Haque, Northrup, Lawer & Bursztajn, 2012). Given the links between insecure attachment, emotional dysregulation and antisocial behaviour, it is possible that insecure attachment mediates these difficulties in offenders with ASD. However some studies have found theory of mind to be *unimpaired* in some individuals with high functioning ASD (Happe, 1994; Kaland, Callesen, Moller-Nielson, et al., 2008). Hence, impairment in ToM may not generalise across the spectrum, rather it may be more prevalent in people with ASD who have offended.

As detailed in chapter 2, numerous studies suggest empathy impairments, including poor Theory of Mind ToM, are associated with offending in people with ASD (Baron-Cohen, 1988; Barry-Walsh & Mullen, 2004; Murphy, 2003, 2010; Murrie, Warren, Kritiansson & Dietz, 2002; Radley & Sharhebano, 2011; Woodbury-Smith, Clare, Holland, Kearns, Staufenberg & Watson 2005), yet few have supported these assertions with empirical evidence from the use of an empathy measure. Further, an impaired ToM is a diagnostic characteristic of ASD, which could be interpreted as anyone with the condition being at higher risk of offending than an individual with intact ToM.

Similarly ‘social skills deficits’ are cited by numerous researchers (Allen, Evans, Hider, Hawkins, Peckett & Morgan, 2008; Barry-Walsh & Mullen, 2004; Murphy, 2010; Murrie et al., 2002; Radley and Sharhebano, 2011; Stokes, Newton & Kaur, 2007), as causal factors in the perpetration of an offence by individuals with ASD, yet no underlying reason is identified as giving rise to these deficits. Since empathy and social behaviour are closely related (Davis; 1996; Eisenberg, 2000; Hoffmann, 2000) this may point to a common underlying cause or interacting factors that increase risk, perhaps synergistically, when they occur together.

Thus, the factors that are *thought* to increase risk in people with ASD may be generalisations that conceal the specific underlying factors and dynamics of offending in the individuals concerned. Consequently it is difficult, based upon current literature, to understand the nature of the associations between the identified risk factors and underlying dynamics. Violent or deviant obsessive interests, psychiatric illness, gender and executive dysfunction have been identified as risk factors in offenders with ASD (Långström, Grann, Ruchkin, Sjostedt & Fazel, 2009; Murphy, 2010; Woodbury-Smith et al., 2010). These may then interact with empathy deficits and interpersonal difficulties and increase risk further, although they may not present an increased risk alone.

However, Murphy (2007) emphasises that affective elements of psychopathy may be present in offenders with ASD but advises caution when assessing individuals with ASD for psychopathy, as this overlap is not an accurate framework for assessing and managing risk. In addition Murphy (2013) suggests that conventional risk assessment

tools are inadequate when used with offenders with ASD. The underlying reasons that an offender with ASD may exhibit a particular risk factor are likely to be different to those for an offender with a personality disorder, such as anti-social personality disorder or psychopathic disorder.

Attachment: Indirect links to Offending Behaviour

Empathic abilities develop through the primary attachment relationships (Fonagy, 2004). Bowlby (1982) described an infant's attachment as the nature of the physical and emotional connection to caregivers developed through their response to the infant in times of need and distress. This connection thus creates the blueprints for one's cognitive and emotional understanding and connection to others in relation to the self, the so-called Internal Working Model (IWM; Bowlby, 1982). The IWM thereby influences social behaviour.

The Internal Working Model (IWM) determines how an individual views him/her self as worthy of the love and affection of others based upon how available and responsive others were in times of distress during infancy. The IWM persists into adulthood and influences the way adults relate to others especially during times of stress. An attachment relationship in which the main carer is sensitive and responsive to the infant's affect creates a safe mental and physical space in which the infant can understand his/her emotions (secure attachment). As the carer mirrors, or reflects back, the infant's affect is processed in a 'marked' or exaggerated way and becomes internalised as the infant's affect (not the parent's) and understood. The result is a more tolerable experience of his own emotions, creating a framework through which the

infant can then understand the emotions of others (Fonagy, 2004).

The ineffective mirroring of an infant's emotions, unresponsive or insensitive care may result in insecure attachment resulting in a child with little or no belief that his needs will be met in a caring and sensitive manner. When experienced long term this can lead to insecure attachment (Cicchetti & Toth, 1995; Morton & Browne, 1998) impairments in self-awareness, emotional dysregulation and poor empathic functioning, all of which can be enduring (Bateman & Fonagy, 2004). Parents with emotional difficulties tend to mirror the emotions of their infant in an unmarked way leading the infant to misattribute the emotion to the parent. This prevents the infant from understanding that the negative emotion is his own and also worsens his emotional state through the trauma of experiencing his parent's negative affect (Main & Hesse, 1990). When experienced long term neglectful, inconsistent or abusive caregiving can lead to impairments in self-awareness, emotional dysregulation and poor empathic functioning (Bateman & Fonagy, 2004). Fonagy (2004) suggests that in some people, this underlies impairments in 'mentalisation', the ability to attribute mental states to others as a way of giving meaning to their behaviour, not dissimilar to Theory of Mind. Empirical evidence has been found to support this in adolescents, showing attachment anxiety to be associated with impairments in ToM (Hünefeldt, Laghi, Ortu, & Belardinelli, 2013). Poor affect regulation and over-sensitivity to the perceived negative affect of others may underlie impulsivity and violence (Fonagy, 2004). Hence it is possible that empathy impairments and attachment style, in part, underlie social skills deficits and are thus linked to offending behaviour in people with ASD.

Although attachment in people with ASD is poorly understood (Taylor, Target & Charman, 2008), there may be a higher rate of insecure attachment in adults with ASD (Dissanyake & Crossley, 1996). There is also a broad literature on the attachment styles of offenders, generally. Findings suggest a high prevalence of insecure attachment amongst offenders (Fonagy, Leigh, Steele, steele, Kennedy, Mattoon, Target, & Gerber, 1996; Mikulincer & Shaver, 2007; Ross & Pfäfflin, 2004; van-Ijzendoorn, Feldbrugge, Derks, de Ruiter, Verhagen, & Philipse 1997). However, attachment styles tend to differ for violent, non-violent and sexual offenders (e.g. van-Ijzendoorn et al., 1997; Wood & Riggs, 2008).

Provision within Correctional Institutions for Offenders with ASD

The Autism Act (Department of Health, 2009) stressed the importance of identification, diagnosis and support of adults with Autistic Spectrum Disorders in the community and other environments. Following on from this, the specific Disability Strategy for the support of adults with autistic spectrum conditions (Department of Health, 2010; 2014) developed statutory guidelines making public and private services accountable for addressing the human rights and equality of people with ASD in accessing adequate support in all areas of life, including secure mental health facilities and prisons. Hence, the identification and treatment of offenders with ASD is not only essential in managing the risk of reoffending, but also in meeting the requirements of the law.

Prisons are responsible, by law, for staff failure to screen and assess prisoners with special needs and make reasonable adaptations to provision (Dunn, Thorne & Hocken, 2013). The social, communication and sensory impairments that prisoners with ASD

have pose particular problems for understanding and managing their risk and addressing issues effectively in rehabilitative programs. For example, their behaviour may seem inappropriate, disrespectful or antagonistic to staff and other prisoners (McAdam, 2012). The noise and lighting in a prison environment may exacerbate this resulting in staff believing the individual to be intentionally hostile, aggressive and antisocial. Loucks and Talbot (2007) describe the difficulties people with ASD may have coping with the transition from community to prison but this is also the case when returning back to the community. Often people with ASD have difficulty adopting generalisable skills (Attwood, 2007). Thus, those learned in the prison environment may not be transferred effectively to other environments, such as the community.

In accordance with the philosophy underlying the Disability Strategy (Department of Health, 2010; 2014), the Good Lives Model (GLM; Ward, 2002) uses a balanced approach of managing psychological and behavioural factors associated with the risk of reoffending (dynamic risk factors or criminogenic needs), whilst supporting individuals to lead healthy purposeful lives in reducing the risk of reoffending. This is achieved through the accomplishment of a lifestyle that provides individuals with basic human needs, or 'primary goods', such as freedom from psychological stress, being part of wider social groups, employment and independence, amongst others. Evidence supports the underlying theoretical framework of the GLM (Purvis, 2010). Thus, building on the strengths of individuals to achieve their basic human needs reduces the risk of offending, rather than simply eradicating risk factors. Further, the GLM views offending as a result of difficulties achieving personal goals due to a lack of internal or external resources. This may be particularly relevant to offenders with ASD, whose

internal resources may be more compromised than other offenders due to the nature of their condition, and so reducing access to primary goods such as employment and healthy intimate relationships. Where the psychological skills and abilities of an individual are compromised, thus affecting the ability to achieve one's goals, the commission of an offence may result. Hence the acquisition of better or alternative skills through treatment may successfully reduce offending.

An understanding of the capacity to empathise and the nature of attachment is essential in supporting individuals through offender behaviour programs and also when leaving prison, to build stable and supportive relationships in managing their risk of re-offending. In addition, Murphy (2013a) stresses the importance of assessing empathy and understanding the dynamics of interpersonal problems in maladaptive coping when managing risk in individuals with ASD. Also, dysfunctional and restricted coping strategies contribute to an increased risk of offending in people with ASD (Murphy, 2010).

It is possible that high levels of distress experienced at the exposure to displays of negative emotions in others may be an underlying cause of this. Davis (1983) considered this a component of empathy, which he termed 'personal distress', as detailed in chapter 3. Hence the identification of such strategies and work focusing upon the development of more functional coping of personal distress in social situations could be a useful way to manage risk. The development of more effective coping styles has been used successfully in the management of violent behaviour in people with ASD with some success (Clare & Woodbury-Smith, 2009; Hillbrand & Sondik, 2012).

Psychopathy and ASD: Overlap and difference

Empathy deficits are not only characteristic of people with autistic spectrum disorders (ASD; Baron-Cohen and Wheelwright, 2004) but also people with Psychopathic Disorder (Blair, 2010; Hare, 2003). Consequently, some researchers have categorized offenders from these two groups similarly due to their common, yet hypothetical, affective deficits (e.g. Fitzgerald, 2011; Lester & White, 2011). The model of Psychopathic Disorder originates from Prichard's (1835) concept of 'moral insanity' describing the reckless and damaging behaviour of a small proportion of mentally ill individuals. This later became designated in DSM-IV (American Psychiatric Association, 1994) as 'antisocial personality disorder' (ASPD), an axis II diagnosis given to those who exhibit pervasive antisocial behaviour from childhood into adulthood, such as criminality, impulsiveness and hostility. Psychopathy was the term given to a proportion of the individuals who fulfill most or all of the criteria for ASPD who, though not inevitably criminal, are highly aggressive, remorseless and egocentric (Blair, Mitchell & Blair, 2005). It has been estimated that 47% of the UK prison population meet criteria for ASPD and 25% of those who meet criteria for ASPD have psychopathic disorder. Blair and colleagues suggest an incident rate of 0.75 % in males and 0.25% in females in the general population (Blair et al., 2005).

Karpman (1948) first developed the concept of primary and secondary psychopathy. Primary psychopaths were defined as callous, manipulative, selfish and dishonest individuals, whilst secondary psychopaths were described as neurotic and anti-social due to underlying emotional disorders. Karpman suggested that the primary psychopath is the true psychopath, although individuals would have a tendency for a mixture of

primary and secondary psychopathic traits. However, it may be more likely that those with a strong secondary component, because of their emotional disorders and impulsive, possibly hostile behaviour, will come into contact with the criminal justice system and mental health professionals. Hence, offenders with ASD may be more likely to show higher levels of secondary psychopathic traits compared to primary psychopathic traits. Psychopathic disorder has also been defined as a developmental disorder (Blair, 2006) similarly to ASD. However, whereas ASD is characterised by impairments in communication, social understanding and imagination (or the ability to imagine the thoughts and feelings of others) (Wing, 1996), Psychopathic Disorder (although not included in the DSM-IV) is described by Hare (1991) as a tendency to be impulsive, hostile, callous and unemotional. People with an ASD tend to have poor intuitive and contextual understanding of language and difficulties understanding and expressing their thoughts and feelings whilst people with psychopathic disorder are recognized to have diminished capacity for remorse, empathy and attachment to others whilst having a self-serving interest in relationships, many of whom indulge in criminal behaviour.

One might superficially deduce that the antisocial behaviour, evident lack of interest in others and absence of emotional expression in some people with ASD and those with psychopathic disorder have common origins. Understandably many researchers and clinicians use this deceptive overlap as a framework by which to understand and explain aggressive and sometimes violent behaviour in people with ASD. However, Blair (2008) highlights the importance of Frith and Happé's (1994) 'fine cuts' approach, which advocates a deeper exploration of surface similarities, in avoiding the grouping of shared impairments to infer identical neurobiological foundations. Further, the

pejorative nature of the 'Psychopath' label, due to its association with cultural images of violent and dangerous individuals, when linked to ASD, casts a rather misleading shadow on the latter condition. Evidently empathy impairments are not as uncomplicated as often presented.

Ghaziuddin, Tsai and Ghaziuddin (1991) reviewed the literature on the prevalence of offending in ASD and found that having ASD does not automatically increase one's risk of offending. Hence, the association of diagnostic criteria for ASD with offending behaviour has little validity when generalised to all individuals with the condition. Rather, it seems likely that a cluster of factors occurring simultaneously are more likely to lead offending in particular circumstances (Looman & Abracen, 2013), of which empathy impairments related to attachment problems, may be significant. In addition, better knowledge regarding the dynamics of empathy deficits and social skills relative to levels of autistic and psychopathic traits may therefore provide clues to treatment targets.

Fundamentally, in order to assess the risk of offending and manage it effectively it is essential to understand if empathy is one of the motives or features which gives rise to offending. Similarly, if insecure attachment is associated with offending then this should be regarded as a risk factor for further offending (Adshead, 2003). In addition, the attachment style of patients is thought to affect relations in therapy (Meyer & Pilkonis, 2002). When particular patient-therapist attachment styles are paired there is a likelihood of better outcomes (Fernandez-Alverez, 2006). Hence an understanding of attachment styles is considered to be pivotal in developing a good therapeutic alliance

with ones' clients or patients due to the effects this can have on the success of therapy. The accessibility of therapy to people with ASD may also be problematic, due to difficulties understanding their own thoughts and feelings and being able to communicate these effectively (Dubin, 2009). However, no research has explored the effects of attachment and empathy upon the success of treatment in people with ASD.

Hence, the formulation and management of risk in offenders with ASD is likely to benefit from careful consideration of the attachment style and particular empathy impairments in the individual. Whilst features of psychopathy may be present in offenders with ASD, as they are to a greater or lesser extent in the general population, they may conceal underlying psychological impairments specific to ASD. In the absence of an accurate representation of the empathy profiles, associated attachment styles and psychopathic traits in offenders with ASD, interventions may not successfully target and treat the relevant psychological problems associated with offending. Hence, due to a lack of research in this area this thesis aims to:

- Establish what the risk factors for offending are in people with ASD.
- Establish if specific empathy impairments, attachment styles and levels of psychopathic traits are associated with higher levels of autistic traits using a mediated linear multiple regression model.
- Assess if offending is associated with a specific profile of empathy impairments, attachment styles, autistic and psychopathic traits using a logistic regression model.
- Evaluate the results of the quantitative investigation carried out in light of the review of the literature on offending in ASD and efficacy of measures used in informing the assessment and treatment of offenders with ASD.

Chapter 2 of this thesis reviews the literature on risk factors for offending in people with ASD. Although the literature in this area is minimal, empathy deficits and social skills deficits are identified as risk factors for offending in a significant proportion of the studies. However, this suggests a link between ASD and offending, which has previously been disproved. The lack of consensus regarding empathising ability in people with ASD generally may be an indication of underlying empathy deficits and attachment problems in offenders with ASD. However, many studies use very small sample sizes and have not attempted to measure empathy or attachment psychometrically. The literature also makes connections between ASD and psychopathic traits due to these risk factors. The review indicated that this area would benefit from the investigation of empathy and attachment as they vary with autistic and psychopathic traits.

Chapter 3 is a critique of Davis' (1983) Interpersonal Reactivity Index (IRI) used in the investigation reported in chapter 4 as a measure of empathy. The IRI has been used widely with clinical and non-clinical populations, including people with ASD, in addition to offenders and non-offenders as a multidimensional measure of empathy. Evidence from previous research questions the relevance of the fantasy subscale as a valid measure of empathy. However, the perspective taking subscale is an effective measure of cognitive empathy and empathic concern and personal distress subscales are acceptable measures of affective empathy.

Chapter 4 of this thesis is a report on the investigation of empathy, attachment and psychopathic traits in a community sample of offenders and non-offenders, with and

without a diagnosis of ASD. A purpose built website was used to collect data over the Internet using social media networks and University email circulars to advertise the research. Results of regression analysis indicated that the level of autistic traits is significantly and positively predicted by personal distress mediated by anxious and avoidant attachment and primary psychopathic traits at low levels of empathic concern. Logistic regression analysis indicated that a higher level of empathic concern and a higher level of autistic traits mediated by secondary psychopathic traits significantly predicted an increased likelihood of having committed an offence.

Chapter 5 discusses the findings from the investigation in light of the literature review and the reliability and validity of the IRI. The IRI may not be an effective measure of cognitive empathy in individuals with higher levels of autistic traits. However, the personal distress and empathic concern subscales are useful in understanding the complex relationship between autistic traits, psychopathic traits and attachment. Overall, the findings suggest that further research is justified into the way greater levels of fearful-avoidant attachment and personal distress interact with psychopathic traits at varied levels of empathic concern in an offender population with ASD. The results are discussed with regard to treatment aimed to reduce the risk of offending/re-offending in people with ASD.

CHAPTER 2

A systematic Review of Risk of offending in individuals with Autistic Spectrum Disorders.

Abstract

Great media interest has been directed towards reports of offending behaviour in people on the Autistic Spectrum; indeed, there is growing interest within clinical, prison and forensic settings as to what makes one individual with an autistic disorder more prone to offending than another. The characteristics of Autistic Spectrum Disorders (ASDs) have often been associated with offending. However, there is little more than anecdotal evidence to support this assertion. In addition, autistic features in offenders with ASD are not necessarily the determining factors in the perpetration of a crime; hence, it would be erroneous to generalize such a philosophy to all people with ASD. Nonetheless, it is possible that some of the difficulties experienced by people with ASD increase their vulnerability to offending when mediated by other factors. The aim of this review was to distinguish between the latter in order to identify the features of the life, behaviour and psychology of adults with ASDs associated with offending behaviour of all types (i.e. static and dynamic risk factors). All research designs, including case study, were examined in which the characteristics and demographics of individuals with ASDs who had offended were analysed and reviewed. These studies were accessed via electronic databases, reference lists from relevant papers, books and by communicating with experts in this field. Seventeen studies met the inclusion criteria based on PICOS; the selected population was adult offenders and non-offenders with a formal diagnosis

of an autistic spectrum condition at the age of criminal responsibility; the intervention/comparator used was exposure to known dynamic risk factors and characteristics of ASD; the outcome was defined as offending behaviour (with or without convictions); included study types were cohort, case control, cross-sectional study and randomised control trial (RCT). Scores on quality assessments ranged from 43% to 93% based upon adapted Critical Appraisal Skills Programme (CASP: 2000) guidelines. Results were conflicting and inconclusive; no consensus seems to have been reached as to what risk factors may be associated with offending behaviour in individuals with ASDs, and there is no indication that they are equivalent to those of the non-ASD population. However, seven of the examined studies highlighted empathy deficits as relevant to offending in people with ASD and thirteen identified social skills problems as relevant. However, to suggest that poor social skills is a risk factor for offending in ASD is tautological, since it is one of the diagnostic criterion for the condition, and misrepresents the many individuals with ASD who experience these difficulties and never offend. In addition, it is possible that people with ASD are particularly vulnerable to attachment difficulties because of childhood adversity, which may underlie empathy deficits and lead to the social skills difficulties associated with offending. Further research across larger samples of offending and non-offending participants, incorporating a group with differential diagnosis and specific offending behaviour, would be helpful in reducing confounding factors and enabling the isolation of relevant characteristics related to offending behaviour. In addition, longitudinal studies following the lives of people with ASD from childhood would enable the identification of factors contributing to the perpetration of offences at different points in the lifespan.

Introduction

Professional opinion is divided regarding AS and offending; the question of whether the characteristics of ASD may act as predisposing factors to offending behaviour has resulted in much debate. Characteristics often mistakenly viewed as inherent in individuals with ASD, such as empathy deficits, lack of concern regarding the consequences of behaviour and poor insight into what motivates the behaviour of others, have been highlighted as significant contributors to offending behaviour (Howlin, 2004). However, some of this research has been based upon anecdotal reports and single case studies e.g. Baron-Cohen (1988); Mawson, Grounds and Tantam (1986); Murphy (2010), Radley & Shaherbano (2011), therefore, caution needs to be used when considering theories and models of offending in ASD based upon this research that are generalised to the entire population of individuals on the autistic spectrum. Nonetheless, such risk factors have also been recognised as those that influence the risk of offending/re-offending in non-ASD prison and forensic psychiatric populations (Baker, Beech & Tyson, 2006). Baker and colleagues (2006) suggest that disorganised attachment (Main & Solomon, 1990), characterised by an absence of any organised attachment behaviour, is likely to generate the conditions giving rise to poor empathy and impulsivity. Baker and colleagues explain this in terms of difficulties with emotional regulation and the ability to reflect upon the mental states of themselves and others, so-called 'reflective function', or 'mentalisation' (Fonagy & Target, 1997).

Much research has been carried out amongst forensic populations in order to empirically establish the nature of risk factors (e.g. Beech, Friendship, Erikson & Hanson, 2002; Dempster & Hart, 2002; Beech, Fisher & Thornton, 2003; Hanson & Harris, 2000;

Mills, Kroner & Hemmati, 2003). However, generalisation from these studies is limited since the samples used are often from specific convicted offender populations, such as sex offenders, who reside in particular settings within the USA and UK. Further, there is no reason to assume factors that increase the risk of offending in the non-ASD population would be identical to those increasing risk in people with ASD.

There are no systematic reviews at present that have investigated risk factors for offending across the autistic spectrum. However, there is one systematic review that has examined the dynamics of violence in Asperger's Syndrome (Bjorkley, 2009), which is primarily based upon case studies, and therefore much of the information is anecdotal. Published single case studies are difficult to review collectively due to the distinct nature of each case. In addition, the review has a focus on violent offending and a limitation to Asperger's syndrome, therefore represents only a fraction of individuals on the autistic spectrum and as such cannot be assumed to apply to all individuals with ASD. Ghaziuddin, Tsai and Ghaziuddin (1991) reviewed the literature published between 1940 and 1990 to establish whether there was any link between ASD and violent criminal behaviour and concluded that there was no link.

In a review of the literature on Asperger's Syndrome and offending Newman and Ghaziuddin (2008) investigated the link between psychiatric comorbidity and offending in AS by examining cases and case series studies. They found that in a sample of 37 cases in total, 29.7% had a definite and 54% had a probable psychiatric disorder. The authors stress the importance of early diagnosis and intervention in this group in order to prevent offending. Mouridsen (2012) has more recently reviewed the research

focusing on prevalence of offending in ASD and risk factors for offending in ASD. The author makes no conclusions regarding risk factors but suggests that the presence of ADHD in people with ASD may significantly increase the risk of offending and maintains that further research into additional medical conditions, such as epilepsy, is required to establish the contribution to offending. However it would be almost impossible to ascertain if the effects of ictal mood change or psychosis could result in a greater susceptibility to offending in people with ASD compared to those without ASD.

Although there is no opportunity to generalize the findings from single case studies due to the sometimes unusual nature of the individuals presented and lack of valid data collection methods used, they can potentially provide detailed information which might be unobtainable through larger studies and may be useful in corroborating or challenging findings from studies carried out on a larger scale that utilise alternative methodologies. Studies investigating multiple cases may present relatively detailed information regarding each case, which is then compared, qualitatively, to highlight similarities and differences across the succession of cases. Such case series studies can be useful for the triangulation of data and validation of quantitative investigations. The aim of this literature review is to gather available evidence from case studies, case series and larger scale studies with greater internal and external validity in order to establish what factors are associated with a risk of offending in adults on the autistic spectrum. Case studies will be used to add depth to findings in larger scale studies due to the scarcity of literature in this area of research.

Method

Sources of Literature

The search was conducted using electronic databases, contacting experts and bibliographic inspection of other reviews and papers. The databases: PsycARTICLES Full Text, Embase 1974 to 2014 August 28, CAB Abstracts 1973 to 2014 Week 34, Embase Classic 1947 to 1973, HMIC Health Management Information Consortium 1979 to July 2014, Journals@Ovid Full Text August 28, 2014, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1946 to Present, PsycINFO 1967 to August Week 4 2014 were used on August 28th 2014. In addition, the TRIP database, PubMed, Web of Science, Cochrane Reviews database, Campbell Reviews database, ASSIA and INTUTE were accessed on 28th August 2014. The experts contacted were Professor Tony Attwood, Professor Marc Woodbury-Smith, Professor Richard Mills and Dr. David Murphy. Professor Marc Woodbury-Smith provided 3 published papers, Professor Tony Attwood supplied 3 published papers and Dr. David Murphy supplied 1 published paper. Professor Richard Mills provided 5 papers. All the studies selected and retained were from published peer reviewed journals.

Search Strategy

The search strategy for this review began by an initial inspection of the literature utilising a set of basic terms, which could then be expanded to incorporate synonyms, informed by relevant/irrelevant by subject articles which were examined more closely. For example, it was necessary to use the term ‘pervasive developmental disorder’ since the term ‘pervasive’ is associated with a large amount of computing literature.

However, despite ‘ASD’ being the acronym for ‘acute stress disorder’ in addition to autistic spectrum disorder, it was not necessary to alter or remove this term, as it is not commonly used to refer to stress related illness.

A set of search terms incorporating synonyms and Boolean operators was deployed. Additions and subtractions of search terms with varied permutations enabled refinement of the search to incorporate as many studies relating to risk, offending and ASD in adults, as possible, whilst excluding the huge body of research on childhood autism and information technology which contained many similar terms. The original set of search terms was: (ASD or Asperger* or Autis* or pervasive developmental disorder or PDD-NOS) and (offen* or recidivis* or reoffend* or violen* or abus* or assault or aggress*or steal* or arson* or firesett* or murder or homicid* or crim* or stalk* or theft or prison*) and (adult* or men or women or man or woman or prison* or patient or secure or hospital or special or community or residential) and (factor* or dynamic* or static or characteristic* or influence* or contributor* or mediator*). This research strategy produced a very large set of results, the majority of which were unrelated to the field of offending behaviour or autism. Hence, the search was modified by mixing different combinations of the bracketed sets of terms and adding or subtracting terms that appeared to result in an over-inclusive list of results.

This resulted in the final set of terms: (ASD or Asperger* or Autis*) and (risk* or dynamic* or characteristic*) and (offen* or crim* or recidivis* or reoffend*) and (prison* or psychiatr* or forensic), searched in ‘keyword’ or ‘keyword, title or abstract’ of all data sources; the results obtained are shown in Table 1 and Appendix 1.

Table 1: Search Results

Source	Number of Results	Number of Relevant papers (first filter)	Number Meeting Inclusion criteria* (after duplicates excluded)
PsycARTICLES Full Text, Embase 1974 to 2014 August 28, CAB Abstracts 1973 to 2014 Week 34, Embase Classic 1947 to 1973, HMIC Health Management Information Consortium 1979 to July 2014, Journals@Ovid Full Text August 28, 2014, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1946 to Present, PsycINFO 1967 to August Week 4 2014	1501	25	8
TRIP Database	115	0	0
PubMed	30	5	0
Web of Science	25	7	0
ASSIA	12	8	4
Cochrane Reviews Database	0	0	0
Campbell Systematic Reviews	0	0	0
INTUTE	0	0	0
Contact with Experts	12	5	1
Additional bibliographic search	13	5	4
TOTAL	1683	55	17

*Inclusion criteria below based upon PICOS

Study Selection

Inclusion Criteria based upon PICOS (Population, Intervention/Comparator, Outcome, Study type)

The following criteria were used to establish which studies met inclusion requirements based upon PICOS criteria:

- Population – Offenders and non-offenders of 18 years old and over, with a diagnosed autistic spectrum condition (ASD, Autistic Disorder, Asperger's Syndrome and Pervasive Developmental Disorder-not otherwise specified or PDD-NOS).
- Intervention/Comparator – Examination of known dynamic risk factors and characteristics of ASD
- Outcomes - Offending behaviour or criminal activity, although a conviction is not necessary.
- Study Type – Cohort, case control, cross-sectional, RCT, Case series (n>4), single case study.

Exclusion Criteria – Case studies that are brief and descriptive, case Series with fewer than five participants consisting of brief descriptions, publication earlier than 1980 (as significant advances in the understanding of risk and offending, in addition to the diagnosis of ASD have occurred since 1980) book chapters, Letters, expert opinion, reviews of literature, prevalence only studies.

Quality Assessment

A quality assessment procedure was designed based upon the Critical Appraisal Skills Programme (2000) guidelines so that papers could be assessed on quality criteria relevant to this review topic. All the studies found were case control, case study, expert opinion or cross-sectional design. In accordance with inclusion criteria, quality assessments for case study, case series, case control and cross-sectional studies were created. These are provided in Appendix 2, 3, 4, and 5. The quality score was calculated based upon a score of 2 for each 'criterion met', score of 1 for 'partially met', a score of 0 for 'not met' and a score of '0' for unknown. The total score was calculated as a percentage from the possible total score, which was different for the different designs. Papers which scored between 70 and 100% (inclusive) were described as 'high quality' whilst those scoring between 50 – 69 % (inclusive) were described as 'moderate quality'. A score of 49% and below was described as a 'poor quality' study. A quality score of 50% or above was the quality requirement for review; one of the studies selected (Mawson, Grounds & Tantam, 1985) obtained a 'poor quality' score therefore was rejected on this basis. Two reviewers (the author and independent scientist) conducted quality assessments for this literature review. Inter-rater reliability was calculated for each study and provided in tables 2 to 5.

Data Extraction

Data were extracted from each paper utilizing the quality assessment forms and the table headings shown in Table 2. These included the study design, number of participants and diagnostic category for the ASD, the method of data Collection and

source of information, offence types included in the study, possible risk factors indicated and strengths and weaknesses of the study.

Results

The electronic database search resulted in 1683 papers found, with duplicates removed for each search; this gave a total of 1241 studies. Based upon title, abstract information and year of study, yielded a total of 45 papers. These were examined more closely based upon PICOS criteria above, further detailed inspection and exclusion criteria above and further duplicates were removed, to finally provide 12 studies. Four experts were contacted which provided 12 results although 9 of these had already been found and retrieved. Of the remaining 3 papers 2 did not meet inclusion criteria. A hand search of the bibliographies of the papers already selected provided an additional 13 papers; 4 papers met the inclusion criteria using PICOS and 5 were rejected on the basis of duplication and 4 did not meet inclusion criteria. In total 17 papers were found which met inclusion criteria and 16 met quality assessment criteria.

Figure 1: Flow Chart Showing Search results

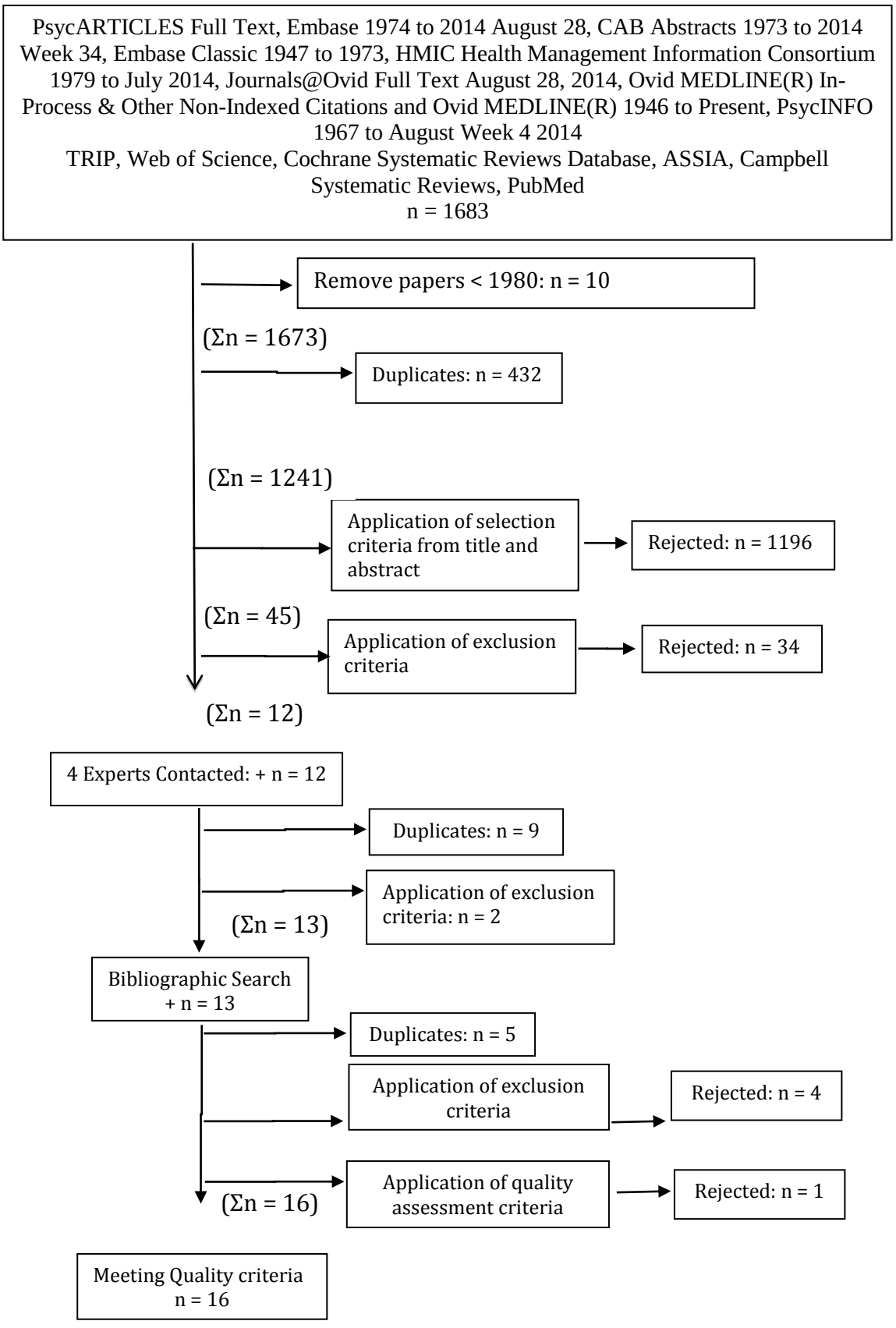


Table 2: Cross-sectional Studies (studies in chronological order)

Authors and Year of Publication	**Number of Participants and Diagnostic Category for Autistic spectrum Condition in Participants**	**Data Collection Method and Information Source**	**Offence Type**	**Quality Assessment Score (%)**	**Findings with regard to Risk Factors**	**Strengths and Weaknesses of Study**
Hare, Gould, Mills and Wing (1999)	1305 participants screened yielding: ASD=31 (29 male and 2 female; with psychiatric comorbidity) (+ 31 possible ASD cases described more akin to psychopathy) Age range: 21-66 years (SD=10.6, mean=38.33 years)	• Nylander Screening Questionnaire (Nylander & Gillberg, 2001) • Handicaps, Behaviours and Skills Schedule (HBS: Wing, 1980)	Indecent assault, damage to property, wounding, manslaughter, Murder, Arson, ABH, Affray, GBH, wounding with intent, threats to kill, AOBH, violence towards staff and patients, unlawful wounding, sexual offending.	27/40 (68%) Inter-rater reliability = 98%	Reported to be unclear from case notes. ***(Unusable due to lack of clarity in reporting data on risk factors).***	Strengths: • Study screened all participants including those with pre-existing diagnosis. • Population demographics presented were detailed highlighting potential confounding variables. • Good discussion of areas for further research. Weaknesses: • Screening carried out by different staff for

						different participants. • Information regarding risk factors was based upon previous clinical experience of one of the authors and not on the present study.
Allen, Evans, Hider, Hawkins, Peckett & Morgan (2008)	16 total: Forensic history with Asperger's Syndrome = 16 male	Staff Questionnaire and participant SSQ	• Violent conduct • Threatening behaviour • Property destruction • Drug offence • Theft • Sexual offending • Arson • Fraud • Motor offence,	37/40 (93%) Inter-rater reliability = 97%	• Social difficulty. • Lack of concern. • Lack of awareness for outcome. • Impulsivity. • Obsessions. • Family conflict. • Change experienced • Bereavement.	Strengths: • Triangulation of findings by informant and participant report • Ethically sound • Aims and procedure are clear • Focus of study is on risk factors • Discussion of validity of findings Weaknesses: • Small sample size • Only applies to participants with AS

			Murder			• Low response rate may have introduced bias • No control group used
Långström, Grann, Ruchkin, Sjostedt & Fazel (2009)	422 Convicted total: Autism = 317 (psychiatric history) Asperger's Syndrome = 105 (psychiatric history) (121 females)	• Hospital records • The national Crime Register (Sweden)	• Homicide • Attempted homicide • Aggravated assault • Common assault • Robbery • Unlawful threat • Harassment • Arson	30/40 (75%) Inter-rater reliability = 88%	• Gender– male. • Older age. • Co-morbid psychosis. • Substance use disorder. • Personality disorder.	Strengths: • Large sample size • Aims and procedure are clear Weaknesses: • Ethics not adequately addressed • Sample biased due to sample of psychiatric patients • Unclear how and when ASD was diagnosed using which criteria. • No triangulation of findings with participant interview. • No control group

Table 3: Case Control Studies (studies in chronological order)

Authors and Year of Publication	**Number of Participants and Diagnostic Category for Autistic spectrum Condition in Participants**	**Data Collection Method and Information Source**	**Offence Type**	**Quality Assessment Score (%)**	**Findings with regard to Risk Factors**	**Strengths and Weaknesses of Study**
Murphy (2003)	39 male psychiatric patients total: Offenders Asperger's Syndrome =13 Non-offenders non-Asperger's syndrome =13 Offenders non-Asperger's=13	• Wechsler Intelligence Scale –Revised (WAIS-R; Wechsler, 1986)* • National Adult Reading Test- Revised (NART-R; Nelson & Wilison, 1991)* • Wechsler Memory Scale – Revised (WMS-R; Wechsler, 1988)* • Adult	Not described. Participants were all forensic patients detained in high security hospital due to nature and severity of offending and mental health problems.	35/42 (83%) Inter-rater reliability = 85%	From Quantitative data: • Cognitive function of AS patients is not significantly different to those with Personality Disorder or Schizophrenia. From Qualitative data: • Misperceived injustice. • Difficulty perspective taking. • Lack of	Strengths: • Comparison and control groups used • Aims and procedure are clear • All participants diagnosed with ASD based upon same criteria • Thorough assessment and data collection Weaknesses: • Only applies to participants with AS • Small sample size • Sample biased due to

		Memory and Information Processing Battery (AMIPB; Coughlan and Hollows, 1985)* • The Classic Weigl (Weigl, 1941)* • Qualitative description of offending behaviour in patient files.			awareness of consequences of own actions.	sample of psychiatric patients • Ethical issues not discussed. • Some of the assessments used are extremely old and may therefore not be valid in the present day.
Woodbury-Smith, Clare, Holland, Kearns, Staufenberg & Watson (2005)	67 total: ASD offenders = 21 (18 male: 3 female) ASD non-offenders = 23 Non-ASD general population = 23	• Home Office Offender Index • The Facial Expressions of Emotion Stimuli and Tests (FEEST: Young, Perret, Calder, Sprengelmeyer &	• Manslaughter • Attempted Murder • Arson • Indecent Assault • Assault • Threats to kill	36/42 (86%) Inter-rater reliability = 97%	• Impairment in recognition of facial expression of fear is associated with offending in ASDs. • Theory of mind ability is not associated with offending in ASDs.	Strengths: • Aims and procedure very clear • All participants diagnosed with ASD based upon same criteria • Control group used • All participants diagnosed with ASD based upon same criteria

		Ekman, 2001) • The Adult Eyes Test-revised (Baron-Cohen et al, 2001) • The Behavioural Assessment of the Dysexecutive Syndrome (BADS: Wilson, Alderman, Burgess, Emslie & Evans, 1996)	• Harassment • Deception		• Executive dysfunction is not associated with offending in ASDs.	• Acknowledgement and discussion of confounding variables • Results are interesting and highly relevant Weaknesses: • Small sample size • Discussion of ethical issues is absent. • Groups were not matched well on IQ
Woodbury-Smith, Clare, Holland & Kearns (2006)	45 total: (convictions not reported) ASD = 25 (21 male: 4 female) Non-ASD =20 (13 male: 7 female)	• ADI-R (Lord et al, 1994) • Self-Reported Offending Questionnaire (Farrington, unpublished) • Home Office (UK)	• Burglary • Robbery • Theft • Drug offences • Criminal damage • Violence • History of convictions	33/42 (79%) Inter-rater reliability = 98%	• Perceived victimization	Strengths: • Ethical issues were adequately addressed • Bias was adequately discussed • Aims and procedure are clear • All participants diagnosed with ASD based upon same criteria Weaknesses:

		offender's Index				• Rate of offending in sample too low to be informative. • Some risk factors were suggested • Sample bias introduced due to low response rate likely to be associated with greater participant support.
Stokes, Newton & Kaur (2007)	63 total: High Functioning ASD = 25 (16 male: 9 female) Non-ASD = 38 (32 male: 6 female)	Parent Questionnaire	Stalking Behaviour	32/42 (76%) Inter-rater reliability = 95%	• Lack of friendships and appropriate relationships • Inadequate social skills	Strengths: • Control groups used • Aims and procedure are clear • All participants diagnosed with ASD based upon same criteria Weaknesses: • Only applies to higher functioning participants • Small sample size • Based entirely on parental report – no triangulation of findings.

						• No explicit inference relating to risk factors in stalking
Mouridsen, Rich, Isager & Nedergaard (2008)	1246 Convicted psychiatric history total: Childhood Autism = 113 (82 male: 31 female) Atypical Autism = 86 (56 male: 30 female) Asperger's Syndrome = 114 (97 male: 17 female) Non-ASD = 933	Records from the Danish Criminal Register	• Violent crimes • Robbery • Possession of weapons • Sexual offending • Arson • Theft • Violations of drug law • Vandalism • Fraud • Offenses against property • Receiving stolen goods • Traffic violation	32/42 (76%) Inter-rater reliability = 90%	• IQ is not associated with a risk of offending. • Gender is not associated with a risk of offending.	Strengths: • Large sample size • Confounding effects adequately acknowledged • Aims and procedure are clear • Use of appropriate control group Weaknesses: • Sample biased due to sample of psychiatric patients • No consideration of confounding nature of childhood admission to hospital and effect on adult behaviour (i.e. effects of separation). • Focus of findings is on offence type rather than risk factors.

						• Participants diagnosis of ASD based on different criteria • No triangulation of findings with participant interview.
Woodbury-Smith, Clare, Holland, Watson, Bambrick, Kearns & Staufenberg (2010)	44 in total: 21 offenders (18 male and 3 female) with ASD diagnosis Age: mean =35.4 years SD=11.6 years FSIQ: Mean=91.2 SD=14.4 23 non-offenders (20 male and 3 female) with ASD diagnosis Age: Mean =29.7 years SD=7.9 years	Semi-structured interview to categorise the nature of circumscribed interest, whether the interest was violent or not and the type of index offence.	Arson, harassment, ABH, GBH, threats to kill indecent assault, deception, manslaughter, armed robbery, hoax bomb threats, assault, attempted murder.	31/42 (74%) Inter-rater reliability = 85%	• Offenders with ASD significantly more likely to report presence of violent circumscribed interest than non-offenders with ASD.	Strengths: • Aims and procedure clear • Study examined presence or absence of 1 specific potential risk factor in detail. • Groups quite well matched on age and gender. • All participants diagnosed with ASD based upon same criteria. • Categorization of interests was validated by 'blind' second rating. • Self report measure supported by health care

	FSIQ: Mean=104.3 SD=17.7					records Weaknesses: • Groups differed considerably in FSIQ • Sample size was small and percentage of offenders with violent interests, though significant had n=4 therefore may show type 1 error. • Poor consideration of confounding variables, such as psychosocial vulnerabilities, that may interact with interests.
Kawakami, Ohnishi, Sugiyama, Someki, Nakamura, Tsujii (2012)	175 in total: 147 males and 28 females All diagnosed with high functioning ASD in childhood using DSM-IV. Divided into	Clinical records, interviews with participants and parents of participants to measure: Childhood adversity, type and frequency	Theft (55.6%), sexual misconduct (peeping, voyeurism, prostitution, lingerie theft), violence, running away. arson, blackmail,	38/42 (90%) Inter-rater reliability = 90%	Specific childhood adversities associated with criminality: • Family violence, Physical abuse, Sexual abuse • Neglect	Strengths: • Large sample size • Aims and procedure are clear • Control group large and well matched • Risk factors studied are previously unexplored

	criminal group n=36 (30 males and 6 females) and non-criminal group n=139 (117 males and 22 females)	of criminal behaviour, age of diagnosis	trouble acts		(strongest link) • Parental divorce. • Parental loss. • Age of initial diagnosis (delays in diagnosis).	but relevant • Multiple sources of data Weaknesses: • Focus on environmental factors • Interaction between environmental and individual factors not explored • Insufficient consideration of interaction between environmental factors. • No measure of severity of family malfunction (dichotomous scale used). • No consideration of gender effects.

***** cited in Murphy (2003)

Table 4: Case Series Studies (studies in chronological order)

Authors and Year of Publication	**Number of Participants and Diagnostic Category for Autistic spectrum Condition in participants**	**Data Collection Method and Information Source**	**Offence Type**	**Quality Assessment Score (%)**	**Findings with regard to Risk Factors**	**Strengths and Weaknesses of Study**
Murrie, Warren, Kritiansson & Dietz (2002)	6 in total; all male offenders with Asperger's Syndrome	Case history including assessments		25/30 (83%) Inter-rater reliability = 85%	• Deficient empathy. • Interpersonal naiveté. • Sexual frustration.	Strengths: • More detailed consideration of individual cases with clear aims to the study. • All participants had offended and diagnosis of AS • Clinical histories and psychometric data used • Highlights differences and similarities across cases Weaknesses:

						• Small sample and low generalizability • No details given regarding assessments conducted. • No comparison of non-AS possible
Barry-Walsh & Mullen (2004)	5 in total; all male offenders with Asperger's Syndrome (AS)	Case history including assessments	Arson, assault, stalking, sexual offending	21/30 (70%) Inter-rater reliability = 95%	• Lack of empathy (and egocentricity). • Concrete logical thinking. • Difficulty establishing peer relationships. • Difficulties understanding consequences of actions	Strengths: • More detailed consideration of individual cases with clear aims to the study. • All participants had offended and diagnosis of AS • Clinical interviews used as data sources overcoming some issues with questionnaires Weaknesses: • Small sample and low generalizability • No details given regarding assessments

						conducted. • No comparison of non-AS possible • Narrow focus on obsessive interests in case presentations
Murphy (2007)	13 total: Offenders with Psychiatric history and Asperger's Syndrome = 13 male	PCL-R scores	Not described. Participants were all forensic patients all detained in high security hospital due to nature and severity of offending and mental health problems.	26/30 (87%) Inter-rater reliability = 85%	• PCL-R scores are not indicative of risk for offenders with Asperger's syndrome.	Strengths: • All participants diagnosed with ASD based upon same criteria • Thorough assessment and data collection by experienced clinicians • Good sample size Weaknesses: • Only applies to participants with AS • Sample biased as all psychiatric patients. • Assessments not inter-rated for reliability. • Ethical issues not discussed.

Table 5: Case Studies (studies in chronological order)

Authors and Year of Publication	**Number of Participants and Diagnostic Category for Autistic spectrum Condition in participants**	**Data Collection Method and Information Source**	**Offence Type**	**Quality Assessment Score (%)**	**Findings with regard to Risk Factors**	**Strengths and Weaknesses of Study**
Mawson, Grounds & Tantam (1985)	1 male AS (psychiatric history)	Case history, WAIS, EEG, Galvanic Skin Response (GSR) to sounds.	Violence towards women, a child and a dog.	12/28 (43%) ***(score below threshold for inclusion in review)*** Inter-rater reliability = 100%	• Auditory sensitivity. • Impulsivity.	Strengths: • Details of offences provided Weaknesses: • No formal diagnosis of ASD • Possible schizophrenia • No specific discussion of risk factors • No clear formulation of offences dynamics
Baron-Cohen (1988)	1 male AS (possibly Autism, psychiatric	Case history, psychometric assessments	Physical aggression/violence	22/28 (76%) Inter-rater	• Social skills deficits. • Poor perspective	Strengths: • Thorough assessments and data collection.

	history)	(WAIS-R), interview based assessments of violence and social understanding with the participant, interview based assessments with participant's father and 'girlfriend' for purposes of triangulation.		reliability = 95%	taking. • Poor coping skills.	• In depth discussion of interviews and formulation. Weaknesses: • AS diagnosed not based upon standardised assessment.
Murphy (2010)	1 male ASD Psychiatric History	Case history including assessments	Manslaughter	21/28 (75%) Inter-rater reliability = 85%	• Communication difficulties. • Poor interpersonal coping style. • Poor perspective taking. • Cognitive rigidity. • Executive dysfunction.	Strengths: • ASD diagnosed based upon standard, reliable criteria • Thorough assessment and data collection. • Detailed information and discussion regarding contributing factors to

					• Anger problems.	offence. Weaknesses: • Sample biased as based on psychiatric patient. • Assessments not inter-rated for reliability. • Unknown whether the formulation and therefore, risk factors, were agreed upon by a multi-disciplinary team or an individual clinician.
Radley and Sharhebano (2011)	1 male ASD (psychiatric history)	Case history including assessments	Arson	19/28 (68%) Inter-rater reliability = 100%	• Late diagnosis.. • Poor social skills and inability to make appropriate relationships. • Alcohol abuse. • Poor perspective taking. • Poor coping skills. • Obsessional interests. • Mental illness	Strengths: • Detailed information regarding possible contributing factors to offence. Weaknesses: • Sample biased as based on psychiatric patient. • Very descriptive with little formulation. • No assessments described.

					(psychosis).	• Unknown whether the formulation and therefore, risk factors, were agreed upon by a multi-disciplinary team or an individual clinician.

Descriptive data Synthesis

Table 6: Participant Categories for Selected Studies*

Study	Females with ASD	ASD offenders	AS offenders	Atypical autism-offenders	Autism offenders	ASD non-offenders	Non ASD/gen. population offenders	Non ASD non-offenders	General population	Total in study	ASD Offender psychiatric History	ASD Non-Offender Psychiatric History	Non-ASD offender Psychiatric History
Allen, Evans, Hider, Hawkins, Peckett &	0		16							16			

Morgan (2008)													
Långström, Grann, Ruchkin, Sjostedt & Fazel (2009)	121		21		10	391				422	31	391	
Murphy (2003)	0		13				13	13		39	13	26	
Woodbury-Smith, Clare, Holland, Kearns, Staufenberg & Watson (2005)	3	21				23			23	67		23	
Woodbury-Smith, Clare, Holland & Kearns (2006)	11	25						20		45			
Stokes, Newton &	9					25			38	63			

Kaur (2007)													
Mouridsen, Rich, Isager & Nedergaard (2008)	78		21	7	1	284	168		765	1246	29	313	
Woodbury-Smith, Clare, Holland, Watson, Bambrick, Kearns & Staufenberg (2010)	3	21				23				44			
Kawakami, Ohnishi, Sugiyama, Someki, Nakamura, Tsujii (2012)	28	36				139				175			
Murrie, Warren, Kritiansson & Dietz (2002)	0		6							6	5		

Barry-Walsh & Mullen (2004)	0		5							5	2		
Murphy (2007)	0		13							13	13		13
Murphy (2010)	0	1								1	1		
Radley and Shaherbano (2011)	0	1								1	1		
Baron-Cohen (1988)	0		1							1	1		
TOTAL	253	105	96	7	11	885	181	33	826	2144	96	753	13

*Some figures are unreported therefore those quoted in this table are approximate figures.

Table 7: Summarised Participant Categories*

	With Diagnosis of an ASD		No Diagnosis of an ASD	
	Offenders	Non-offenders	Offenders	Non-Offenders
Asperger's Syndrome	96	93		
Autism	11	112		
High Functioning ASD/ASD	105	Unknown		
Atypical Autism	7	79		
Total	219	885	181	859
Known Psychiatric History*	96	753	13	13

*Some figures are unreported therefore those quoted in this table are approximate figures.

The total number of participants in the studies included in this review is 2144. These participants are primarily offenders with psychiatric histories although, a proportion are from the community with no offending or psychiatric history. Two of the studies (Mouridsen et al., 2008 and Langstrom et al., 2009) constitute a large fraction of the participants, some with a psychiatric history, due to large sample sizes and therefore they are not representative of the nature of participants in the majority of studies. Included in the sixteen studies are 1104 participants with a formal diagnosis of an ASD (see table 5). Of these, 219 were offenders (20%) and 885 were non-offenders. The non-offender group was most often categorized as ASD with no further detail of diagnostic category except for Mouridsen and colleagues (2008) who provided a more detailed analysis of their participant groups. Of the offender group 96 had a diagnosis of Asperger's Syndrome, 11 Autism, 105 with ASD/High functioning ASD and 7 with

Atypical Autism (or PDD-NOS). Of those participants with an ASD who were not registered offenders some admitted to criminal acts and were not convicted (see Woodbury-Smith, et al., 2006).

Of those with any type of ASD, at least 849 participants had a known psychiatric history. Of the sixteen studies selected 1040 participants constituted control groups who had no diagnosis of an ASD. Fifteen of the Sixteen studies in this review employed samples of offenders, although not all convicted. The exception was the study by Stokes et al (2007), which used a community sample to investigate stalking behaviour. Seven of the sixteen studies used all participants with a psychiatric history; these were Mouridsen and colleagues (2008), Långström and colleagues (2009), Murphy (2003, 2007, 2010), Radley and Shaherbano (2011) and Baron-Cohen (1988). In none of the studies were psychiatric and non-psychiatric participants compared, however, Woodbury-Smith and colleagues (2005), Murphy (2003), and Kawakami and colleagues (2012) compared offender and non-offender samples. Seven of the sixteen studies reported to include females in their participant samples providing a total of 253 females with diagnosed ASDs, which represented almost one quarter of the participants with an ASD. The ratio of male to female participants with an ASD was 3.4:1. Of these females, 92 (36%) were reported to have committed an offence. Of all offenders with an ASD in this review, the ratio of males to females is 4.2:1. This is in accordance with the estimated ratio of males to females with an ASD in the general population of 4.3:1 (Fombonne, 2005).

Fourteen of the studies in this review scored 70% or over in the quality assessment and can therefore be described as 'High quality'. The case study by Radley and Shaherbano (2011) scored between 68% on quality assessment and therefore can be described as 'of moderate quality'. Two studies did not meet the threshold for inclusion; a brief case study by Mawson and collagues (1985) and the cross-sectional survey study of ASD in three hospitals by Hare, Gould, Mills and Wing (1999) which investigated the occurrence of ASD in three high secure psychiatric hospitals. Although the latter study was large and relatively in-depth with regard to diagnosis and offence type, it did not yield any data on risk factors, despite scoring 68%, therefore did not meet the purpose of this review. The highest quality studies employed case control, cross sectional and case series design. In order to assess risk in individuals with ASDs it is useful to include a control group to ascertain what factors are related to the ASD and which are related to other variables such as psychiatric co-morbidity, up-bringing, cognitive impairment and environmental effects, which Kawakami and colleagues (2012) attempted to do. Woodbury-Smith and colleagues (2005) and Murphy (2003) were unusual in their inclusion of a control group of non-ASD non-offenders. Seven studies examined individuals with ASD with varied offending history, whereas Langstrőm and colleagues (2009) focused upon violent offending. However, Stokes and colleagues (2007) examined only stalking behaviour, specifically.

Given the small number of research studies published in this area it was necessary to compare a small number of methodologically very different studies. Hence a technique was required that would take into account any skew introduced by comparing risk factors identified from large scale studies compared with those of a smaller scale.

Accordingly, the quality assessment scores from the above studies were collated in association with the sample size for each study for the categories and sub-categories of risk factors identified (see table 8). The weighted mean of the quality assessment scores was calculated for each category of risk factor as an indicator of its validity based upon the following:

$$\bar{\bar{Q}}_w = \frac{\sum (Q_1 \times S_1) + (Q_2 \times S_2) + \ldots (Q_n \times S_n)}{\sum S_1 + S_2 + \ldots S_n}$$

Where:

$\bar{\bar{Q}}_w$ = weighted mean of quality assessment score

$Q_{1..n}$ = quality assessment score of citing study

$S_{1\ldots n}$ = sample size of citing study

n= number of studies citing that risk factor.

Table 8: Weighted Means of Quality Assessment Scores (%) of Cited 'For' and 'Against' Sub-Categories of Risk Factors

Risk Factor		No of Studies Citing Evidence for Risk Factor	No of Studies Citing no Evidence for Risk Factor	Quality Assessment Score of Citing Studies (%) (total sample size)	Weighted Mean of Quality Assessment Score of Citing Studies (%)
Social	Social difficulty	7		93(16),83(6),76(1), 76(63),75(1),70(5),68(1)	78.96
	Communication	1		75(1)	75

	difficulties				
	Lack of friendships	1		76(63)	76
	Sexual Frustration	1		83(6)	83
	Family conflict	1		93(16)	93
	Misperceived injustice/victimisation	2		79(45),83(39)	80.86
Behavioural	Impulsivity	1		93(16)	93
	Anger	1		75(1)	75
	Obsessions or circumscribed interests	3		93(16),74(44),68(1)	78.89
Empathic Ability	Lack of empathy	2		83(6),70(5)	77.09
	Lack of concern	1		93(16)	93
	Difficulty perspective taking	3		83(39),76(1),75(1)	82.63
	Impairment in recognition of facial expression of fear	1		86(67)	86
	Theory of mind ability		1	86(67) against	86
Psychiatric /Clinical	Co-morbid psychosis	2		75(422),68(1)	74.98
	Substance misuse	2		75(422),68(1)	74.98
	High PCL-r Scores		1	87(13)	87
	Personality disorder	1		75(422)	75
Cognitive	Concrete thinking	2		75(1),70(5)	70.83
	Lack of awareness of	3		93(16),83(39),70(5)	84.58

	consequences of own actions				
	IQ		1	76(1246)	76
	Executive dysfunction	1	1	75(1) for 86(67) against	75 for 86 against
Historical	Age of initial diagnosis (delays in diagnosis)	2		90(175),68(1)	89.88
	Childhood adversity (family problems, violence, physical abuse, sexual abuse and neglect, parental divorce and parental loss).	1		90(175)	90
Other	Change experienced	1		93(16)	93
	Bereavement	1		93(16)	93
	Gender (male)	1	1	75(422) for 76(1246) against	75 for 76 against
	Age (older)	1		75(422)	75

Table 9: Weighted Means of Quality Assessment Scores of Citing Studies (%) for Principal Categories of Risk Factors

Principal Risk Factor Category	Total number of Studies Citing Risk Factor	Weighted Mean of Quality Assessment Score for Citing Studies (%)
Historical	3	89.75
Empathic Ability	7	85.39
Cognitive	6	83.33

Behavioural	5	81.73
Social	13	79.79
Other	4	75.66
Psychiatric/Clinical	5	75.11

The risk factors associated with offending in adults with ASDs identified by this review are somewhat inconsistent (see tables 2 to 5 and 8 and 9). For example, Langstrőm and colleagues (2009) found older age to be associated with offending however, their findings may have been associated with psychiatric comorbidity. Conversely, Mouridsen and colleagues (2008), who conducted a higher quality study with a larger sample size and control group, argue against the effects of age upon offending in ASD. The literature indicates a broad spectrum of possible risk factors many of which are the characteristics of ASD or those associated with non-ASD offenders. Difficulties with relationships and poor interpersonal skills were shown to be associated with risk in participants with ASDs in the studies by Allen and colleagues (2008) and Stokes and colleagues (2007). This is often explained in terms of poor Theory of Mind (e.g. Howlin, 2004). However, Murphy, (2003) and Woodbury-Smith and colleagues (2005) found that the cognitive impairments more commonly associated with ASDs, such as Theory of Mind and executive dysfunction (useful in forming relationships), are not associated with offending in individuals with ASDs. It is possible that the inconsistencies observed are due to the nature of the participant samples used and difficulty recruiting individuals with ASDs who are not already in services, which often constitute a biased sample.

Summary of Results

Selection Bias and Methodology

The study conducted by Mouridsen and colleagues (2008) utilises a large sample size, which validates generalisability. However, the participant samples used for comparison are quite limited. Adult participants, who were child psychiatric in-patients with a criminal record, were compared with adults from the general population with a criminal record as a control group. However, non-psychiatric inpatient and non-offender groups were not employed for comparison which could have conferred some internal validity to the study by facilitating the separation of complex variables that may be associated with criminality, psychiatric illness or common personality traits found in the general population. Validity could have been similarly increased by the inclusion of non-offender and non-psychiatric groups. In addition, the case group (of individuals with diagnosed Pervasive Developmental Disorder, or PDD) were diagnosed based on criteria specified by the ICD-9 (WHO, 1978) which has been updated to ICD-10 (WHO, 1992), during which time (14 years) the diagnosis and recognition of autistic conditions and other pervasive developmental disorders has changed considerably. Also, the risk factors for recidivism in offenders with a history of psychiatric illness are different compared to those who do not (Mills, Kroner and Morgan, 2011, p.43).

The proportion of males to females in the participant samples used are reflective of the currently accepted estimates of prevalence of ASD in females in the general population. However, difficulties in the diagnosis of ASD in females is known to be problematic as outlined in chapter 1, and may have influenced some of the results in a number of the studies which were conducted based upon diagnostic information from over 10 years

ago. The characteristics of ASD in females are often markedly different (Attwood, 2007), which raises questions regarding the validity of studies that do not differentiate between female and male participants. It is also questionable whether results of studies employing participant samples of only males can be usefully applied to females with ASD.

Stokes and colleagues (2007) have used a moderately sized sample, but not sufficiently large to justify generalisability to all individuals with ASD. The participants were the parents of individuals with ASD rather than the individuals themselves, which raises questions regarding validity of report. In this study, parents were questioned regarding the nature of their children's interpersonal skills. However, the age range of the children was broad (13-36 years) and the results are likely to be confounded by the differing levels of knowledge that parents have of their adolescent children compared to adult children. In addition, the social skills of a 13-year-old child with ASD are likely to be quite different to those of a 36-year-old adult with ASD, further complicating the generalizability of their findings across their sample. It is questionable whether the interpretation of the results in this study could be applied to any individual with a diagnosis of ASD because during the period reflected in the age range of the participants the nature and meaning of social behaviour changes considerably.

Conversely, the study conducted by Allen and colleagues (2008) utilised a large sample size of participants with Asperger's syndrome who had been involved in criminal activity though not necessarily convicted. The aims of this study are clear; to explore prevalence, patterns of offending and subjective experience of the criminal justice

system. It is therefore understandable that the researchers did not employ a control group or other comparison groups. However, this presents some challenges to using this study as a source of information for the investigation of risk factors in offending. Moreover, all participants were male and therefore this reduces external validity since findings cannot be applied to a female population. Nonetheless, this study scored very highly (37/40) on quality assessment, in part due to a high standard of ethics, confirmation of findings from informant data using participant report and a thorough discussion of the validity of findings.

Similarly, Kawakami and colleagues (2012) conducted an excellent study with 175 participants with high functioning ASD (hfASD), men and women, 36 of whom had a criminal history. This study took an alternative approach to the investigation of risk factors by looking at childhood adversity and age of diagnosis of ASD, hence a pure focus upon external/environmental factors. The researchers triangulated data by using a number of information gathering procedures; clinical records, participant and parent interview, in order to improve accuracy and validity. Childhood adversity was measured using varied categories and a dichotomous scale thereby yielding useful information regarding the type of childhood adversity that was associated with offending in later life, but was unable to offer details on the severity of adversity which was linked to offending.

Research conducted by Langström and colleagues (2009) examined the association of socio-demographic factors of individuals with Autism or Asperger's syndrome and violent offending. These individuals were selected on the basis of having ASD,

discharge from a psychiatric hospital over the period 1988-2000 and having been convicted of a violent offence in the same period. Unfortunately, similar to the study conducted by Mouridsen and colleagues (2008), it is subject to inaccuracy introduced by the change in ICD diagnostic criteria during that time. Further, this study was subject to selection bias in limiting the participants to psychiatric patients. In addition, the absence of comparator groups creates difficulties understanding which factors affect risk of violence in individuals with ASD specifically and which factors may be associated with psychiatric illness.

Murphy (2003) examined the cognitive differences between 39 participants at Broadmoor high security hospital; 13 with AS, 13 with personality disorder (PD) and 13 with Schizophrenia which constitutes a small sample size from which to generalize findings to other forensic populations. Similarly, Murphy's (2007) study of Psychopathy in offenders with ASDs lacks external validity in the even smaller sample size used as a cross-sectional study. It appears that the participants are a commonly employed sample of 13 male patients with Asperger's Syndrome at Broadmoor hospital. This raises questions concerning the validity of this sample, in that they are likely to have participated in numerous tests and measures and constitute a rather select group, unrepresentative of others with ASDs. Woodbury-Smith and colleagues (2005), though utilizing a relatively small sample size, employed participants who were both male and female and also validated ASD diagnosis using the Autism Diagnostic Interview-revised (ADI-R; lord et al., 1994). Two measures were used to assess Theory of Mind (ToM) but indicated that this was not a risk factor for offending. However, this may have been due to the measure used, which is based upon the interpretation of facial

expression. Participants with ASD (offenders and non-offenders) were compared with non-ASD controls from a community sample whose offending status was unknown, which thereby reduces the validity of the data. In their later study, the participant sample of Woodbury-Smith and colleagues (2006) was smaller but based on similar group size yet the rate of offending in the sample was too low for valid inferences to be made regarding risk factors. It is unclear whether the two studies conducted by Woodbury-Smith and colleagues (2005; 2006) have drawn on data from the same participant group.

Likewise, in the case series presented by Murrie and colleagues (2002) and Barrie-Walsh and Mullen (2004), the cases were obtained from clinical experience and are likely to have been selected because of their unusual nature, therefore, they are unlikely to be representative of the majority of individuals with ASD who commit offences. In support of this, Kawakami and colleagues (2012) report that 54% of their (larger) sample had committed theft, a minor offence compared to violent crime, which 19.4% of participants had committed. However, clinical experiences is able to yield richer, more detailed data from numerous sources, raising questions and challenging pre-existing assumptions, which provides an alternative approach to the purely deterministic perspective of larger scale quantitative studies. The six cases presented by Murrie and colleagues (2002) give comprehensive accounts of the participant's lives leading up to their offending and report scores on various standardised psychometric measures to support their formulations conferring a degree of validity to their study that was absent in that of Barrie-Walsh and Mullen (2004).

Mouridsen and colleagues (2008) employ a process of data collection from the nationwide Danish Criminal Register. The authors point out that this avoids recall bias in depending upon participant or informant report; however, the original source of some of the information used to construct the database itself depends upon the reports of others. Consequently, there may still be challenges to reliability and data integrity which the authors have not considered which is of great significance when attempting to understand a participant group who are often misunderstood and whose behaviour and motives are misinterpreted. Moreover, using data from criminal records, whilst enabling the study of convicted, and therefore presumably, guilty individuals, discounts those who have committed crimes but avoid apprehension and/or conviction, thereby presenting a subset of individuals with PDD and criminal behaviour.

Adding to the validity of this study was the inclusion of a representative proportion of females with ASD who had committed offences. However, the difficulties diagnosing ASD in females were not taken into account for these studies and are likely to have been pertinent over the period during which the research was conducted. Moreover, Mouridsen and colleagues' discussion of risk factors for criminality in individuals with PDD refers to a number of well-known case studies and these are not considered in the context of the results in their study. Nonetheless, a strength of this study is the period of time over which the groups were observed, despite this being retrospective.

As previously noted, Stokes and colleagues (2007) utilize a questionnaire methodology which relies upon the knowledge and accuracy of parent informants and is therefore open to recall bias which reduces the validity of findings. Furthermore, the

questionnaires designed by the authors for this study were not tested on either of the populations under study in order to assess the validity and reliability of the tool itself. It is possible that the particular constructs that the researchers intended to explore were not accessed by their methodology at all and would have been improved by the addition of a self-report measure.

The questionnaire used to collect historical data by Allen and colleagues (2008) contains information relating to educational background, psychiatric history, behavioural difficulties and medication history. In individuals who are misunderstood and marginalized, such as many of those with ASD, it is likely that much of this information is related to environmental factors rather than internal disposition. Many individuals with ASD experience difficulties adapting to highly stimulating and stressful environments such as school and the workplace, and may develop psychiatric illnesses such as anxiety disorders and depression as a result, yet they do not become involved in criminal activity. Hence, those factors correlated with offending behaviour in the study by Allen and colleagues (2008) may be a reflection of environmental pressures to conform, or cultural ideology, rather than risk factors per se and do not imply a causative relationship or the direction of that relationship. Informants for two of the questionnaires are staff members who work closely with participants, which is likely to increase accuracy in responses; however attempting to understand the experience and thoughts or feelings of an autistic person through the mind of a non-autistic person is susceptible to misinterpretation. It is therefore possible that internal validity in this study is reduced by some of the questionnaires used and informant bias. Nonetheless, the semi-structured questionnaire used to explore participant experiences

of offending and factors affecting their behaviour enabled the subjective experiences of the participants to be understood and add to the data, although this is not without drawbacks, such as participant effects. It has been suggested that individuals with ASD have a tendency to experience difficulties in recognizing and verbalizing their emotions, ('alexithymia' as outlined in chapter 1) which may lead to inaccuracies in self-report questionnaires (Tantam, 2013, p.386),

Langstrőm and colleagues (2009) obtained data from hospital and criminal justice databases that was then analysed using statistical regression to identify any links in socio-demographic data and violent offending. Regression analysis is useful in that it enables the construction of a predictive model but in this study the model may be biased due to the nature of the samples used. The authors acknowledge that the diagnosis of comorbid psychiatric disorders as distinct from a diagnosis of ASD is difficult to make. In addition, the sample represents a narrow selection of people with ASD and offenders; it is reasonable to assert that a proportion of offenders have ASD which is currently undiagnosed. A proportion of offenders with ASD will not have been hospitalized, as those in this study were. Moreover, the authors make no reference to obtaining permission from participants for the use of their personal data, which is questionable on ethical grounds. Further, the authors did not identify mediators to links observed and did not elucidate any causality upon relationships observed between variables, as one might expect from a regression model. Similarly, Murphy (2003) presented regression analysis identifying links that require further study, explanation and validation. He describes how qualitative descriptions of offending behaviour indicate particular

difficulties in AS patients, yet does not describe any systematic analysis of data used to make these inferences.

In addition, Murphy (2003) obtained data on participants from hospital admission records and conducted a battery of assessments to identify cognitive differences between patients with Schizophrenia, Personality Disorder and Asperger's Syndrome. However some of the assessments were developed in the 1940's and 1980's hence, their validity is questionable in the present day. The later study by Murphy (2007) employed the PCL-R to identify the characteristics of psychopathy that are also often observed in individuals with ASDs. This was an ethically sensitive, but useful, piece of research due to the assumptions surrounding autism and Psychopathy. Murphy (26th May 2011, personal communication) has increased the sample size in a current similar study in order to improve internal and external validity.

Barrie-Walsh and Mullen (2004) present five cases of offenders with AS without any assessment data on which to base their subjective judgments of the motivations for individual behaviour. The authors focus primarily upon the obsessive interests of the participants and formulate the events leading to offending around the interests. Although this is interesting, in particular drawing attention to the patterns across cases, more information regarding what purpose the pursuit of obsessive interests served for the individuals when offending occurred. For example, the obsessive interest may have been a way of managing underlying anxiety or other intolerable emotions. Psychometric evaluation may have provided more insight into less discernable individual

characteristics, rather than a focus on obvious behaviours, which may have facilitated better understanding of pertinent risk factors for offending.

Findings from the case control study conducted by Woodbury-Smith and colleagues (2005) were strengthened by a generally good match between the participants in the groups. However, the three groups used were not matched well on IQ and hence this may have been a confounding variable. The study conducted by Woodbury-Smith and colleagues in 2006 may have been confounded by the low response rate; those individuals who did participate are more likely to have been from specific socioeconomic categories with more familial support in answering questionnaires and attending interview. A record of the demographic characteristics of participants might generate a better understanding of the effect of these upon our current methodological approach to research in offenders with ASD.

As is to be expected from case studies, there exists inherent selection bias and methodological limitations since there is a sample size of one and the participant is almost always an individual selected by the author for reasons of uniqueness and the degree or depth of work conducted with that individual. In particular, the two high quality case studies used in this review were useful contributors of detailed information, providing some confirmation of findings from the larger scale studies. It was evident from these studies that a variety of factors, which may be specific to the individual, interact leading to the commission of an offence.

Findings Relating to Risk factors

Gender and Age of Diagnosis

Mouridsen and colleagues (2008) suggest that gender is not a risk factor in PDD and criminality, which conflicts with other findings (Langstrőm et al., 2009). Both these studies drew their findings from large samples, however, females comprised only 29% of the total (ASD and non-ASD offenders) sample for Langstrom and colleagues and 25% of the autistic offender sample for Mouridsen and colleagues (see table 6). Therefore, a deduction based upon such unbalanced samples is rather tenuous.

Most striking in the study by Mouridsen and colleagues (2008) is the lack of consideration that the effects of admission to a psychiatric hospital may have on a child following diagnosis, which is described as typical procedure in Denmark between 1945 and 1980, following diagnosis. The sequalae on adult life and criminality resulting from disturbed and traumatic childhood, including separation from parents and hospitalization is well known (Bowlby, 1980), yet not recognized as a variable which may have confounded the entire study. Furthermore, this review indicates that childhood adversity is a major risk factor for offending in people with ASD, as demonstrated in Tables 6 and 7 and evidenced by Kawakami and colleagues (2012).

Delays in diagnosis have also been cited as a significant risk factor contributing to offending (Kawakami et al., 2012). Thus, if an individual is experiencing difficulties in family, education, social and work life, to which ASD is often related, then dysfunctional coping strategies may increase the likelihood of anti-social, aggressive or violent and criminal behaviour.

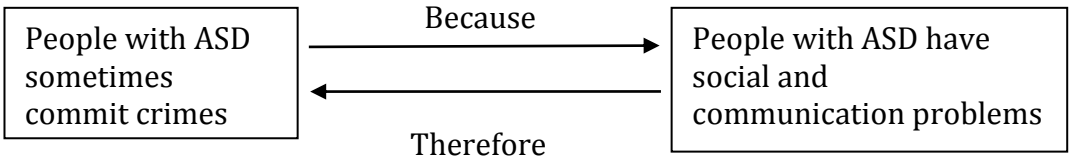
Social Problems

Despite the limitations to the study of Stokes and colleagues (2007) the authors make some relevant interpretations of their results which are of significance in identifying risk factors influencing offending behaviour in people with ASD. They suggest that for individuals with ASD relationships and friendships are an essential element of healthy social development which then facilitates the forming of appropriate intimate relationships. This may also imply that the absence of healthy friendships amongst people with ASD can lead to stalking and sexual offences and should be considered in the management of risk. However, it is essential that contributing or mediating factors are identified in such cases since many people with ASD do not have the benefit of healthy friendships, yet they do not become stalkers or the perpetrators of sexual crimes.

Findings in the study by Allen and colleagues (2008) indicate a series of predisposing and precipitating factors to offending in individuals with ASD (see table 2). These are often described as difficulties that people on the autistic spectrum typically encounter in daily life which do not necessarily lead to offending behaviour, such as social and communication problems. Despite this, tables 8 and 9 show that 13 studies suggest social problems are risk factors for offending (e.g. Allen, Evans, Hider, Hawkins, Peckett & Morgan, 2008; Barry-Walsh & Mullen, 2004; Murphy, 2010; Murrie et al., 2002; Stokes, Newton & Kaur, 2007; Radley and Sharhebano, 2011).

However, the weighted mean quality assessment score for this category is disproportionately low (79.79%, see table 9). It is possible that, professionals working

with people with ASD could be subject to a kind of 'autism bias', or circularity in their explanation of behaviour and fail to identify underlying factors, for example:



Behavioural Issues

Correspondingly, Barry-Walsh and Mullen (2004) through five case studies situate offending within the context of AS and the tendency for obsessive interests. Clearly, the pursuit of an obsessive interest is not in itself a risk factor for offending in people with ASD, or many more people with ASD would commit offences, since obsessive interests are quite typical of this population. Hence, when information is being obtained regarding individuals with ASD by informants it is more valid to triangulate with other information sources, in particular from the individuals with ASD themselves. Nonetheless, it is easy to understand how a violent or deviant obsessive interest could increase ones risk of committing an offence associated with that interest.

Empathic Ability

Allen and colleagues (2008) have utilized their participant accounts to inform predisposing and precipitating factors thereby improving the validity of their findings. Amongst many risk factors identified (see table 2) they report social difficulties, family problems and empathy deficits (lack of concern and lack of awareness of the effects of their actions on others). Again, relationship difficulties and family problems may underlie empathy deficits that are apparent in offenders with ASD, through impaired

mentalisation. If individuals with ASD have a predisposition to impaired mentalisation, then family problems affecting early infant relationships may exaggerate this effect.

Accordingly, a number of other studies have highlighted impairments in the capacity to empathise; a lack of understanding of the emotions of others, difficulties perspective taking and impairments in the recognition of facial expression of fear (Baron-Cohen, 1988; Barry-Walsh & Mullen, 2004; Murphy, 2003, 2010; Murrie et al., 2002; Radley & Sharhebano, 2011; Woodbury-Smith et al., 2005).

In studying qualitative descriptions of offences, Murphy (2003) also notes that a number of factors which tend to be associated with offending in individuals with AS, such as difficulty perspective-taking, may reflect underlying difficulties such as 'mentalisation', or the ability to understand mental states in the minds of others (detailed in chapter 1), in this population which warrants further investigation. Murphy's (2007) research suggests that Psychopathy scores are not useful as indicators of risk in individuals with Asperger's Syndrome. Both of these disorders have some common characteristics but Murphy stresses that they have differing implications for future risk. This is in accordance with Monahan and colleagues' (2001) view that some risk factors will be disproportionately pertinent to some than others. In addition, Blair (2008) has suggested a specific distinction between psychopaths and people with ASD based upon their differing types of empathy deficit and impaired social cognition (2008).

Table 8 shows empathy deficits as a significant risk factor when considered in a broader sense, including perspective taking, Theory of Mind and a lack of concern for others

and not simply the recognition of emotions in others. It is important to highlight that empathy deficits in offenders with ASD does not imply that empathy deficits are likely to lead to criminality in any individual with ASD. Rather, empathy deficits have been found in offenders with ASD, hence, they may contribute to the risk of offending/re-offending in people with ASD.

Cognitive Issues

Despite a number of the studies reporting no association between offending and empathy deficits (Woodbury-Smith et al., 2005) it is possible that again, some of the behaviours reported could be explained in terms of difficulties understanding the emotions and thoughts of others. For example, an act of violence perpetrated towards another person may be the result of impulsivity and anger preceded by a lack of understanding, or misinterpretation, of the other person's thoughts and feelings.

However, it is also conceivable that cognitive distortions used to justify offending behaviour may be mistaken for empathy deficits in offenders (Rich, 2006). This may also be associated with cognitive rigidity and concrete thinking associated with ASD and demonstrated to be a risk factor in this review (see table 8). Ultimately, at what level a behaviour is perceived determines how it is described (psychological, social, behavioural, developmental etc.) and therefore under which class it is categorized by researchers unless psychometric measures are employed to validate inferences.

In addition some studies have shown that only cognitive empathy, otherwise thought of as Theory of Mind or mentalisation, is impaired in people with ASD, yet the affective

response to the emotions of another (affective empathy) is unimpaired or heightened (e.g. Dziobek et al., 2008). The cognitive difficulties shown to be risk factors by this review, such as a lack of understanding of consequences of actions and cognitive rigidity (Barry-Walsh & Mullen, 2004; Murphy, 2003, 2010) seem to be associated with offending when co-occurring with empathy deficits. This does not seem unreasonable since deficient empathy may result in an individual having little idea regarding the effect that their actions may have on the feelings and hence the outcome for others.

Childhood Adversity

The study conducted by Kawakami and colleagues (2012) investigating the relationship between childhood adversities and offending indicated a very strong link between childhood neglect and offending in people with ASD. In a non-ASD population, childhood neglect has been associated with later offending through the links with personality disorder and insecure attachment (Levinson and Fonagy, 2004), therefore this is not a surprising result. However, it is possible that the interaction between empathy deficits and poor attachment is exacerbated in individuals with ASD due to their pre-existing difficulties relating to others.

Case studies seem to be similarly varied in this regard; whilst Radley and Shaherbano (2011) describe a degree of historical childhood adversity in their participant, no such factors are identified by Murphy (2010) and Baron-Cohen (1988) as relevant to offending. Radley and Sharhebano (2011) agree with Kawakami and colleagues (2012) that later diagnosis was associated with offending. This is understandable in the context of familial problems and childhood adversity; support following diagnosis may act as a

protective or preventive factor in leading to behavioural problems and offending. The difficulties presented to a family with an undiagnosed autistic child may also have a disruptive effect on family life and create great challenges to parents who may already be struggling to cope. Hence, the link may be bi-directional.

Psychiatric/Clinical Issues

The findings in the study by Langström and colleagues (2009) are unsurprising; risk factors in offending behaviour are very similar to those identified as risk factors in the general offender population such as being male, substance misuse and personality disorder. This is likely to be due to the methodology employed, which is comparable to that used in studying risk factors in the general offender population. The collation of data from institution records is necessarily biased due to the limits imposed by what kind of information is typically recorded as part of that system. However, Langström and colleagues' (2009) study highlights a possible synergistic or combined effect of ASD with psychosis, substance misuse and other factors involved in the increased risk of offending. The neurobiological differences in people with ASD may predispose them to different outcomes to the non-ASD population where these factors co-occur. Thus, also highlighting that the interaction of risk factors may occur in a non-linear fashion necessitating more complex models of risk.

Murphy's (2003) study was not aimed primarily at the investigation of risk factors for offending in ASD yet, he emphasizes that his results indicate that, compared with patients with a PD or Schizophrenia, those with AS are less likely to commit violent crimes. Murphy (2003) reports that 15% of AS patients have high scores on violence

rating scales for offending history and index offence, compared to 69% of patients with a personality disorder and 62% of patients with schizophrenia.

In a similar vein, Woodbury-Smith and colleagues (2003) suggest that it is not impairment of facial emotional recognition per se that distinguishes offenders with ASDs from non-offenders with ASDs and non-ASD Offenders, but the specific impairment in the recognition of fear in the face of another. However, other groups of offenders show a tendency to misunderstand facial expressions of fear, such as psychopathic individuals (Iria & Barbosa, 2009). However, it is important that individuals with ASD are not assumed to be psychopathic due to their shared impairment in empathy when the underlying causes could be very different and have very different global effects (Blair, 2008). In the later study by Woodbury-Smith and colleagues (2006) it is also suggested that misperceived ill-treatment by others is commonly associated with offending in people with ASDs. However this may be a reflection of a failure in mentalisation or empathy, as reported by Murphy (2003).

Discussion

This systematic literature review has highlighted that there are few conclusive findings regarding risk factors for offending in individuals with ASDs. The results of studies are mixed and they differ in their weaknesses and strengths, although for all the studies examined in this review strengths outweighed weaknesses. The studies with the larger sample sizes tend to employ some participants who have co-morbid mental disorders, which may confound the results. Findings are often determined by the focus of the study and samples employed. Further and more importantly, it is evident that the risk factors in individuals with ASDs are not obvious and are likely to be different from those associated with other groups of offenders, which should be taken into account in professional practice when assessing and managing risk.

The experience of childhood adversity, such as family violence, abuse, neglect and parental loss feature quite highly as risk factors, although these factors are also indicators of risk in non-ASD populations. In addition, the age of diagnosis seems relevant to good outcomes in people with ASD. This seems reasonable in that early diagnosis is likely to be met with early support and the likelihood for better outcomes in adult life. However, with regard to gender as a risk factor to offending in ASD, this does not seem to be the case since the number of female offenders in this review is entirely in accordance with the proportion of male to females with ASD in community samples, hence males do not seem to be over-represented in these studies overall.

In addition, empathy deficits seem to play a role in offending for people with ASD. However, it is unlikely to be a risk factor alone, rather in the presence of other risk

factors, such as early attachment relationships, a dynamic may be established which gives rise to poor emotional regulation and difficulties understanding the effect of ones behaviour on others. Hence, difficulties understanding the consequences of ones actions may also be associated with empathy impairments. The studies that identified empathy as a risk factor could have been improved empirically establishing which types of empathy were impaired and to what extent from the norm. The study by Woodbury-Smith and colleagues (2005) attempted this, finding theory of mind to be unrelated to offending in people with ASD.

Sensory sensitivity, which is often experienced by people with ASD (as outlined in chapter 1), was not identified as a risk factor by any of the studies that reached the threshold of quality for this review. However, substance misuse, as with non-ASD offenders is likely to lead to a heightened risk of offending in people with ASD, as it is in people without ASD. However, it is unknown what the effect of a different sensory and therefore neurological disposition in people with ASD may have upon the consequences for substance abuse. If an illicit substance or alcohol has the ability to reduce inhibitions and increase impulsivity in the typical population then it is likely to show an exaggerated effect in individuals with ASD who have pre-existing difficulties with executive function and behavioral control.

Strengths and Limitations of this Systematic Literature Review

In summary despite these weaknesses, this literature review has employed an alternative approach to previous literature reviews on autism and offending behaviour. It has attempted to address a practical need for information with which clinicians may

understand the risks and management of offending of individuals on the autistic spectrum. Rather than taking the conventional route, of adding to a previously defined body of evidence which is represented by well known names in the field presenting anecdote and clinical opinion, it has quality assessed and examined a set of larger scale studies which have a common thread providing current evidence.

However, this literature review is not exhaustive and there are weaknesses in the methodology employed. Firstly, the search terms used are not guaranteed to identify all the research papers that are relevant. Secondly, human error will have undoubtedly resulted in some items of relevance being rejected or missed. Thirdly, the search engines and databases are not infallible. It is possible that publication bias has influenced this research area, since many of the same names appear in many databases and journals. The number of papers selected was small due to the small body of literature on this area and the specific focus of methodology and participants. A proportion of the literature on offending behaviour of adult individuals with ASDs is anecdotal and based upon case studies and groups of cases. Although interesting, they give no systematic consideration to risk which can be generalized to other individuals with ASDs. Nonetheless, larger scale studies also reflect the complications involved in obtaining larger samples with well-matched participants and few confounding variables.

It is possible that the studies in this review were too general in their research of risk relating to an overly broad definition of offending and offence types. Further, although some authors refer to empathy deficits, this was rarely directly measured in offenders with ASD's in any of the studies despite a variety of empathy measures being readily

available. In addition, by focusing on specific types of offending, the number of possible permutations of interacting factors and variables would be reduced and may therefore reveal patterns which have been previously masked by overly complex data. In addition, qualitative and longitudinal studies may yield interesting results that could be more informative of cause and effect rather than case control studies which are limited to indicating association.

Future research should focus upon the contribution of empathy deficits in offenders in offenders with ASD in understanding the dynamics underlying the motivation for the perpetration of criminal acts. It is evidently insufficient to interview participants or obtain information from clinical histories. The assessment of the capacity to empathise employing a widely used reliable and valid measure would generate more accurate results than the previously employed methods of interview and clinical formulation have. Similarly, the contribution that the ability to form and maintain relationships has in offending may provide useful insights into the importance of healthy attachment relationships and their effect upon social skills and the ability to empathise and manage ones behaviour accordingly. The underlying dynamics regarding empathy deficits in psychopathic offenders and offenders with ASD is an important area to investigate in understanding the distinction between these two groups of people so that risk may be assessed and managed more effectively on that basis.

CHAPTER 3

A Psychometric Critique of the Interpersonal Reactivity Index (IRI: Davis, 1980)

Introduction

This review is an examination of the Interpersonal Reactivity Index (Davis, 1980) used to measure individual empathy. The IRI will be evaluated with reference to its scientific properties as a psychometric tool, it's applicability and relevance to forensic populations and people with ASD and its utility to research. The IRI was developed by Davis (1980) as a multi-dimensional measure of dispositional empathy. Whereas previous measures of empathy were largely emotional or cognitive, Davis intended to produce a multi-dimensional measure that would enable the cognitive and perspective taking aspects of empathy to be assessed separately from emotional or affective responses. He believed that this would enable the different dimensions of empathy to be understood in terms of behavioural motivation at an individual and group level, ultimately providing a valid and reliable measure of empathy.

An Overview of Davis's Organisational Model of Empathy

Empathy is broadly conceived to be the ability to understand and respond accordingly to the experiences observed in another (Davis, 1980). Davis (1983a, 1983b, 1996) has elaborated and developed the theoretical models and measurement of empathy viewing the ability to empathise as a collection of interacting elements (see figure 2) essentially involving cognitive processes leading to an affective outcome, thereby building on the

earlier work of psychologists. The model is said to be 'organizational' because it offers an organizational framework through which the dynamic interactions between antecedents, processes, intrapersonal outcomes, and interpersonal outcomes can be understood sequentially. The organizational model covers both the affective and cognitive, individual differences, origins, and interpersonal aspects of empathy. Although created before Davis' Organizational Model, the IRI concurs well with it.

The IRI

The IRI (Davis, 1980) consists of 28 self-report items divided into 4 subscales that were established by factor analysis, each consisting of seven items measuring empathy under 4 different capacities: perspective taking (PT), fantasy (F), empathic concern (EC) and personal distress (PD). For each subscale scores range from 0 to 28. The response to each item was based upon a 5-point Likert scale (0= does not describe me well, to, 4= describes me very well). The cognitive dimension of empathy is estimated by the summation of scores from the PT and F subscales, whilst the affective dimension is estimated through the summation of the PD and EC subscales A number of the items are reverse scored due to the way they are presented.

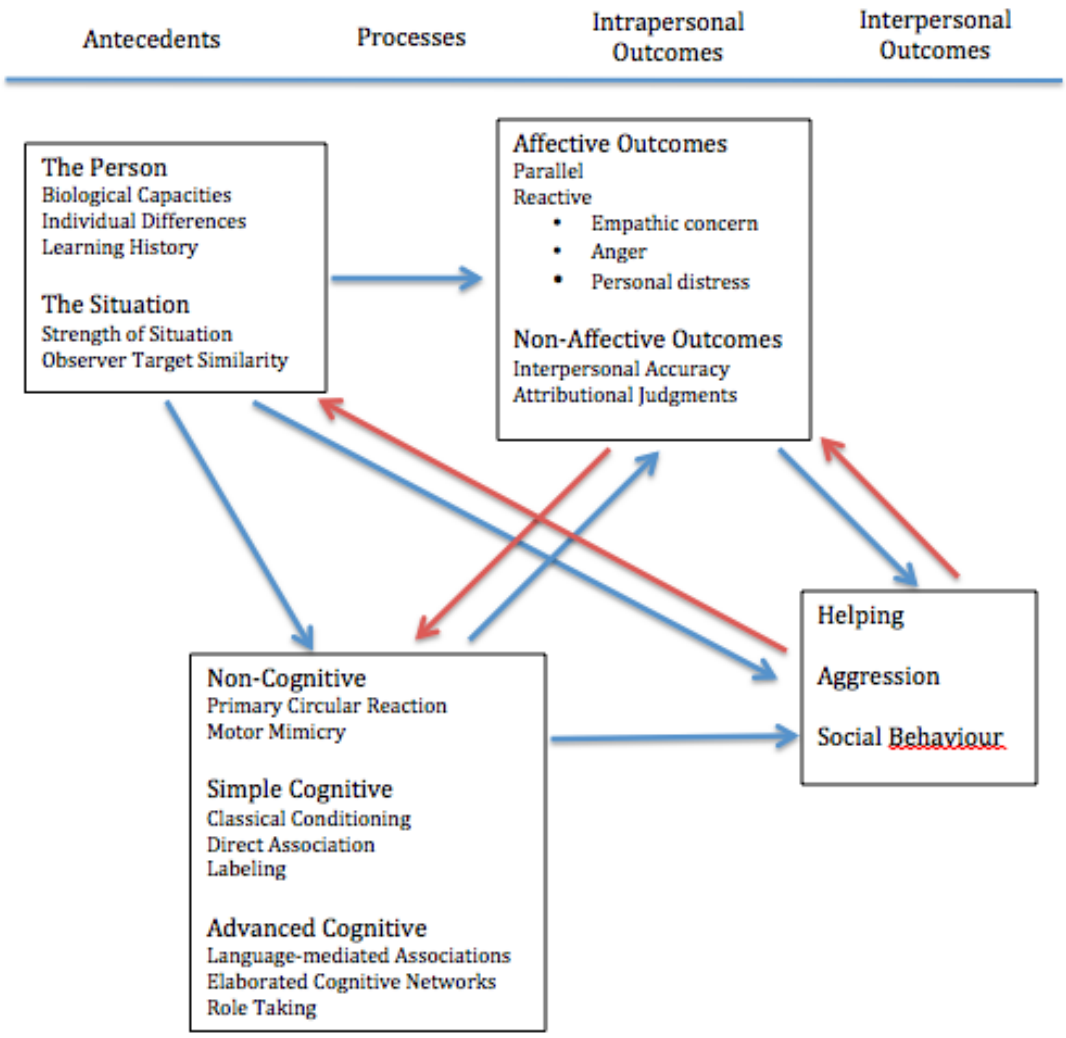


Figure 2: Organisational Model of Empathy (Davis, 1996: p.219)

The perspective taking (PT) subscale measures the tendency to *spontaneously* take the psychological perspective of others in daily life (e.g. "I sometimes find it difficult to see things from the other guy's point of view."). This is similar to "theory of mind" (Baron-Cohen, 2001) largely defined as one's cognitive awareness of the contents of the mind of others. This subscale is thought to provide an estimate of the capacity for social role-taking and therefore, there are no items that probe the internal or external consequences of this capacity. The Fantasy subscale (FS) measures the tendency to get caught up in

fictional stories and imagine oneself in the same situations as fictional characters. Items in this subscale represent the inclination to identify with fictional characters (e.g. "Becoming extremely involved in a good book is somewhat rare for me."). Davis attempted to evaluate this ability by inquiring about an individual's tendency to transpose oneself into the emotions and behaviour of fictitious characters in books, plays and movies.

The Empathic Concern (EC) subscale measures other-oriented feelings of sympathy and compassion for others. Items here relate to feelings of concern towards others suffering or hardship, for example "When I see someone being taken advantage of, I feel kind of protective towards them." The Personal Distress (PD) subscale measures self-oriented feelings of distress when an individual is experiencing difficult or stressful social situations, for example "In emergency situations, I feel apprehensive and ill-at-ease."

Content Reliability and Internal Consistency

This refers to the extent to which the items and factors correlate in defining the framework of the psychological construct that they are attempting to measure. An iterative process of factor analysis and refinement of test items facilitates this. In developing the IRI Davis (1980) created the first version (V1) based upon 50 items, positioned in ordered in a random fashion on the questionnaire, some of which were taken from Mehrabian and Epstein's (1972) Emotional Empathy Scale and Stotland's Fantasy Empathy Scale (Stotland et al., 1978) whilst others were created specifically for the IRI. A sample of 201 males and 251 females participated in the study, giving a substantial total of 452 participants. Joreskog factor analysis with oblique rotation

(delta=0) yielded 4 main factors as previously described (i.e. PT, F, PD and EC). Davis reported that a number of items also clustered into different factors for men and women but chose to focus and refine the factors which were common to both sexes, by adapting and re-testing a second version (V2) of the IRI.

The IRI-V2 was based on the items which clustered to give the 4 factors in V1, items that had been modified from V1 and additional new items that were thought to fit into one of the 4 factors of V1. Factor loadings from V1 were used as a guide to develop the additional factors in terms of the constructs that were being assessed. Again in V2 the items were ordered randomly into a 45-item questionnaire using the same 5-point scale. The participant sample consisted of a different 221 male and 206 female students from introductory psychology classes who were required to participate as part of their course requirements. Items were selected for the final empathy measure based upon loadings that were highest for both sexes. Also, items that loaded heavily on more than 1 subscale were not included in the final instrument. The final measure (see appendix 6) consisted of 28 items and 4 subscales with 7 items in each.

The final version of the IRI was tested on a different student sample of 579 males and 582 females, hence a sufficiently large sample size for factor analysis. Confirmatory factor analysis using oblique rotation (delta=0), assuming factors to be correlated, resulted in strong support for the 4 subscales. The 4-factor measure has good internal reliability (see Table 10 and 11) showing that each item and each subscale formed a coherent construct. Further these were very similar for males and females; hence the measure was shown to be reliable for use with both sexes.

However, Davis reported that only 3 of the items loaded on more than 1 factor, yet, in examining the factor loadings it is clear that on some items there are moderate loadings on additional items for either males or females. In addition, on the EC subscale there are 15 items that load at least moderately (0.22-0.66) for males and females, which brings into question the validity of the EC construct as an element of empathy. Despite this, Davis does not explain how he selected the 7 items for this subscale. Nonetheless, Carey, Fox, & Spraggins (1988) confirmed the dimensions and subscale items of the final version of the IRI by factor analysis. However, Ireland (1999) reports less internal reliability with the IRI in an offender population (PT = .70, F = .64, EC = .43, PD = .52) compared to Davis's original sample. The results may be accounted for by the use of a small sample of 98 young offenders and 211 adult male and female offenders.

Table 10: Inter-correlations of the 4 Subscales of the IRI for Males ($p < 0.01$ for correlations greater than 0.10)

	Perspective Taking	Empathic Concern	Personal Distress
Fantasy	.10	.30	.16
Perspective Taking		0.33	-0.16
Empathic Concern			0.11

Taken from Davis (1980)

Table 11: Inter-correlations of the 4 Subscales of the IRI for Females ($p < 0.01$ for correlations greater than 0.10)

	Perspective Taking	Empathic Concern	Personal Distress
Fantasy	.12	.31	.04
Perspective Taking		0.33	-0.29
Empathic Concern			0.01

Taken from Davis (1980)

The reliability and factor structure of the IRI were investigated by Bevan, O'Brien-Malone and Hall (2004) for use with an offender population and indicated that the IRI is less reliable than previously believed. Principle Component Analysis (PCA) with varimax rotation was used indicating a 3-component structure and not the 4-components originally found by Davis (1980). Component 2 consisted almost entirely of all the negatively-worded items, whilst all the items containing the word 'emergency' loaded onto component 3 because they were answered similarly regardless of the nature of the question. All other items loaded onto component 1 and did not appear to have any common properties. Results were not significantly changed by the method of oblique rotation, originally used by Davis (1980).

The authors suggest that these results are likely to be due to the commonly impaired literacy and linguistic levels of offenders. Negatively worded items take longer to process and are more difficult to understand for an individual with poor literacy. The

interesting phenomenon associated with the word 'emergency' may be due to a form of attention bias in that the word is emotive and has serious connotations, to which offenders may be sensitive. Nonetheless, the authors found that the high scores on the PT and EC subscale were significantly correlated with higher scores on socialization and pro-social attitudes. Conversely, lower PT scores were significantly associated with antisocial attitudes and impulsivity. Higher scores on the EC subscale were significantly correlated with antisocial attitudes. No significant correlations were found for the F and the PD subscales. The authors recommend that the wording in the PT and EC subscales could be simplified to use with offenders and that the PD subscale be omitted due to low reliability. However, the sample of 80 prisoners was relatively small compared to the samples used by Davis (1980, 1983), therefore, any confounding factors or peculiarities in the sample may have attenuated the significance of the results.

Nonetheless, a larger scale study with 839 prisoners (Lauterbach and Hosser, 2007) confirmed the issues with negatively worded items in the original IRI for offender samples. Verbal skills and cognitive ability were demonstrated to affect the scores on the IRI in this sample. Results of the PCA showed that all negatively-worded items loaded onto one component, F and PD loaded onto the same component and EC and PT loaded onto 2 separate components. The authors described the development of a shorter simpler version of the IRI with a 4-point scale to avoid the tendency for participants to respond at the central point. Although negatively-worded items are thought to improve concentration and avoid passivity in responding, they may introduce inaccuracy through the cognitive demand placed upon participants if they cannot meet that demand (Magazine, Williams, & Williams, 1996), therefore these were removed. The F scale

was reduced to 4 items and the EC scale consisted of 5 items, whilst the PT scale had 6 items and the PD scale 4 items.

Consequently, after incorporating these changes internal consistencies improved (see table 12); Lauterbach and Hosser (2007) suggest that the EC and PT scales are accurate assessments of affective and cognitive empathy respectively. Logistic regression indicated that the PT subscale made a significant contribution to the prediction of re-offending 24 months following release. Thus, a higher score on PT predicted a small but statistically significant reduced risk of reoffending 24 months after release from prison. However, the authors note that no difference was found between the PD scale for offenders and non-offenders. Davis (1980) originally proposed that PT and PD scores were negatively correlated; high PT scores were associated with lower PD scores indicating greater empathy. Yet, this seems counter-intuitive, since lower levels of personal distress experienced at another's pain or misfortune might lower the threshold to aggression or violence.

Lauterbach and Hosser (2007) found no significant correlation of PD to delinquency but found positive significant correlations between PT and PD and PT and EC scores. Since personal distress can lead to the inhibition or the generation of an aggressive response the authors make no conclusion regarding the validity of the PD subscale. The shortened version is not recommended for use with the prison population. The use of the original version is advocated, but with a cautionary note concerning its clarity and applicability to the lives and abilities of the prison population. Additionally, the results of an adapted version of the IRI cannot be reliably compared to standardised norms in

attempting to understand the differences in empathic abilities between offender and non-offender populations.

The inter-correlations between the subscales of the IRI (see Table 10 and 11) are similar for both sexes and indicate that each of the 4 subscales are measuring distinctive constructs that are connected through significant, yet low-moderate correlations. The cognitive subscales, PT and F have low, but significant correlations and the affective subscales, EC and PD have low correlations. However, the PT subscale is moderately and positively correlated to EC (r_{female}=0.3; r_{male}=0.33) and moderately yet, negatively correlated to PD. This is interpreted by Davis as an indication that better perspective taking ability allows a cognitive understanding of the separateness of the individual to the person observed in distress, which facilitates feelings of concern, rather than anguish at the exposure to distressing feelings that may be misinterpreted as ones own.

Table 12: Inter - Correlations for Shortened Empathy Subscales

Subscale	F	PT	EC	PD
Fantasy (F)	(0.74)			
Perspective Taking (PT)	0.43***	(0.77)		
Empathic Concern (EC)	0.45***	0.61***	(0.81)	
Personal Distress (PD)	0.52***	0.34***	0.44***	(0.63)

Taken from Lauterbach and Hosser (2007)

Cronbach's alpha in parentheses (reliability).

****p<0.001*

Test-Retest Reliability

This is the degree to which the results of a first test agree with the results of a second test. Generally, an individual's level of empathy would not be expected to change over a period of weeks or months, therefore, a reliable test should produce very similar results within a reasonable period, given other issues such as mental health, remain stable. Davis (1980) reports satisfactory test-retest reliability (Table 13), however, the sample size used in this study was quite small (56 males and 53 males) and the questionnaire was completed only twice by the sample after a period of 60-75 days.

There is considerable variation in temporal stability between subscales (0.61-0.81) suggesting that some items in particular subscales may be more stable than others but the reliability coefficients for items are not available for evaluation. It should also be noted that Kline (1986) recommends the minimum figure for reliability as 0.7 due to the increasing standard error associated with a score. In males, the F and EC subscales reach this cut-off, whilst the F, EC and PD scales reach this cut-off in females.

Table 13: Test – Retest Reliability Coefficients for the subscales of the IRI

	Fantasy	Perspective Taking	Empathic Concern	Personal Distress
Males	0.79	0.61	0.72	0.68
Females	0.81	0.62	0.70	0.76

Taken from Davis (1980)

Face validity

Refers to the clarity or transparency a test has in measuring what it purports to measure. The items and subscales of the IRI, although untested in terms of face validity, clearly refer to the experience of empathy in various forms. Each item refers to a feeling, understanding or behaviour associated with and ability to understand and experience what other people are experiencing, whether real or imagined. However, there has been some criticism of the 'fantasy' subscale and it's relevance to the other 3 subscales in the IRI in measuring the ability to empathise (Nomura & Akai, 2012) indicating that the fantasy subscale may have low incremental validity (Kline, 1986).

However, the 'fantasy' subtest has been shown to be predictive of reoffending, both pre and post-treatment, in sex offenders (Barnett, Wakeling, Mandeville-Norden & Rakestrow, 2012). The authors suggest that the ability to fantasize, as related to empathy, facilitates coping through an escape from reality. Further, the IRI has been criticised in terms of content validity, as have many other self-report tests, for their reliance upon the ability to understand the content of the items and transpose ones views of the construct in question into the specified response scale (Bevan, O'Brien-Malone & Hall, 2004). In addition, the IRI has received criticism for its high level of face validity, which may leave it open to impression management, respondents giving the socially desirable response (Jolliffe and Farrington, 2006). This may be particularly important in research studies where offender populations are being assessed.

Mullins-Nelson, Salekin & Leistico (2006) investigated psychopathy and empathy in a community sample. Using the Psychopathic Personality Inventory-Short Form (PPI-SF;

Lilienfeld, 2004), designed for use with non-forensic samples. In this study the IRI demonstrated good internal reliability (α=0.771) and the authors found no significant correlation between total PPI-SF scores and PT score for men and women combined. However, significant moderate negative correlations were found between total PPI-SF and Factor II PPI-SF (lifestyle and antisocial) scores with EC subscales for male and female participants combined. Despite showing no deficits in PT and EC scores, participants with higher PPI-SF factor 1 scores (greater interpersonal affective deficits) reported to experience less shame than those who scored lower on PPI-SF factor 1. The authors suggest that in the community sample from this study, results from the PT and EC subscales are in line with the successful psychopath concept, whereby individuals may exhibit high psychopathy scores despite showing normal ability in empathy, but an impoverished *response* to empathy thereby experiencing less shame.

Predictive Validity

This refers to the ability of a test to predict specific criteria, ideally in the future. Thus, childhood IQ has been shown to accurately predict later school performance (Kline, 1986). This is difficult to assess for the IRI since longitudinal studies are very difficult to conduct and many other aspects of life have the potential to impact upon empathy levels. However, the IRI has shown good prediction of psychological attributes such as emotionality, self-esteem and social functioning (sensitivity to others), which one would expect to be correlated to empathy (Davis, 1983a). However, this predictive value may be interpreted as a simple association due to a measurement of similar or common constructs. In addition, as previously noted, using logistic regression in a shortened version of the IRI, the PT subscale has shown to contribute to the prediction of violent

reoffending within 2 years following release (Lauterbach and Hosser, 2007). This effect remained even when controlling for socio-economic status, which has been previously identified as a mediating factor in the relationship between empathy deficits and offending (Jolliffe and Farrington, 2004).

In a sample of 748 young adult offenders Bock and Hosser (2014) found lower scores on all IRI sub-scales for violent offenders compared to non-violent offenders. However, although the PT and F sub-scales were predictive of recidivism within 5 years of release from prison, there were no differences in IRI scores in violent and non-violent reoffending. The authors suggest their findings should be treated with caution and recommend further research investigating factors mediating the effects of empathy on reoffending.

Higher PT scores predicted better social functioning and higher self-esteem and showed a weak, negative, relationship with 'fearfulness' in emotionality. In contrast, F scores were found to have no association with social functioning except a positive association with shyness, loneliness and social anxiety in men. Thus, suggesting a tendency for socially anxious males, perhaps such as those with ASD, to fantasize more often or more intensely than average. F subscale scores did not predict self-esteem but were predictive of higher levels of emotionality. High EC scores were predictive of emotionality and unselfish concern for others. PD scores were most predictive of low self-esteem and poor interpersonal functioning, specifically shyness and social anxiety. Davis noted a particular profile of vulnerability, uncertainty and fearfulness in higher than average PD scores (1980b; 1983).

Recent developments in technology have lead to the discovery of 'Mirror neurons', the so-named neurons found in the frontal and parietal lobes that are active when an individual acts out behaviour, but also when an individual observes the same behaviour performed by another person (Rizzolatti & Laila, 2004), often referred to as 'motor empathy'. These neurons have, understandably, been associated with the general concept of empathy (Iacobini, 2009). Further evidence from neuroscience has strengthened the opinion that empathising abilities can be divided into cognitive and affective empathy in accordance with the construct of empathy in the IRI (Banissy, Kanai, Walsh, Rees, 2012).

Concurrent Validity

Concurrent validity refers to the extent to which a measure concurs with results of other measures for the same psychological construct. Davis (1983a) noted different associations between the IRI subscales and other measures of general empathy. The PT subscale was observed to correlate more highly with other measures of cognitive empathy compared to measures of emotional empathy. Correlations for PT with the Hogan Empathy Scale (HES: Hogan, 1969) were: r_{female}=0.37; r_{male}=0.42. The following correlations were obtained for the PD subscale with the HES: r_{female}=-0.4; r_{male}=-0.25. As expected, considering the HES is a cognitive measure, a moderate negative correlation with personal distress was obtained, similar to correlations between the PT and PD subscales of the IRI (Davis, 1980; 1983a; 1983b).

Jolliffe and Farrington (2004) have suggested, for this reason, that the EC subscale should be used as a measure of affective empathy and the PT subscale a measure of cognitive empathy. They purport that the F and PD scales, although involved in the empathic process and outcomes, do not accurately measure affective or cognitive empathy. Conversely, Williams and Paulhus (2004) found that higher levels of psychopathy were negatively correlated with scores on the PD subscale, though this was in a student population, the sample size was large (n=289), therefore providing support for the IRI as a valid measure of affective empathy.

In accordance with this, the EC subscale was seen to correlate more strongly with other measures of emotional empathy than the other subscales in the IRI (Davis, 1983a). The F and EC subscales of the IRI showed the following significant correlations with the Mehrabian and Epstein Empathy Scale (1972), respectively: r_{female}=0.56; r_{male}=0.48; r_{female}=0.56; r_{male}=0.63.. However, the PD subscale showed a correlation of 0.36 for males only with the Mehrabian and Epstein Empathy Scale. Although according to Davis' model one would not expect the F subscale to correlate with measures of purely emotional empathy, he points out that those who score highly on the F subscale tend to be very emotional people. Further, these results support previous results indicating that high scores on PT tend to be associated with lower scores on PD and higher scores on EC (Davis, 1980). In addition scores for females were generally higher than males in all 4 subscales which adds validity to the IRI based upon other research suggesting that females, generally, have a greater capacity for empathy than males (Mehrabian & Epstein, 1972; Hoffmann, 1979b;).

The PT subscale showed the most significant and largest correlation with the Hogan Cognitive Empathy Scale at, r_{female}=0.37; r_{male}=0.42 (Davis, 1983a). The PD subscale was significantly and negatively correlated with the Hogan Cognitive Empathy Scale, r_{female}=-0.40; r_{male}=-0.25, suggesting greater personal distress with lower cognitive empathy, in accordance with IRI inter-correlations.

In addition, the IRI has been used with individuals with Autistic Spectrum Disorder (ASD). A study by Rogers, Dziobek, Hassenstab, Wolf and Convit (2007) showed a positive, significant correlation between the EC and PD subscales (for affective empathy) but not for the cognitive empathy sub scales, i.e. PT and F in individuals with ASD. This study also demonstrated that individuals with ASD scored lower than non-ASD controls on measures of cognitive empathy, but not on EC in accordance with other research (Dziobek et al., 2008; Lockwood, Bird, Bridge & Viding, 2013). However, participants with ASD obtained higher scores on the PD subscale. The ASD group scored significantly lower than controls on the PT and F subscales giving further empirical support to the notion that people with ASD have problems understanding the perspective of both real *and fictional* people.

These findings are concur with results from another self-report method used to assess empathy in ASD, the ‘‘reading the mind in the eyes’’ test (Baron-Cohen & Wheelwright, 2004). However, individual case studies have shown deficits in cognitive *and* affective empathy in people with ASD using the IRI (Shamay-Tsoory, Tomer, Yani, & Aharon-Peretz, 2002). Shamay-Tsoory and colleagues’ results may be a reflection of a high rate of alexithymia, or the ability to identify and communicate one’s

emotions, in their sample, suggesting that results from the IRI may be confounded by alexithymia. Results on the IRI by Hirvela and Helkama (2011: see table 16) showing reduced levels of empathy across all subscales in participants with Asperger's Syndrome, may thus, be accounted for by alexithymia.

Construct Validity

Construct validity is described by Kline (1986) as the extent to which a measure actually measures the construct that it is intended to measure. This is established by testing hypotheses using the tool under evaluation, which have been previously demonstrated using other methods. Davis' (1980, 1983a, 1983b) original creation and validation of the IRI reports acceptable levels of construct validity, i.e. an acceptable ability to comprehensively and accurately measure empathy and no other psychological construct. This is supported by points previously mentioned, such as scores for females being generally higher than for males on all 4 subscales, the predictive capacity of the IRI with associated constructs such as emotionality and social functioning, but very low correlation with IQ (since empathic ability is not expected to be affected by IQ).

However, Kline (1986) points out that the subjective nature of the interpretation of hypotheses used to test construct validity can leave it vulnerable to inaccuracy. Also, the construct of the Fantasy subscale has been brought into question since it has been shown that the other subscales of the IRI may work equally well in measuring fantasy characters as real-life people (Nomura & Akai, 2012) thereby suggesting that the F subscale may be unnecessary.

In addition, Meffert, Gazzola, den Boer, Bartels and Keysers (2013) point out concerns with the concept of empathy and suggest a distinction between deliberate and spontaneous emotion experienced at the observation of emotions in others. Although the PD subscale has been criticised for its lack of relevance to true empathy (Bevan et al., 2004), the concepts of spontaneous and deliberate vicarious emotion add validity to the PD subscale. Since the empathic concern subscale contains items that refer to the deliberate and spontaneous response to the observation of emotion in others, the distinction between empathic concern and personal distress is primarily through the valence of the emotion experienced in the observer. Hence, if empathy involves the experience of an initial spontaneous parallel emotion in the observer then these 2 subscales can be considered to have common affective empathic origins and therefore both can be considered measures of empathy. Hence, the PD subscale may measure more spontaneous empathy whilst the EC subscale measures more deliberate empathy.

Also later analysis of the 4-factor structure with offender populations indicates that the IRI may better fit a 3-factor structure (Bevan, O'Brien-Malone & Hall, 2004). Nonetheless, the use of a Scree Plot, limiting factors to eigenvalues less than 1 may have overly limited the number of possible factors yielded. The authors also suggest that the IRI is not a reliable instrument to use with offenders due to the literacy requirements of self-report questionnaires that are often poor in offenders. However, this study is based upon a much smaller sample size (N=88) than Davis' original study and other studies have shown that IRI scores are independent of IQ scores (Davis, 1980, 1983a), though the samples employed were not from offender populations. Conversely, Lauterbach and Hosser (2004) confirm that the IRI *is* dependent upon IQ in offenders.

Jolliffe and Farrington have attempted to overcome this by creating the Basic Empathy Scale (BES: 2006) based upon a sample of school children, reasoning offenders to be at a similar literacy level. However, this is likely to show poor generalization to an adult sample since empathic abilities are continuing to develop in adolescence (D'Orazio, 2002). This finding was supported by Curwen (2003) with adolescent male sex offenders. Curwen found age and social desirability to be related to IRI scores but not victim empathy. Low scores on Empathic Concern and high scores on Personal Distress were associated with greater justifications and acceptance of sexual and interpersonal violence, as expected. Hence, the IRI is likely to be a better measure of cognitive and affective empathy in adults (offenders and non-offenders) than other measures.

Also, a study with 30 incarcerated sex offenders, Kim, Choi, Rhee, Kim, Joung, & Kim (2012) showed that empathy scores measured with the IRI were unaffected by cognitive behaviour treatment. This is in accordance with other studies previously mentioned (e.g. Jollife and Farrington, 2004), indicting that the IRI may not be an effective measure of empathy. Conversely, Kelly (2014) used the IRI as a measure of perspective taking, with a population of 16 learning disabled offenders. The study showed a significant increase in perspective taking ability after group treatment using an adapted thinking skills program, despite the small sample size (n=16); PT mean=14.69 (SD=4.1) compared to before treatment, PT mean=11.75 (SD=6.56), p=0.039.

It is also important to take into consideration the demographics of Davis' original samples and question whether the nature of empathy in a primarily white, Caucasian, middle class sample of well-educated young people could usefully generalize to other

populations. If the nature of empathy is a universal psychological and behavioural capacity then the answer to this is yes. However, it remains to be seen whether the items used to access that capacity are appropriate to overcome societal barriers such as socioeconomic status, education and age.

Similarly, the question regarding the cultural differences in the experience and expression of empathy are important aspects of assessing the validity of the IRI as a psychometric tool. The IRI has been validated for a number of different cultures ranging from Brazil (Sampio, Guimarães, Camino, Formiga & Menezes, 2011) to China (Huang, Weijian, Binghai, Haide & Davis, 2012) and Korea (Kim, Choi, Rhee, Kim, Joung, & Kim, 2012), which adds support to its ability to access empathy and hence, provides evidence for good construct validity.

Discriminatory Power and Appropriate Norms

Discriminatory power is the ability of a test to achieve a broad range of scores (Kline 1986) and has been demonstrated by the standardized norms (see Table 14 for means and standard deviations) published by Davis (1980, 1983a). The IRI has norms for the original student sample (males and females) when the measure was created (Davis, 1980), in downloadable format from the Internet Discriminatory power is also indicated by the varied results on the IRI for different samples such as people with Schizophrenia (e.g. Montag, Heinz, Kunz & Gallinat, 2007) and abusive parents (e.g. Wiehe, 2002).. The norms for offender samples are less clear. A large-scale study (Beech, Fisher, & Beckett, 1998) evaluating the efficacy of Sex Offender Treatment Programs in the UK has produced results from the IRI on the personal distress subscale which may be useful

comparison figures. Sex offenders showed a significant reduction in personal distress post-treatment (mean=10.1, SD=5.7) compared to pre-treatment (mean=11.8, SD=5.7). However, both were higher than the non-offender comparison group (mean=7.5, SD=3.8), suggesting higher scores on personal distress may be associated with offender populations.

Despite the lack of consensus regarding standardised norms for the IRI with offenders, it has been used widely in studies with offender populations and shown significant differences on some subscales between male offender and non-offender populations (Burke, 2001; Goldstein & Higgins-D'Alessandro, 2001; Lindsey, Carlozzi & Eells, 2001) and significant differences between offender types (e.g. Fisher, Beech, & Browne, 1999). Bevan and colleagues (2004) provide scores for 88 violent male offenders (mean age 34 years) compared with Davis' (1980) scores for male factory workers shown in table 14. However some studies have found no significant differences in empathy subscales between offenders and non-offenders or types of offender using the IRI (Arnold, 1999; Marshall, Jones, Hudson, & McDonald, 1993). Jolliffe and Farrington (2004) suggest that this may be due to population demographics, such as socio-economic status and IQ, which have not been controlled for in some studies.

Table 14: Standardized Norms for the IRI subscales (Davis, 1983a)

	Fantasy Mean	Perspective Taking	Empathic Concern	Personal Distress
Males	15.73 (5.60)	16.78 (4.72)	19.04 (4.21)	9.46 (4.55)

Females	18.75 (5.17)	17.96 (4.85)	21.67 (3.83)	12.28 (5.01)

Table 15: Mean IRI Subscale Scores for Offender and Non-offender Samples (Bevan et al., 2004)

	Fantasy	Perspective Taking	Empathic Concern	Personal Distress
Offenders	9.28 (5.44)	12.99 (5.00)	12.83 (4.71)	10.14 (4.46)
Non-offenders*	11.09 (5.73)	20.19 (4.25)	13.4 (6.30)	18.35 (4.40)

*From Davis (1980) sample of factory workers
Standard deviations in parentheses.

Table 16: Mean IRI Subscale Scores for Asperger's and non-Asperger's Samples (Hirvela & Helkama, 2011)*

	Fantasy	Perspective Taking	Empathic Concern	Personal Distress
Asperger's Syndrome	14.46 (5.49)**	13.56 (5.63)***	15.59 (5.71)***	12.76 (6.42)**
Control Non-Asperger's	16.85 (5.67)	17.02 (4.30)	18.87 (4.13)	10.01 (4.41)

*From 23 female and 18 male participants with Asperger's Syndrome, mean age 34 years.
** $p<0.05$; *** $p<0.005$
Standard deviations in parentheses.

Further, the IRI has been useful in the study of Anorexia Nervosa (AN) and ASD (Courty, Maria, Lalanne, Ringuenet, Vindreau, Chevallier, 2013), demonstrating that females with AN show very similar levels of perspective taking, fantasy and personal distress to those with ASD but different levels of empathic concern. The authors propose that the results support evidence indicating that AN may be a female variant of

ASD. In addition, this study shows empathic concern to be significantly lower and personal distress to be significantly higher in participants with ASD compared to controls.

Moreover, in a study of 20 participants with major depressive disorder (MDD), the IRI demonstrated that people with MDD experience significantly lower levels of empathic concern and perspective taking than age and gender matched controls (Cusi, MacQueen, Spreng & McKinnon, 2011). These findings were in accordance with a further measure of empathy, the Toronto Empathy Questionnaire (TEQ: Spreng, McKinnon, Mar & Levine, 2009) used by the authors in their study.

Socio-cultural and Historical Validity

This refers to the ability of a test to maintain its relevance and meaning over time and through changing societal attitudes, norms and cultural values. The IRI was developed and validated during the 1980's, a time of limited technology in comparison to the present day. The Internet and World Wide Web were ideas in progress that the general populous had never heard of. During this period the social and cultural conception of empathic behaviour was located in a highly westernised view of human behaviour.

The advent of globalisation and the merging of cultural values through the communicative vehicle of the Internet have had an unquestionable effect upon social behaviour and how cultures view, and therefore measure, psychological constructs such as empathy. Therefore researchers using the IRI should be aware of the cultural shifts that have occurred, yet may not be represented in the IRI. For example, the reading of

fictional books is an activity that may have reduced with the improvements in television, availability and cost of DVDs and exposure to transatlantic media. Nonetheless, this could be a favourable development for the use of the IRI, which is based upon American English, and may have been less well understood by UK samples in previous years. However, updated norms would be a helpful development to validate findings from current research with the IRI

Conclusions

The IRI is a widely used, reliable and validated tool for the measurement of empathy in a number of populations including offender populations. The items on the tool are clearly written and in language that is moderately transferrable between age groups and seems to have stood the test of time with regard to its communicative accuracy. Also, it is likely that in the current socio-cultural climate where American television and the Internet has a central place in the average British household, and indeed prisons, the language used which is rather American-English is familiar to most and should not be a barrier to understanding the items on the IRI. However, the increasing exposure of young people to media violence may result in a suppression of empathy, hence younger adults may show scores on empathic concern and personal distress that fall below the mean.

Davis stresses the importance that users of this measure should not simply assume that higher scores indicate higher levels of empathy and that adding all scores from all 4 subscales will give a grossly inaccurate view of an individual's capacity to empathise. However this is not clearly highlighted in his work, as there is no manual for the IRI,

which leaves the use of the IRI open to interpretation and has the potential for errors to be made. However, the IRI is available at no charge from the Eckhard College website with standardized norms and access to Davis' original research papers leaving the instrument open to examination and further testing for evaluation.

The use of the IRI with varied participant groups such as those with ASD, AN and MDD in addition to student populations and offenders makes this a particularly versatile measure of empathy, despite some issues with wording that may reduce its validity with less literate participants. However, this issue can be overcome to an extent by providing extra time to complete the questionnaire and providing support to participants who may struggle to understand negatively worded items. Nonetheless, caution is advised in interpreting results from the IRI when used with an institutionalised offender population.

Unfortunately, because there are few studies in which standardised norms are reported for particular populations e.g. offenders, mentally ill people, learning disabled people, it is impossible to assess how results of the IRI differ from the norm for that population. However, this does not prohibit using the IRI as a means of comparing differing populations in a study and could be done so without concern for scientific reproach. The studies that have been carried out using the IRI as an assessment of empathy have highlighted specific issues with the wording, language and scale used, which may impact on the results when used with an offender population or people with developmental disabilities such as ASD or Asperger's Syndrome. Nonetheless, these issues are not insurmountable and could be addressed by making the items as

meaningful as possible to the population with which it is used. Alternatively, using the IRI with a high functioning community sample consisting of offenders, non-offenders and people with ASD may be a more reliable approach.

Consequently, the user should be aware of the student population on which it was based and consider this when interpreting results, as well as taking steps to avoid the misconstruing of items which might lead to unrepresentative results. Hence, the validity of the IRI may be improved by providing support to those who may need an item explaining by a researcher during administration. In addition, the most reliable and valid approach to assessing cognitive and affective empathy using the IRI is to use only the PT, EC and PD subscales since the validity of the F subscale as a measure of empathy remains questionable and its contribution to the experience of empathy in individuals is vague.

CHAPTER 4

An Investigation into the Mediating and Moderating Effect of Attachment on Empathy and its Association with Autistic and Psychopathic Traits in the prediction of offending

Abstract

The understanding of risk factors in offenders is an essential part of managing that risk effectively. The risk of offending in people with Autistic Spectrum Disorders is difficult to assess and manage because little is known and understood regarding the dynamics of risk in this small population of offenders. The literature indicates that empathy deficits and interpersonal problems are significant as risk factors, which has lead to difficulties discriminating offenders with Autistic Spectrum Disorder from those with psychopathic disorder. However, there is emerging evidence that people with ASD have quite different empathy and social impairments to those with psychopathic disorder. How one relates to others is determined amongst other factors, not only by the ability to empathise but also attachment style. This has consequences for the fair and effective treatment of both groups of offenders. However, the mediating effect of attachment on empathy has never been investigated when associated with psychopathic and autistic traits. This research used a quantitative methodology to establish if: 1) a community sample of 80 male and female participants could be differentiated on the basis of their level of autistic traits predicted by psychopathic typology associated with empathy mediated by attachment style, and 2) Empathy, mediated by attachment style and autistic and psychopathic traits could predict offending in the same community sample.

Introduction

Risk in Offenders with ASD

The commission of offences by individuals with ASD is believed to be rare. Due to difficulties estimating the prevalence of ASD in the general and offender populations, estimating the prevalence of offending is challenging. However, Siponma and colleagues (2001) found only 3% of a sample of 126 young offenders to have Asperger's Syndrome. In a sample of 114 child inpatients with Asperger's Syndrome, Mouridsen and colleagues (2008) report 18.4% to have convictions and note that serious crime people with ASD is extremely in rare. It has been suggested that despite a lower level of offending in people with ASD, they are more likely to admit offending behaviour (Woodbury-Smith et al., 2006). Thus, the estimates of offending in ASD may be biased towards the higher end compared with non-ASD samples due to naivety and ease of disclosure.

The understanding of risk in offenders with ASD is essential if rehabilitative treatment is to target the correct risk factors in order to manage that risk effectively (Andrews & Bonta, 2003). The lack of remorse apparent in some offenders with ASD, perhaps due to difficulties understanding the consequences of their offending on others, has lead to a coupling of psychopathic disorder and ASD by both clinicians and researchers. However, the treatment of offenders with ASD is unlikely to be successful in terms of rehabilitation if a treatment model designed for individuals who have psychopathic disorder is followed since behaviour change in people with ASD requires an adapted approach specific to the individual's strengths and limitations associated with the condition (Estay & Paxton, 2007). There remains uncertainty whether offenders with

psychopathic disorder are resistant to treatment (D'Silva, Duggan & McCarthy, 2004) however, this is not the case for offenders with ASD. In addition, adaptations to treatment programs are necessary and obligatory by law to meet the needs of individuals with ASD (Department of Health, 2009, 2010). Hence, in order to reduce and manage risk in offenders with ASD it is essential that the risk factors for their offending behaviour are correctly identified and targeted.

Research into the risk factors for offending in people with ASD indicates that empathy deficits and social skills deficits are of particular significance. Theories have been put forward that place empathy deficits and emotional dysregulation (Allen et al., 2008; Baron-Cohen, 1988; Barry-Walsh & Mullen, 2004; Hillbrand & Sondik, 2012; Lerner, Haque, Northrup, Lawer, & Bursztajn, 2012; Murphy, 2003, 2010; Murrie et al., 2002; Woodbury-Smith et al., 2005; Radley & Sharhebano, 2011), psychiatric comorbidity (Newman & Ghaziuddin, 2008) and social dysfunction (Haskins & Silva, 2006; Palermo, 2004) as core features leading to offending in people with ASD.

As detailed in chapter 2, research on offending in people with ASD is sparse, samples populations are often small and study types are mostly case series and case study designs. Nonetheless, there are a good quality cross sectional studies (Allen, Evans, Hider, Hawkins, Peckett & Morgan, 2008; Långström, Grann, Ruchkin, Sjostedt & Fazel, 2009). This area would benefit from in-depth qualitative and quantitative longitudinal studies to provide a more detailed and long term understanding of the behavioural trajectory leading to offending. Further, a large proportion of the studies investigating risk factors in offenders with ASD have not employed psychometric tools

in order to validate the assertions made. Rather case reports and carer questionnaires were relied upon for data.

Social skills deficits (Radley & Sheherbano, 2011), a lack of friendships (Stokes, et al., 2007) and family and childhood adversity, such as neglect, abuse and parental loss (Kawakami et al., 2012), have been associated with the risk of offending in people with ASD. Although these have not been investigated together, they may indicate that attachment style is also a pertinent factor in the risk of offending in people with ASD. However, a number of studies indicate that offenders with ASD may have underlying empathy deficits that account for their anti-social or violent behaviour.

Cognitive empathy impairments highlighted in previous studies include difficulty perspective taking (Murphy, 2010: Radley & Sheherbano, 2011) and difficulties understanding the consequences of one's actions on others (Murphy, 2003). Affective empathy impairments are inferred in some studies such as difficulties understanding facial expressions (Woodbury-Smith et al., 2005) and lack of concern (Allen et al., 2008). Also, a number of studies cite generally deficient empathy (e.g. Barrie-Walsh & Mullen, 2004; Murrie et al., 2002) as risk factors that have led to offending. However, Theory of Mind deficits were found not to be associated with offending (Woodbury-Smith et al., 2005).

Psychopathy and ASD: The Paradox

Further, Murrie and colleagues (2002) describe a series of cases of offenders with ASD highlighting that, similar to psychopaths, they display shallow affect and lack of

remorse and guilt, but the absence of other aspects of psychopathy such as the parasitic lifestyle led by many psychopaths. Accordingly, Murphy (2007) also highlights that the PCL-R profiles of offenders with ASD, although showing higher scores on affective items similar to psychopaths, are unlikely to be accurate indicators of risk since the underling motives for behaviour and neurological impairments tend to be different in ASD and psychopathy. Accordingly, as outlined in chapter 1, individuals with ASD who present with psychopathic behaviour may be better conceived of as the more neurotic, secondary psychopath, rather than true, or primary, psychopaths.

Numerous specific, yet easily overlooked, differences between ASD and psychopathic disorder have been highlighted. In particular, individuals with psychopathic disorder are believed to have higher levels of cognitive empathy and lower levels of affective empathy compared to individuals with ASD (Blair, 2006, 2008; Smith, 2009). Cognitive empathy is regarded as the ability to understand what and why an individual may feel a certain way, similar to Theory of Mind (ToM). Affective empathy is the ability to take on the perceived feelings of others whilst appreciating the distinction between self and other (Smith, 2009). People with ASD are believed to have impaired cognitive empathy and intact or heightened affective empathy (Blair, 2006; 2008; Smith, 2009). The reverse is believed to be the case for people with PD. Research suggests that cognitive empathy is unimpaired in people with PD but affective empathy is diminished (Blair, Sellars, Strickland, Clark, Williams, Smith & Jones, 1996; Dolan & Fullam, 2004; Hagenmuller, Rossler, Endrass, Rossegger, Haker, 2012; Richell, Mitchell, Newman, Leonard, Baron-Cohen, & Blair 2003). Nonetheless, this has been challenged by Mathersul and colleagues (2013) who have demonstrated that a subgroup of individuals

with ASD show both impairments in affective empathy in addition to cognitive empathy, which the authors suggest is linked to low autonomic arousal.

Some individuals with ASD can appear unempathic, uncaring and remorseless, in a similar way to people with psychopathic disorder, which has lead to an interest in the links between the two conditions (Blair, 2006; 2008; Bjorkly, 2009). Although the social and imagination deficits in ASD used as diagnostic criteria are strongly associated with empathy impairment, empathy research in people with ASD is inconclusive and does not support the notion of a global empathy deficit (e.g. Gleichgerrcht, Torralva, Rattazzi, Marenco, Roca, & Manes, 2013; Michel et al., 2011). Although both ASD (Blacher, Kraemer, & Schalow, 2003; Baron-Cohen & Wheelwright, 2004; Decety & Meyer, 2008; Gillberg, 1992) and PD (Blair, 2006; Soderstrom, 2003) have been referred to as disorders of empathy and social cognition, the impairments and underlying motives and dynamics are different (Blair, 2008; Jones, Happé, Gilbert, Burnett, & Viding, 2010).

Accordingly, the ability to manipulate others is another important feature of psychopathy (Hare, 2003), which is facilitated by good levels of perspective taking ability. It is possible that high levels of cognitive empathy coupled with low levels of affective empathy will facilitate offending, as might be the case in psychopathy. An ability to plan, manipulate and harm others with very little affective consequence is likely to increase the risk of offending. Consequently, if the ability to manipulate is absent or diminished as in people with ASD, hypothetically the risk of offending should be reduced. Research investigating empathy deficits in people with psychopathic

disorder supports this theory, however the results are less conclusive for people with ASD.

Empathy in Individuals with ASD

Some research indicates that people with ASD have impaired cognitive empathy (i.e. Theory of Mind) and intact affective empathy (e.g. Dziobek et al., 2008; Lockwood et al., 2013; Rogers et al., 2007). Conversely, some investigations show no significant difference in empathy deficits in people with ASD from non-clinical populations when communication and the capacity for self-reflection are taken into account (Bird et al., 2010; Nemiah, Freyberger, & Sifneos, 1976). Mathersul, McDonald & Rushby (2013) found that cognitive and affective empathy were impaired in high functioning people with ASD. However, the inability to integrate emotional and cognitive empathy could account for the empathy deficits in ASD (Shamay-Tsoory, Tomer, Yaniv & Aharon-Peretz, 2002). Further, Rogers and colleagues (2007) proposed that the unemotional and uncaring manner of some individuals with ASD is due to difficulties in understanding the perspective of others. However, they are able to show as much concern as typically developing individuals if information is offered in such a way as to illuminate the points of view of other people. Also, studies have indicated that people with ASD are averse to the distress of others (Blair, 1999; Sigman, Dissanayake, Corona, & Espinosa, 2003), thereby indicating a different perception of distress to that of psychopaths.

In addition, many studies assessing empathy in people with ASD employ the Empathy Quotient (EQ: Baron-Cohen & Wheelwright, 2004), a questionnaire designed specifically to detect pathological levels of empathy deficit. Studies show significantly

lower scores not only in people with ASD (Baron-Cohen & Wheelwright, 2004), but also in people with schizophrenia (Bora, Gökçen & Veznedaroglu, 2008) and in sex offenders (Gery, Miljkovitch, Berthoz, & Soussignan, 2009). Hence, despite the EQ showing moderate to good validity and reliability it is possible that it taps into alexithymia as well as empathy, which might account for mixed results using this measure, since people with ASD show a tendency to have higher levels of alexithymia than controls (Berthoz and Hill 2005; Hill, Berthoz, & Frith, 2004; Lombardo, Barnes, Wheelwright, & Baron-Cohen, 2007; Silani, Bird, Brindley, Singer, Frith, & Frith, 2008). Alexithymia is a subclinical condition characterized by difficulties in identifying and describing feelings and difficulties in distinguishing feelings from the bodily sensations of emotional arousal (Nemiah, Freyberger, & Sifneos, 1976). In addition, the use of alternative empathy measures, including neurophysiological measures, with non-clinical samples of people with ASD have shown no significantly lower levels of empathy than controls (Dziobek et al., 2008; Fan, Chen, Chen, Decety, & Cheng, 2013).

Furthermore, research does not support the notion of a general, cognitive or affective empathy deficit in offenders (Jackson & Bonacker, 2006; Jolliffe & Farrington, 2004). Davis (1996) highlighted the multidimensional nature of empathy in an organizational model that posits empathy to be influenced by situational, biological, social and personal factors. This illustrates the interaction of many factors, such as prior knowledge and learning on outcomes. Davis found that high levels of distress experienced at the observed misfortune of another results in less empathic behaviour (Davis, 1983). Hence individuals who experience more distress at the observed distress of others are more likely to display escape behaviour rather than helping behaviour. It is

therefore possible that high levels of emotional arousal in people with ASD resulting from the observed emotions of others, associated with a poor understanding of the origins and consequences of those emotions may result in 'escape' behaviour involving hostility and aggression.

Empathy and Offending

From a meta-analysis of empathy and offending literature, Jolliffe and Farrington (2004) conclude that cognitive empathy has a stronger negative association to offending than affective empathy. This implies that individuals with less cognitive empathy, such as individuals with ASD, are more likely to commit offences, than psychopaths who have greater cognitive empathy. However, by controlling for Learning Disability and socioeconomic status (SES) amongst samples, empathy differences between offenders and non-offenders were removed. Hence, this effect could be accounted for by low IQ or factors associated with SES. The authors also point out that the varied definitions and differing sensitivity of empathy measures may account, in part, for inconsistent results in many studies.

Further, lower empathy levels may be may be the result of offending rather than the reverse. Indeed, the suppression of distressing empathic processes could be viewed as an adaptive response to aversive, yet unavoidable situations. Hence, the repeated involvement in offending situations may result in the dampening of empathic responses as a coping mechanism. This may account for lower empathy levels in sex offenders directed towards victims yet typical levels of empathy directed at others generally (Wood & Riggs, 2008). The suppression of empathy is also likely to be related to

offence supportive thinking and cognitive distortions in sex offenders & other offenders (Langdon, Murphy, Clare, Steverson, & Palmer, 2011; Marshall, Hamilton and Fernandez, 2001). In addition, Meffert, Gazzola, den Boer, Bartels, & Keysers (2013) have made a distinction between spontaneous and deliberate empathy, showing that people with high levels of psychopathy respond less spontaneously to the emotions of others, but equally deliberately when compared to controls.

The links between Empathy, Attachment and Offending Behaviour

Since empathic ability develops through attachment relationships in early infancy (Fonagy, 2004) it is possible that attachment style and empathic ability interact to increase risk or resilience. As outlined in chapter 1, attachment is the developmental process through which ones' understanding of self and other evolves (Bowlby, 1982).

Bowlby (1973) first described how typically developing children with insecure attachment to their caregivers exhibit delinquent behaviour. Extreme anger felt towards the caregiver is redirected to a 'safer' target, which is less likely to threaten the parent-caregiver relationship. This has since been researched and shown to be associated with neglectful caregiving, separation from caregivers and abuse (Cichetti & Valentino, 2006). Delinquency, or conduct disorder in childhood is a precursor to antisocial personality disorder (ASPD) in adulthood, which has also been strongly associated with insecure attachment in offenders (Van-Ijzendoorn et al., 1997). Further Frodi, Dernevik, Sepa, Philipson and Bragesjo (2001) found a high rate of insecure attachment styles in psychopathic offenders, which was associated with a high rate of childhood neglect and abuse. Hence, there is a strong theoretical link between insecure attachment, impaired empathic functioning and the risk of violence.

Consequently, the attachment system determines how individuals view and function in their relationships and respond to stress (Mikulincer & Shaver, 2007). For insecurely attached individuals, in times of need there is a dependence on the (secondary) attachment strategies of either hyperactivation or deactivation (Shaver & Mikulincer, 2009). Hyperactivation strategies involve intense proximity-seeking expressed as controlling behaviour, overdependence and coerciveness. Conversely, deactivation involves the suppression of the attachment system resulting in compulsive self-reliance and a strong dislike of intimacy.

Attachment in Individuals with ASD

Although Kaner (1943) originally described autistic children as aloof, cold and uninterested in others, attachment research in people with ASD has shown mixed results. Some researchers (Dissanayake & Crossley, 1996; Rogers, Dziobek, Hassenstab, Convit, 1991; Sigman, Mundy, Sherman & Ungerer, 1986; Taylor, Target & Charman, 2008; Walters, Barrett & Feinstein, 1990) report lower levels of secure attachment in adults with ASD. However results may be accounted for by alexithymia rather than low empathy (Bird et al., 2010) or insecure attachment in people with ASD per se. In addition, when controlling for verbal mental age group differences disappear (e.g. Adolphs, Sears & Piven, 2001).

Furthermore, these inconsistencies in the findings from attachment research in ASD have been challenged for higher functioning children who have been shown to have equal levels of secure attachment as those of typically developing children (Grzadzinski, Luyster, Spencer, & Lord, 2012; Rutgers et al., 2004; Sigman & Ungerer, 1984). Taylor

and colleagues (2008) suggest that the characteristics used to categorise parental and child behaviour in the traditionally used attachment paradigm may not be applicable when a child has ASD. In addition they suggest that parental behaviour towards autistic children may require a more explicit approach that could be misinterpreted as insensitive or interfering. Despite secure attachment an awareness of the self as separate from the other may not develop in some children with ASD, therefore the attachment relationship may be more self-serving (Yirmiya & Sigman, 2001). The authors conclude that attachment should be considered a risk factor in influencing outcomes for children with ASD as with typically developing children.

Thus, variations in results in research of empathy in people with ASD may be accounted for by their varied attachment styles (Turner & Hamilton-Giachritsis, 2013). In addition, empathy may be better understood as a state, open to change, rather than a fixed trait (Brown, Harkins & Beech, 2012). The suppression of empathy and variations in empathic accuracy have been associated with attachment anxiety and avoidance (Simpson, Kim, Fillo, Ickes, Rholes, Oriña & Winterheld, 2011). Anxiously attached individuals have a tendency to display coercive, controlling behaviour, which then may be exacerbated by impaired cognitive empathy and intact or heightened affective empathy in people with ASD. When coupled with impulsivity and poor social knowledge in adults with ASD, controlling behaviour would have the potential to become abusive, aggressive and violent.

Attachment and Offending

Using a two dimensional measure of attachment based upon attachment avoidance and

anxiety (the Experience of Close Relationships questionnaire-Revised, ECR-R: Fraley, Waller & Brennan, 2000). Mikulincer and Shaver (2007) demonstrated that insecurely attached individuals who show high levels of attachment anxiety or attachment avoidance show a higher rate of antisocial behaviour than securely attached individuals who tend to have low levels of attachment anxiety and avoidance. However, their behaviour has different motives. Avoidantly attached individuals tend to engage in criminal behaviour to distance themselves from others or to demonstrate disregard for others by breaking rules (Allen et al., 2002). Conversely, anxiously attached people are thought to engage in criminal behaviour as a way of attracting attention and obtaining care, or expressing anger and resentment (Allen, Moore, Kuperminc, & Bell, 1998).

Studies with offender populations have shown a high prevalence of insecure attachment (Fonagy, Leigh, Steele, steele, Kennedy, Mattoon, Target, & Gerber, 1996; Mikulincer & Shaver, 2007; Ross and Pfäfflin, 2004; van-Ijzendoorn, Feldbrugge, Derks, de Ruiter, Verhagen, & Philipse 1997). Insecure attachment has been associated with anger, aggression and violence (Fonagy, 2003; Mikulincer & Shaver, 2007; Novaco's, 1994; Schore, 1996).

In addition, avoidant (insecure) attachment and unresolved trauma has been associated with violent offending (Renn, 2002). High levels of avoidant and dismissing attachment have been found in criminal psychopaths (Frodi, Dernevik, Sepa, Philipson & Bragesjo, 2001). The lower levels of affective empathy in psychopathic disorder may be associated with greater attachment avoidance, due to a lack of emotional connection and reduced interest in others from a relational perspective. Attachment avoidance is

thought to be associated with a deactivation of the attachment system (Belksy, 2002) resulting in emotional detachment. Simpson and colleagues (2011) suggest that highly avoidantly attached individuals' attempts to de-activate the attachment system result in empathy suppression. Hence offenders who have lower levels of autistic traits will score higher on primary psychopathy, are likely to show higher levels of attachment avoidance and perspective taking (i.e. cognitive empathy) and lower levels of affective empathy.

Conversely, hyper-activation of the attachment system in people with high levels of attachment anxiety is likely to result in great efforts to gain or maintain proximity (Simpson et al, 2011). In typical adults this is thought to result in greater attempts to understand and empathize with others involved. However, it is thought that in anxiously attached offenders the perspective of the target is diminished to allow the needs of the individual themselves to take priority and to lessen the separation (Belsky, 2002). If the prevalence of insecure attachment in people with ASD is higher than in the general population (Dissanayake & Crossley, 1996; Rogers, Dziobek, Hassenstab, Convit, 1991; Sigman, Mundy, Sherman & Ungerer, 1986; Walters, Barrett & Feinstein, 1990) then it is likely to be greater in the population of offenders with ASD, especially given the social impairments and interpersonal difficulties identified by research.

In addition, a coupling of high levels of affective empathy with lower levels of cognitive empathy may result in greater levels of confusion and anxiety causing difficulty with interpersonal dynamics, problem solving, behavioural regulation and hence, offending. In accordance with the concept of secondary psychopathy, it is likely

that higher levels of autistic traits will be associated with higher levels of secondary psychopathic traits. Therefore, offenders with higher levels of autistic traits are likely to score higher on secondary psychopathy, which will be associated with a lower level of cognitive empathy, a higher level of affective empathy and a higher level of attachment anxiety.

Psychopathic traits (Hare & Neumann, 2008) and autistic traits (Baron-Cohen et al., 2001) are present in varied levels throughout the general population. Both psychopathy (Hare and Neumann, 2008) and autism (Robinson et al, 2011) are regarded as extreme versions on the continuum diverging from that considered normal or typical. In addition, the more contemporary view of attachment is one of a two dimensional continuum (Fraley et al., 2000). Therefore, studying the way these traits vary with dispositional empathy in the general population, which consists of offenders and non-offenders, provides a basis for the investigation and modeling of the fundamental relationships that may exist between them and subsequently their relationship to the likelihood of offending.

Hence it is hypothesised that:

1. a) Decreasing levels of cognitive empathy and increasing levels of affective empathy will predict increasing levels of autistic traits when the relationship is mediated through increasing anxious and decreasing avoidant attachment.

b) Decreasing levels of primary psychopathy scores and increasing levels of secondary psychopathy will be predictive of increasing levels of autistic traits.

2. Offending will be predicted by lower levels of empathic concern, higher levels of primary and secondary psychopathy, higher levels of attachment anxiety and avoidance and lower levels of autistic traits.

Method

The study was conducted using a purpose built website created in collaboration with Nerds Central LTD. All participating information, consent and questionnaires were contained in the website, URL: www.empathy-research.org.uk. The website utilised a security model based on 3 principles: Secure Socket Layer (SSL) communications; data encryption stored on disk and; anonymity. A pilot study was conducted with 10 participants in order to test the functionality of the website. The website was open for participation for 8 weeks and kept open for an additional 6 weeks in order for participants to withdraw or ask questions. Screenshots from the pages of the website are provided in Appendix 10 to 19.

Ethics

Full ethical approval to carry out this study was obtained from the University of Birmingham. In order to protect anonymity, participants and potential participants had the utility to message the researcher via the website. Answers to questions were posted on the website 'Question and Answer' page. Participants created a unique personal identifier in order to link their consent forms and questionnaires and enable the researcher to identify their data if they wished to withdraw from the study, which was also done through the website messaging system.

The first 70 requesting participants had the opportunity to claim a £5 Amazon gift voucher as gratuity for participation. The email of each participant who applies for a voucher was linked to a key that indicated that they had participated in the research. However this was not associated with the personal identifier used by participants.

Therefore the data could not be associated with email address. Vouchers were sent to emails provided by participants, which were then deleted from the researchers account. Information was provided on the website regarding help lines and suggestions in the event that participation raised concerns or caused any distress.

Participants

A community sample was used for this research. University departments were sent emails to circulate to staff and students to request participation in the study. The research was advertised through social and professional networking sites such as Twitter and Facebook and professional websites. The research was not advertised freely in order to avoid the website being sabotaged by people interested only to obtain multiple vouchers. In response, a number of Twitter accounts held by charities circulated information about the research study to their followers The charities and account holders were: Insider Times, Inside Justice, Research Autism, Autism Research and The National Autistic Society.

Measures

The Adult Autism Quotient (Appendix 8) (AQ; Baron-Cohen, Wheelwright, Skinner, Martin & Clubley, 2001**)**

The Adult Autism-Spectrum Quotient (Baron-Cohen et al., 2001) is a 50-item self-report questionnaire consisting of ten questions in 5 areas that are characteristic of ASD. These areas are social skills, communication, imagination, attention to detail and attention switching. Some research indicates that the internal consistency is improved when the AQ is better conceived as a three-factor structure (Hurst, Mitchell, Kimbrel,

Kwapil, & Nelson-Gray, 2007). The three factors suggested were, social skills, communication and detail/patterns and are in accordance with the DSM-IV-TR (American Psychiatric Association, 2000) diagnostic criteria. The instrument shows good test-retest reliability (Baron-Cohen et al., 2001) and has been validated cross culturally (Voracek & Dressler, 2006; Wakabayashi, Baron-Cohen, Wheelwright & Tojo, 2006) and for clinical samples. Woodbury-Smith, Robinson, Wheelwright and Baron-Cohen (2005) assessed the utility of the AQ as a screening instrument (N=100) with an adult clinical population from the Cambridge Lifespan Asperger's Syndrome clinic. Their results suggest a more accurate cut-off score of 26 would be appropriate for this population rather than that for the general population (cut-off = 32). At this lower cut-off the authors quote 83% of participants as correctly identified, with sensitivity at 94.5%. However, specificity is little better than chance at 51.85%.

Nonetheless, a study evaluating the AQ as a screening tool for ASD in adults showed good concurrence with standardized assessments for autism (Brugha et al, 2011). Alternative assessments are available, but they have neither been tested widely or used with an offender population. For example, Andersen and colleagues (2011) have developed an 80-item self-report questionnaire (RAADS-R) for screening ASD with good results in adult community samples. It shows good concordance with the AQ (correlation in ASD group=0.84 $p<0.001$; in non-ASD group=0.9 $p<0.0001$) and high sensitivity (91%) and specificity (93%), however this has not been tested in a clinical population or a prison population. However, Using a Bayesian approach to the diagnosis of ASD, Turner (2014) has highlighted issues regarding the use and interpretation of the AQ for screening individuals for ASD, due to its bias towards the

stereotypical individual with ASD and poor specificity.

In a large screening of ASD of offenders in 12 Scottish prisons, Robinson and colleagues (2012) suggest that using the AQ with a cut-off score of 32 in a prison population yields poor results and is not recommended. The authors also used an informant screening tool based on the Asperger's Syndrome Diagnostic Interview (ASDI: Gillberg, Rastam and Wentz, 2001) developed by Wing and colleagues (2008). The specificity of the screening tool was moderately good (75.6%) but showed poor sensitivity (28.6%) and remained low despite changes to cut-off score. AUC analysis indicated that this screening tool is little better than chance at correctly identifying individuals with ASD in this population.

Although Fazio, Pietz and Denny (2012) have used the AQ with a large prison sample (N=431) they raised concerns regarding some of the items on the AQ such as questions relating to the ability to relate to children better than adults, which sex offenders often failed to answer. Again, they suggest a cut-off of 26 rather than 32. However, a number of studies using alternative measures with prisoners, such as those to assess theory of mind (e.g. Elsegood & Duff, 2010) do so based upon the instrument's concordance with the AQ (e.g. Elsegood, & Duff, 2010; Owens & Stanfield, et. al., 2012; Robinson et al., 2012).

While questionnaires are open to a degree of impression management and bias, the AQ contains a number of negatively worded items to avoid this. It is preferable to informant questionnaires because the latter are demanding in terms of time. Where others carry out

screening assessments on behalf of the participants they may interpret behaviours within the context of personality disorder or mental health problems rather than within an autistic framework. It is unknown, at what point this would invalidate an instrument. Nonetheless the AQ has received criticism based upon it's rather gender oriented items, that are more applicable to men than women and also upon the rather social and ethnic bias inherent in the questions such as those relating to a preference to museums rather than parties and a preference to factual books rather than fiction.

The Levenson Self-Report Psychopathy Scale (Appendix 9) (LSRP: Levenson, Kiehl, & Fitzpatrick, 1995)

The Levenson Self-Report Psychopathy Scale (Levenson et al., 1995) is composed of 26-items based upon a 4-point Likert agree/disagree scale providing a 2-factor measure of psychopathy. The Factor 1 subscale (primary psychopathy) measures the essential personality traits associated with psychopathy such as Glibness, lack of empathy and lack of guilt or remorse. The Factor 2 subscale (secondary psychopathy) measures characteristics of impulsiveness and irresponsibility that represent the antisocial lifestyle. The LSRP was developed and validated for a non-institutionalised population based upon a sample of 487 male and female undergraduates (Levenson et al., 1995) but was later validated by Lynam et al. (1999) for use with community participants, a proportion of whom are likely to have been offenders. The two factors of the LSRP correlate well with the two factors of the Psychopathy Checklist-Revised (PCL-R; Hare, 1991), the gold standard for assessing psychopathy in forensic samples (Levenson et. al, 1995; Vitale, Smith, Brinkley & Newman, 2002). The LSRP has also been found to

support dimensional models of psychopathy in accordance with the PCL-R and other self-report measures (Walters, Brinkley, Magaletta, & Diamond, 2008).

Despite criticism of self-report measures of psychopathy for their susceptibility to impression management and dishonesty, Lillienfield and Fowler (2007) emphasize that this can be minimalized by the inclusion of items that assess response style. In addition research has shown that psychopaths often report accurately since they perceive antisocial and violent conduct to be more acceptable than non-psychopathic individuals (Lillienfield, 1994; Lilienfield & Andrews, 1996; Ray & Ray, 1982). Further the LSRP avoids wording that could be viewed in a negative way thereby reducing the likelihood of impression management. Also self-report measures are economical to use and do not rely upon the accuracy of the observer. However, psychopaths are well known to lack insight regarding their behaviour and how it is viewed by others (Lillienfield & Fowler, 2006). Nonetheless, where some insight is present reliability is greater for self-report measures since observer inference is not required, thereby increasing validity (Lillienfield and Fowler, 2006).

The LSRP is becoming more widely used with offenders. In a study conducted with female offenders Vitale, Smith, Brinkley & Newman (2002) found the LSRP to be significantly correlated with PCL-R scores. In addition, the LSRP was shown to be significantly correlated with PCL-R scores, violent criminal offending and scores on a passive avoidance task similar to the PCL-R using a sample of 549 offenders (Brinkley, Schmitt, Smith & Newman, 2001). Research has shown that the LSRP is sensitive to empathy deficits (Ali & Chamorrow-Premuzic, 2010) showing that primary

psychopathy is predictive of poor theory of mind, and secondary psychopathy is predicative of poor theory of mind but also emotional distress experienced toward positive emotions in others.

The 2-factor structure of the LSRP has been replicated (Lynham, Whiteside & Jones, 1999) with 1852 non-institutionalised participants. In addition, secondary psychopathic traits, but not primary psychopathic traits have been positively correlated with alexithymia (Lander, Lutz-Zois & Goodnight, 2012). Further in the study by Lander and colleagues, their findings from the LSRP were in agreement with scores on the Psychopathic Personality Inventory-Revised (PPI-R; Lilienfeld, Widows & Staff, 2005), further supporting the LSRP as a measure of primary and secondary psychopathy. Also, using the LSRP, primary psychopathy is associated with a more antagonistic interpersonal style, whereas secondary psychopathy has been found to be related to negative emotionality (Miller, Gaughan & Pryer, 2008).

The Experiences of Close Relationships Questionnaire–Revised (Appendix 7) (Fraley, Waller, & Brennan, 2000)

The ECR-R is a 36-item self-report measure of adult attachment consisting of 18 items measuring attachment avoidance and 18 items measuring attachment anxiety. The ECR-R subscales show good internal consistency and structural validity, as well as convergent and divergent validity. A number of studies indicate that the ECR-R has excellent validity, adequate reliability, and a high level of short-term stability (Ravitz, Maunder, Hunter, Sthankiya, & Lancee, 2010; Sibley, Fischer, & Liu, 2005; Sibley & Liu, 2004). Cronbach's alpha is approximately 0.90 and test-retest reliability between

0.50 and 0.75 (Ravitz et al., 2010). In addition the ECR-R is short, worded simply and scored and analysed easily, although it has been criticized for a degree of awkwardness in the wording of some items (Ravitz et al., 2010). Also self-report attachment questionnaires have received criticism for their reliance on the individual to accurately report how they view themselves and interact in close relationships. Nevertheless, the ECR-R, similar to other self-report attachment questionnaires, requires participants to reflect upon current close relationships and therefore do not tend to provoke distress regarding childhood experiences (Bartholomew & Moretti, 2002).

The ECR-R has been used on community samples to study the effect of attachment, social support and exposure to stress on state anxiety (Ditzen, Schmidt, Strauss, Nater, Ehlert, & Heinrichs, 2008) showing that greater attachment security and social support reduced levels of state anxiety. In addition it has been demonstrated that subjective distress was not associated with ECR-R attachment avoidance but was associated with more attachment anxiety (Maunder, Panzer, Viljoen, Owen, Human & Hunter, 2006). Similarly, following attachment related priming, attachment avoidance and anxiety were found to be related to less empathy and greater attachment anxiety was related to greater personal distress (Mikulincer, Gillath, Halevy, Avihou, Avidan & Eshkoli, 2001), however this study did not use a validated empathy assessment, but a selection of empathy and sympathy related words and a mood scale.

The ECR-R is becoming more widely used with offenders (e.g. Lyn & Burton, 2004; Schneck, Bowers & Turkson, 2012; Wood & Riggs, 2008, 2009). Using the ECR-R and LSRP with offenders, Allen (2013) has shown that higher levels of psychopathy are

associated with high levels of attachment anxiety and avoidance. Lyn and Burton (2004) conducted research using the ECR with 178 prisoners (a participation rate of 19.8%) finding that insecure attachment was significantly associated with offending but more so in sexual offending than non-sexual offending. Hence the assessment was able to discriminate between the two groups quite effectively.

Wood and Riggs (2008) carried out their research with 112 offenders. Their results indicated attachment anxiety was a significant predictor of child molester status. Later Wood and Riggs (2009) carried out their research with a community sample of 96 convicted male child molesters and a control group of 92 non-offending males. Their findings supported their hypothesis that child sex offenders had significantly higher rates of fearful or preoccupied attachment style compared to the control group of non-offending participants. In addition, Using the ECR-R, the attachment status of sex offenders has been found to become significantly more avoidant before the onset of offending (McKillop, Smallbone, Wortley and Andjic, 2012). Therefore, the ECR-R is sensitive to changes in the attachment status of offenders over time.

The Interpersonal Reactivity Index (Appendix 6) (IRI; Davis, 1980)

The IRI is a 28-item scale with four subscales: perspective taking, which measures the cognitive ability to understand another person's point of view; empathic concern, which assesses the affective response to others feelings; personal distress, which evaluates the degree to which the negative emotions of others are shared by the person; and fantasy, which measures the capacity to identify with fictional characters. Items are scored on a Likert-type scale ranging from 1 ('does not describe me well') to 5 ('describes me very

well'). The scales of the IRI have Cronbach's α coefficients ranging from .68 to .79 suggesting moderate to good internal reliability. The scales of the IRI have been shown to distinguish between cognitive and emotional empathy in adults with ASD (Dziobek et al., 2008; Rogers, Dziobek, Hassenstab, Wolf, & Convit, 2007).

The IRI has been used widely in studies with offender populations showing significant differences on some subscales between male offender and non-offender populations as detailed in chapter 3 (e.g. Burke, 2001; Goldstein & Higgins-D'Alessandro, 2001; Lindsey, Carlozzi & Eells, 2001) and significant differences between offender types (e.g. Fisher, Beech, & Browne, 1999). However some studies have found no significant differences in empathy subscales between offenders and non-offenders or types of offender using the IRI (Arnold, 1999; Marshall, Jones, Hudson, & McDonald, 1993). Jolliffe and Farrington (2004) suggest that this may be due to population demographics, such as socio-economic status and IQ, which have not been controlled for in some studies.

The reliability and factor structure of the IRI were investigated by Bevan, O'Brien-Malone and Hall (2004) for use with an offender population and indicated that the IRI showed good fit with a 3-component structure and not the 4-components originally found by Davis (1980). The authors suggest that these results are likely to be due to the commonly impaired literacy and linguistic levels of offenders. Negatively worded items take longer to process and are more difficult to understand for an individual with poor literacy. However, this study is based upon a much smaller sample size (N=88) than Davis' original study and other studies have shown that IRI scores are independent of

IQ scores (Davis, 1980, 1983a)

Nonetheless, the authors (Bevan, O'Brien-Malone and Hall, 2004) found that the high scores on the Perspective Taking (PT) and Empathic Concern (EC) subscales were significantly correlated with higher scores on socialization and pro-social attitudes. Conversely lower PT scores were significantly associated with antisocial attitudes and impulsivity. Lower scores on the EC subscale were also significantly correlated with antisocial attitudes. No significant correlations were found for the Fantasy (F) and the Personal Distress (PD) subscales. However, the sample of 80 prisoners was relatively small compared to the samples used by Davis (1980, 1983) therefore any confounding factors or peculiarities in the sample may have attenuated the significance of the results. As outlined in chapter 3, there has been some criticism of the 'Fantasy' subscale and its relevance to the other 3 subscales in the IRI in measuring the ability to empathise (Nomura & Akai, 2012) indicating that the fantasy subscale may have low incremental validity (Kline, 1986). However, the 'Fantasy' subscale has been shown to be predictive of reoffending through comparison of scores pre- and post-treatment in sex offenders (Barnett, Wakeling, Mandeville-Norden & Rakestrow, 2012). The authors suggest that the ability to fantasize, as a component of empathy, facilitates coping through an escape from reality, thus it is a useful measure especially in individuals with ASD who may have difficulty in this domain.

Table 17: Standardised Norms for Means in Males on All Questionnaires (Key below table 18)

	Domain	Mean	Std. Deviation
[1]Autism Quotient (AQ)		17.8[2]	6.8[2]
Interpersonal Reactivity Index (IRI)	Perspective Taking	16.78	4.72
	Empathic Concern	19.04	4.21
	Personal Distress	9.46	4.55
	Fantasy	15.73	5.60
[3]Experience of Close Relationships – Revised Questionnaire (ECR-R)	Anxiety	3.57	1.10
	Avoidance	2.94	1.13
[4]Levenson Self Report Psychopathy Questionnaire (LSRP)	Secondary Psychopathy	32.96 (32.99[a])	*Not reported* (8.19[a])
	Primary Psychopathy	20.04 (21.68[a)]	*Not reported* (5.05[a])

Table 18: Standardised Norms for Females on All Questionnaires (key below)

	Domain	Mean	Std. Deviation
[1]Autism Quotient (AQ)		15.4[2]	5.7[2]
Interpersonal Reactivity Index (IRI)	Perspective Taking	17.96	4.85
	Empathic Concern	21.67	3.83
	Personal Distress	12.28	5.01
	Fantasy	18.75	5.17
[3]Experience of Close Relationships – Revised Questionnaire (ECR-R)	Anxiety	3.56	1.13
	Avoidance	2.92	1.21
[4]Levenson Self Report Psychopathy Questionnaire (LSRP)	Secondary Psychopathy	27.67	*Not reported (for mixed gender* = 6.86)
	Primary Psychopathy	19.03	*Not reported (for mixed gender* =4.06

Key for tables 17 and 18:

[1]80% of all individuals with ASD score 32 or above (Baron-Cohen, Wheelwright, Skinner, Martin & Clubley, 2001)

[2](Baron-Cohen et al, 2001)

[3]Based on a sample of over 17,000 people (73% female) with an average age of 27 (SD = 10). Twenty-one percent of the sample was married. Information accessed on 6th May 2014 from: http://internal.psychology.illinois.edu/~rcfraley/measures/ecrr.htm

[4]From Levenson et al. (1995) based upon a mixed student sample.

[a]Based upon a sample of 549 incarcerated offenders

Results

Participant Demographics

The sample as a whole consisted of 36 females (45%) and 44 (55%) males. The mean age of female participants was 32.96 years (standard deviation 12.48 years) and for males 32.28 years (standard deviation 10.45 years). 16% of the sample (13 participants) had a diagnosis of ASD. Of the 13 participants with ASD, 3 were female and 10 male. One female had a diagnosis of autism, 3 male participants had a diagnosis of Asperger's syndrome, whilst 2 female and 7 male participants had a diagnosis of ASD.

Only 6 participants (7.5%) scored above or equal to the AQ cut-off of 32 (5 of these had a diagnosis of ASD), whilst 20 participants scored above or equal to the 'clinical' cut-off of 26 (10 of these with a diagnosis of ASD). 16 participants reported having committed an offence. Of these only 2 had a diagnosis of ASD (both male). Two participants who reported having committed offences had a score on the AQ above the clinical cut-off of 26, only one of whom had a diagnosis of an ASD.

The offences reported across the sample are described below in table 20.

Table 20: Frequency of Offences Reported By Gender

Offence *	Drug Related	Motor Offence	Vandalism/ Criminal Damage	Tax Offence	Theft/ Shoplifting	Breaking and Entering/ Burglary
Male	5	3	1	2	3	2
Female	1	0	1	0	5	0

*Some participants reported multiple offences whilst others did not describe their offence. Where a participant reported the same offence more than once, it was counted once for that individual.

Descriptive Statistics

Table 21 gives an overview of descriptive statistics for all variables by gender. All variables showed skew and kurtosis within the bounds for normality, however Avoidant Attachment was shown to be a multi-modal distribution.

Table 21. Descriptive statistics for all measures split by Gender

	GENDER	Mean	Std. Deviation	Significance level (p) for between group effects
PT	Female	25.33	5.514	
	Male	22.36	4.292	
	Total	23.7	5.07	0.008
PD	Female	18.83	4.908	
	Male	17.82	5.05	
	Total	18.27	4.981	0.368
EC	Female	26.58	4.994	
	Male	23.86	4.213	
	Total	25.09	4.75	0.01
FA	Female	24.22	4.969	
	Male	23	6.258	
	Total	23.55	5.712	0.344
ANX	Female	3.8917	1.1594	
	Male	3.9227	1.31483	
	Total	3.9087	1.23966	0.912
AVO	Female	3.5083	1.38613	
	Male	3.8068	0.96723	
	Total	3.6725	1.17592	0.261
AQ	Female	18.83	6.021	
	Male	22.43	7.059	
	Total	20.81	6.814	0.018
PRI	Female	29.06	9.669	
	Male	33.14	9.605	
	Total	31.3	9.788	0.063
SEC	Female	20.33	4.787	
	Male	21.18	4.838	
	Total	20.8	4.803	0.435

Of the 16 (20%) individuals who reported having committed an offence/offences, only 1 had received a conviction. Of the two individuals with ASD who reported having committed an offence, 1 had a diagnosis of ASD and the other Asperger's Syndrome. Only 1 described their offence, of drug possession. No participants in the sample reported violent offences toward the person.

Inferential Statistics

Results from Testing Hypothesis 1:

- *Decreasing levels of cognitive empathy and increasing levels of affective empathy will predict increasing levels of autistic traits when the relationship is mediated through increasing anxious and decreasing avoidant attachment.*
- *Decreasing levels of primary psychopathy scores and increasing levels of secondary psychopathy will be predictive of increasing levels of autistic traits.*

Linear Multiple Regression Analysis

The results from the exploratory hierarchical regression analysis indicate that a number of variables significantly contributed to variance in autistic traits. Personal distress accounted for 11.4 % of the variance in autistic traits. Empathic concern accounted for 5.1% of the variance in autistic traits and anxious and avoidant attachment accounted for 7.2% and 13.3% respectively. Primary psychopathic traits accounted for 3.2% of the variance in the level of autistic traits (see appendix 20 table 24). At step 8, when all variables had been entered into the model, avoidant attachment b=0.442, p<0.001, for personal distress b=0.224, p=0.042. For empathic concern b=-0.014, p=0.773. Perspective taking was not significant where b=-0.125, p=0.287 and neither were fantasy, where b=-0.057, p=0.599 nor anxious attachment, where b=-0.046, p=0.714.

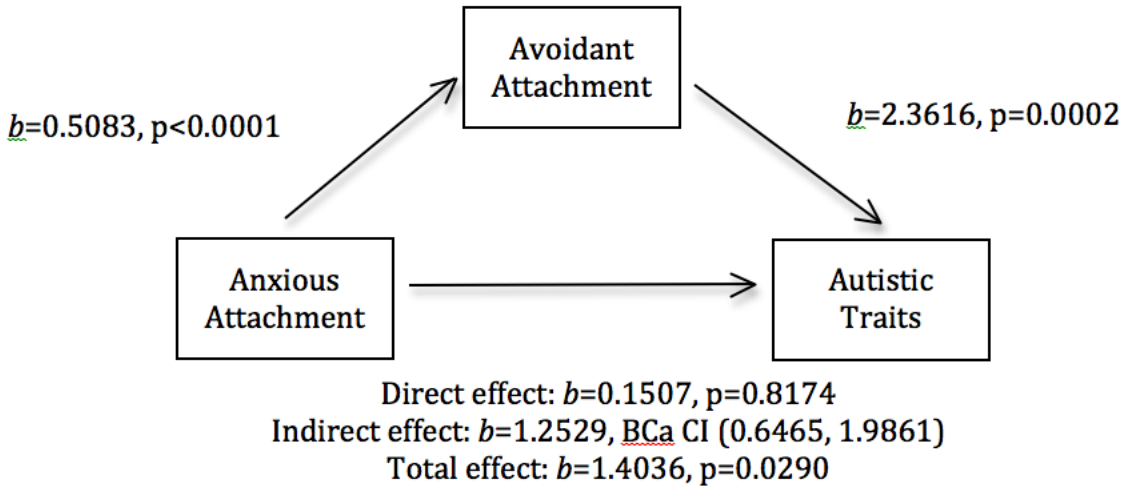
Primary psychopathy was not a significant contributor to the model where, *b*=-0.189, p=0.144 and neither was secondary psychopathy where *b*=0.051, p=0.687. The model is significant at step 7 where, R^2=0.421, $p_{(F\ change)}$=0.049 but at step 8 (final step) on the addition of secondary psychopathy R^2=0.422, $p_{(F\ change)}$=0.687. Hence, although the addition of some variables accounted for a change in variance of the level of autistic traits as the model was constructed, the contribution of some of the variables did not reach a level of significance by the final step (step 8).

Consequently, the model was optimized as described in appendix 11 and the results of this regression are shown in appendix 20, table 25. This model (model 1) indicates that there are 3 significant predictors of autistic traits. Avoidant attachment was a significant predictor at all steps, showing *b*=0.408, p<0.001 accounting for 25.7% of the variance in autistic traits. Personal distress was a significant predictor at all steps where, *b*=0.241, p=0.025 accounting for 8% of the variance in autistic traits. The model falls just below significance at step 3 on the addition of empathic concern where, R^2= 0.369, $p_{(F\ change)}$=0.051 and significant at step 2 where R^2= 0.337, $p_{(F\ change)}$=0.003. However, at step 4 when anxious attachment was added to the model, empathic concern fell above the level of significance, where *b*=-0.189, p=0.047 accounting for 3.3% of the variance in autistic traits, indicating a possible mediating effect. Anxious attachment fell below the level of significance when all other predictors had been entered into the model, where *b*=0.079, p=0.504

Mediation and Moderation analysis of Model 1

Beta values are quoted in unstandardised units for mediation analysis as derived from Hayes (2014) Process (see appendix 20 for further details and rationale for analysis). Results of the mediation and moderation analyses showed a significant indirect effect between autistic traits and anxious attachment through avoidant attachment, *b*= 1.2529, BCaCI (0.6465, 1.9861) as shown in figure 3 below.

Figure 3. Mediated Effect of Anxious Attachment on Autistic Traits Through Avoidant Attachment



Note, the confidence interval range excludes zero, therefore there is a 95% certainty that the value of *b* is not zero, suggesting a significant mediating relationship. Hence, people who scored higher on anxious attachment tend to have higher scores on avoidant attachment and higher levels of autistic traits. The total effect (i.e. the sum of the direct and indirect effects) of anxiety (in attachment) and avoidance (in attachment) on autistic traits indicates that an increase of a score of 1 on anxiety (attachment) increases a score on the AQ by 1.4 units.

Further analysis was carried out to establish if additional mediating or moderating relationships existed between empathy and attachment subtypes i.e. empathic concern predicting autistic traits through anxious attachment. The indirect effect of personal distress on level of autistic traits through avoidant attachment was found to be non significant: b=0.0755, BCaCI (-0.0678, 0.2158), k^2=0.0593, BCaCI (0.0032, 0.1566).

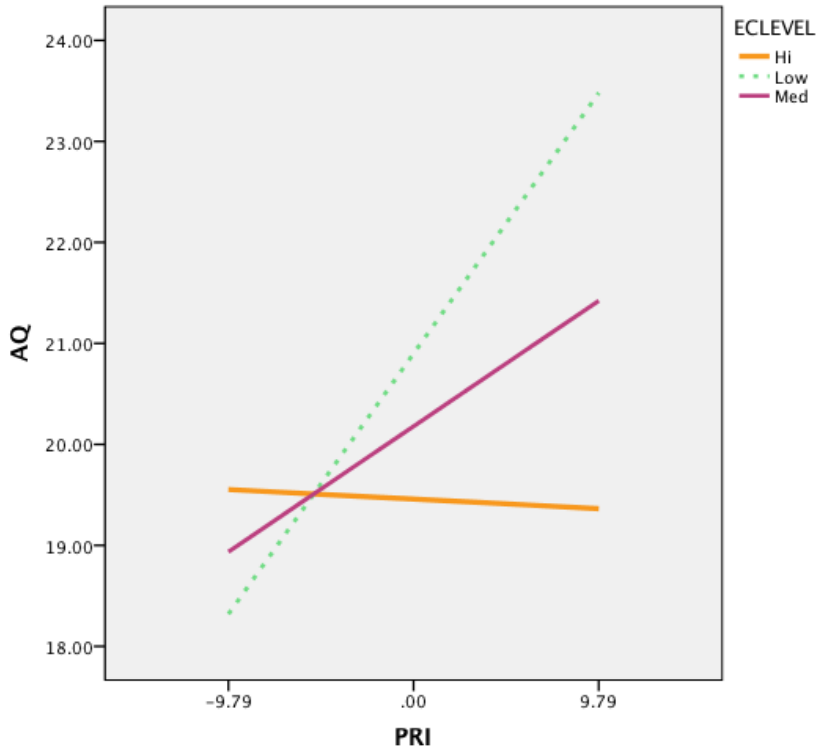
However, a serially mediated relationship between personal distress predicting the level of autistic traits through anxiety (in attachment) and avoidance (in attachment) was found (see appendix 20 for further details of rationale for this analysis). The effect is significant where R^2=0.1155, p=0.002 (see figure 4). The total effect of personal distress on autistic traits shows an effect, b=0.4649, p=0.002, whilst for the direct effect of personal distress on autistic traits, b=0.3550, p=0.0176. The configuration and direction of the pathway is shown below:

Personal distress→ anxious attachment→ avoidant attachment →autistic traits

Where, b= 0.1380, BCaCI (0.0669, 0.2658); R^2=0.2210, p=0.0003. The complete mediated multiple regression model is represented diagrammatically in figure 5 below.

Moderation analysis showed a moderating effect of empathic concern upon primary psychopathy on predicting the level of autistic traits. The interaction was significant at b=-0.0288, p=0.0317, where R^2=0.443, p<0.0001 and $R^2_{(\text{change due to interaction})}$ =0.0368, p=0.0317 indicating that at low levels of empathic concern higher levels of primary psychopathy significantly predicted higher levels of autistic traits (see appendix 20 table 28 and figure 4 below).

Figure 4. Moderating Effect of Empathic Concern on Primary Psychopathy in Predicting Autistic Traits



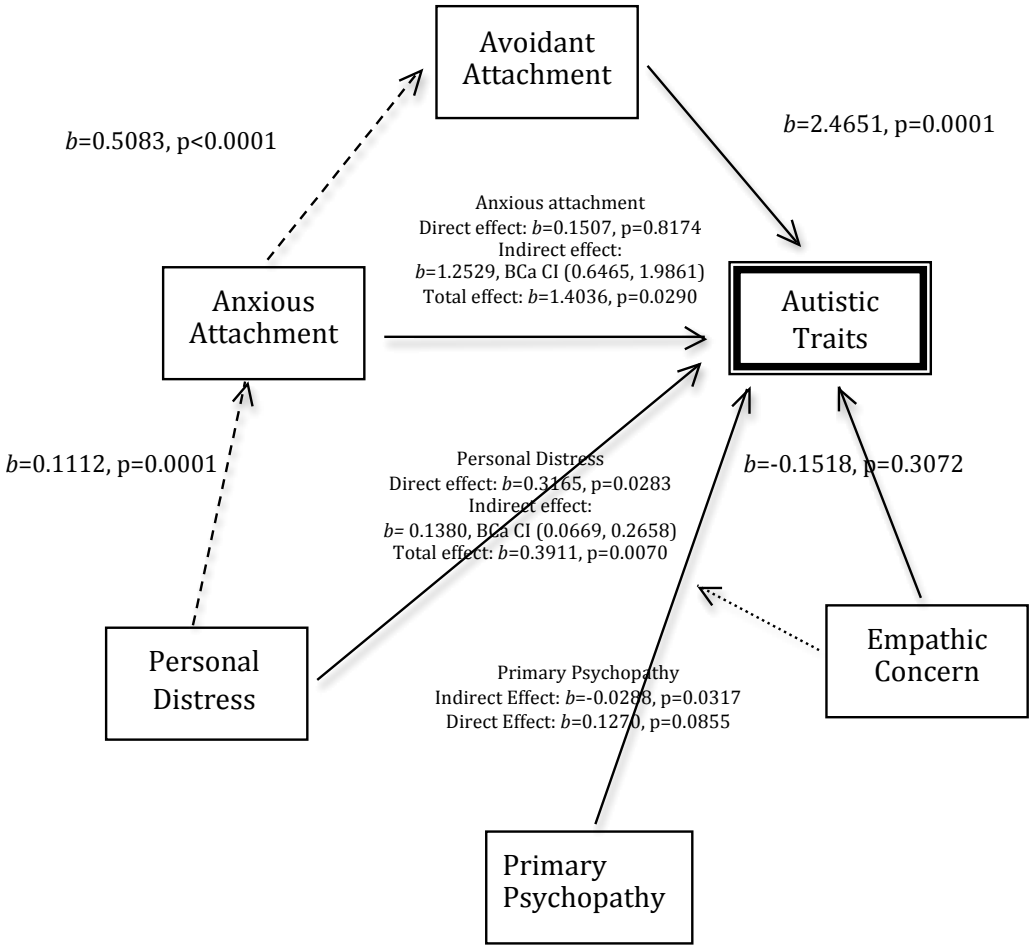
EC = Empathic concern

PRI = Primary Psychopathy

AQ = Autism Quotient

In summary, higher levels of attachment avoidance predict higher levels of autistic traits and also act as a mediator associated with attachment anxiety for the effect of personal distress on autistic traits. Thus higher levels of personal distress predict higher levels autistic traits alone and partially through attachment anxiety and avoidance. In addition higher levels of primary psychopathy predict higher levels of autistic traits at lower levels of empathic concern. These relationships are depicted diagrammatically in figure 5 below showing model 1.

Figure 5. Model 1: Multiple Serial Mediated and Moderated Model for the prediction of Autistic Traits by Empathy, Attachment and Psychopathic Traits



Post Hoc Analysis

Age Effects

Due to the varied and unevenly distributed age groups of participants in this sample (see appendix 21 table 19), age was controlled for in the regression model. The results indicated that age was not a significant predictor of autistic traits, where *b*=-0.082, p=0.403 and the inclusion of age had no significant effect on the other variables in the model (see table 29 and 30)

Gender Effects

The sample in this study was almost evenly split between male and female participants (44 and 36, respectively). A MANOVA was carried out showing that there was no overall significant effect of gender, using Pillai's trace V= 0.191, F(9, 70)=1.841, p=0.076. However, Levene's test indicated that error variance across gender for perspective taking was significant where, F(9, 70)=4.948, p=0.029, indicating that the assumption of homogeneity of variance had not been met when grouped by gender. Perspective taking and empathic concern were significantly higher in females, (F=7.338, p=0.008 and F=6.983, p=0.01 respectively) whereas the level of autistic traits were significantly lower in females where F=5.862, p=0.018 (see appendix 21 table 31).

However, since some research has shown that females have a different presentation of ASD compared to males and males and females differ in their ability to empathise, exploratory analysis was carried out on the data to establish if there were gender differences in the regression model. Gender was found to be a significant predictor of autistic traits in the model (see appendix 21, tables 32 and 33) where *b*=-0.231, p=0.039.

Personal distress was a significant predictor of autistic traits in male participants where *b*=0.492, p<0.0001 and similarly for avoidant attachment where *b*=0.405, p=0.001; R^2=0.462, $p_{(F\ change)}$ =0.001. For female participants only avoidant attachment was a significant predictor of autistic traits where *b*=0.549, p=0.001; R^2=0.301, $p_{(F\ change)}$<0.0001. The sample in this study was insufficiently large on which to conduct a valid serial meditational multiple regression analysis split by gender. The model obtained for the inclusive sample of males and females was considered more reliable for the purposes of addressing the hypothesis under examination since the sample was larger and all variables met assumptions for parametric analysis.

ASD diagnosis

Table 33 below highlights clear differences in people with a diagnosis of ASD in a number of domains. Those with a diagnosis had considerably higher scores on personal distress, attachment anxiety, primary and secondary psychopathy, but lower scores on empathic concern. Scores on perspective taking were almost identical between groups.

Table 33. Descriptive statistics comparing participants with ASD diagnosis and no ASD diagnosis

	DIAG	Mean	Std. Deviation	N	Significance level (p) for between group effects
PT	NO ASD Diagnosis	23.78	5.339	67	
	ASD Diagnosis	23.31	3.497	13	
	Total	23.7	5.07	80	0.763
PD	NO ASD Diagnosis	17.84	5.259	67	
	ASD Diagnosis	20.54	2.145	13	

	Total	18.28	4.981	80	0.073
EC	NO ASD Diagnosis	25.51	4.828	67	
	ASD Diagnosis	22.92	3.774	13	
	Total	25.09	4.75	80	0.072
FA	NO ASD Diagnosis	23.67	6.049	67	
	ASD Diagnosis	22.92	3.616	13	
	Total	23.55	5.712	80	0.668
ANX	NO ASD Diagnosis	3.7672	1.24771	67	
	ASD Diagnosis	4.6385	0.93054	13	
	Total	3.9088	1.23966	80	0.019
AVO	NO ASD Diagnosis	3.6104	1.25832	67	
	ASD Diagnosis	3.9923	0.51228	13	
	Total	3.6725	1.17592	80	0.287
AQ	NO ASD Diagnosis	19.24	5.955	67	
	ASD Diagnosis	28.92	5.057	13	
	Total	20.81	6.814	80	<0.001
PRI	NO ASD Diagnosis	29.34	8.71	67	
	ASD Diagnosis	41.38	9.051	13	
	Total	31.3	9.788	80	<0.001
SEC	NO ASD Diagnosis	20.09	4.808	67	
	ASD Diagnosis	24.46	2.727	13	
	Total	20.8	4.803	80	0.002

A MANOVA was carried out taking into consideration all variables. Results show an overall significant main effect of group (ASD diagnosis/no ASD diagnosis), using Pillai's trace V= 0.442, $F(9, 70)=6.149$, $p<0.0001$. In addition, Levene's test indicated that error variance across ASD diagnosis/no ASD diagnosis for a number of variables was significant; therefore the assumption of homogeneity of variance had not been met for all variables when grouped. For personal distress $F(1, 78)=10.181$, $p=0.002$; For fantasy $F(1, 78)=4.33$, $p=0.041$; Anxious attachment, $F(1, 78)= 4.405$, $p=0.039$; for avoidant attachment $F(1, 78)= 9.418$, $p=0.003$ and for secondary psychopathy $F(1, 78)=$

6.804, p=0.011. Results showed a significant difference between diagnosed and non-diagnosed groups in anxious attachment where F(1,78)=5.698, p=0.019; autism quotient where F(1,78)=30.087, p<0.0001; primary psychopathy where F(1,78)=20.556, p<0.0001 and secondary psychopathy where F(1,78)=10.053, p=0.002.

Results from Testing Hypothesis 2:

Offending will be predicted by lower levels of empathy, higher levels of primary and secondary psychopathy, higher levels of attachment anxiety and avoidance and lower levels of autistic traits.

MANOVA

Taking into consideration scores on all measures, a MANOVA was carried out showing that there was no significant main effect of group (report of committing an offence/no report of committing an offence). For Pillai's trace, V= 0.173, F(9, 70)=1.672, p=0.126. In addition, Levene's test indicated that error variance across offending/not offending for all variables was not significant, indicating that the assumption of homogeneity of variance had been met for all variables when grouped. However, empathic concern and secondary psychopathy were significantly different between those who reported having committed an offence and those who did not (F(1, 79)=5.757, p=0.019 and F(1, 79)=4.918, p=0.029, see also appendix 22 table 35) respectively, suggesting that these variables would show a contribution to the prediction of the report of the commission of an offence.

There is very little variation in scores between the offender and non-offender groups (see appendix 22 table 35). Greater scores for empathic concern, personal distress and fantasy are apparent as are those on anxious attachment and secondary psychopathy. All other scores are slightly lower for the group reporting offending.

Binary Logistic Regression Analysis

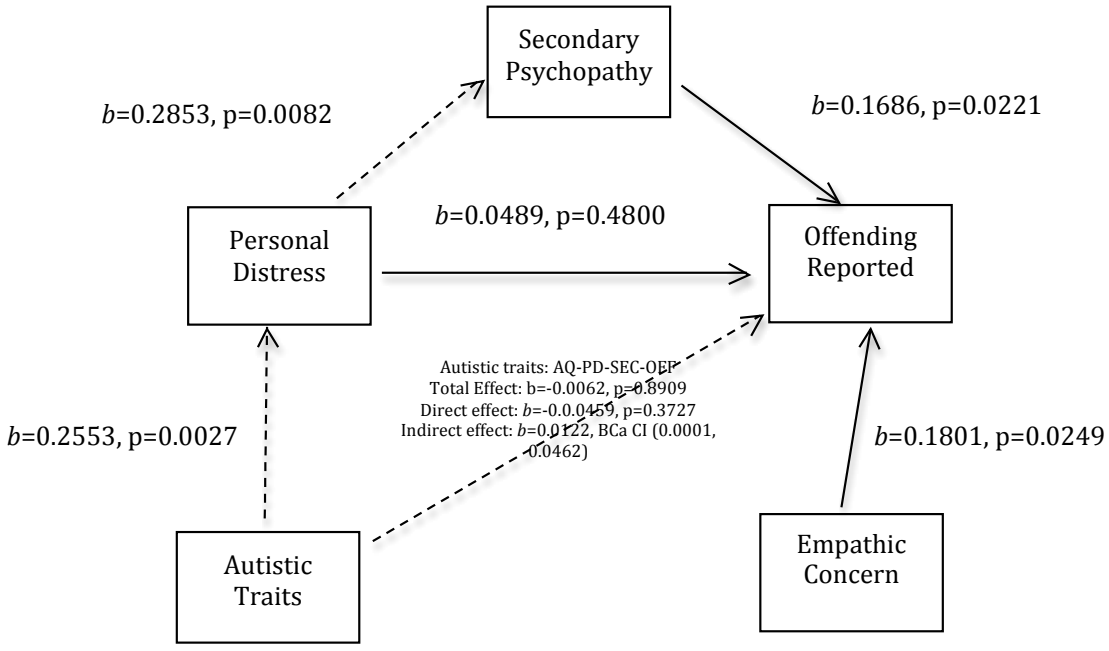
Binary logistic regression was carried out to predict the report of having committed an offence taking all variables into consideration (see appendix 22 for more details of the method used). Empathic concern and secondary psychopathy were found to be significant predictors of the report of committing an offence (see appendix 22 table 38). The binary logistic regression model predicting the report of the commission of an offence by empathic concern and secondary psychopathy was significant where $R^2_{(Nagelkerke)}=0.225$, $\chi^2(2)=12.296$, $p=0.002$. Thus, the odds of offending increase with an increase in empathic concern and secondary psychopathic traits.

Hence, when empathic concern increases by 1 unit, the odds ratio is 1.2 times as large, therefore participants are predicted to be 1.2 times more likely to have reported having committed an offence. When secondary psychopathy increases by 1 unit, the odds ratio is 1.2 times as large; therefore participants are predicted to be 1.2 times more likely to report the commission of an offence.

Mediation and Moderation Analysis of Binary Logistic Regression Predicting the Report of Having Committed an Offence

Mediation analysis showed a significant mediating effect of personal distress and secondary psychopathy on the level of autistic traits in predicting the report of offending where *b*=0.0122, BCaCI (0.0001, 0.0462); -2LL=74.1372, $R^2_{(Nagelkerke)}$=0.1129 (see appendix 22 table 39 and figure 6 below). Hence, a higher level of autistic traits is associated with an increased likelihood of having committed an offence through a higher level of personal distress and a higher level of secondary psychopathic traits. However, a higher level of autistic traits alone is not significantly associated with an increased likelihood in reported the commission of an offence (see appendix 22 table 39).

Figure 6. Model 2: Indirect Effect of Level of Autistic Traits on the Report of Committing Offences through Personal Distress and Secondary Psychopathy.



Thus, figure 6 represents the model predicting the commission of an offence. Higher levels of empathic concern and secondary psychopathy increase the likelihood of

reporting having committed an offence. In addition a higher level of autistic traits through personal distress and secondary psychopathy increases the likelihood of reporting having committed and offence.

Discussion

This research set out to test the following hypotheses:

1. A higher level of autistic traits is predicted by higher levels of personal distress and empathic concern mediated by anxious attachment, higher levels of secondary psychopathy and lower levels of perspective taking, fantasy, avoidant attachment and primary psychopathy.
2. Offending is predicted by higher levels of perspective taking, fantasy, primary and secondary psychopathy and higher levels of anxious and avoidant attachment in addition to lower levels of empathic concern, personal distress and autistic traits.

The results from testing hypothesis one indicated that higher levels of autistic traits were predicted by lower levels of empathic concern, higher levels of avoidant attachment and higher levels of personal distress, where the effect of personal distress was mediated by anxious and avoidant attachment. Primary psychopathy was predictive of the level of autistic traits through an interaction with empathic concern. Greater levels of personal distress and lower levels of empathic concern were associated with higher levels of autistic traits. However, these two variables accounted for only a small proportion of the variance in autistic traits (8.6 and 3.3% respectively). Avoidant attachment accounted for 25.7% of the variance in autistic traits. Avoidant attachment was significantly directly associated with the level of autistic traits and also acted as a partial mediator for the effect of anxious attachment upon the level of autistic traits.

Contrary to hypothesis one, perspective taking and fantasy were not significantly predictive of the level of autistic traits in this sample. Neither was the level of secondary psychopathic traits. Thus, suggesting that in this sample, there was no consistent relationship by which the level of autistic traits could be predicted by perspective taking, fantasy or secondary psychopathic traits. However, this may have been due to the nature of the sample used in this study. It is likely that participants were of higher ability than average since they had to have the knowledge and capacity to use a reasonably complex website involving a large amount of reading and navigation. Communication skills and self-reflective ability, which have been found to account for apparent lack of empathy deficits in people with ASD (Bird et al., 2010; Bird & Cook, 2013; Silani et al., 2008) may account for these results.

In addition, Dyck, Ferguson and Shochet (2001) found no difference in cognitive empathic ability between young people with ASD and controls when IQ had been accounted for. Also, the fantasy subtest has been criticized for its lack of relevance to empathy (Nomura & Akai, 2012). However, the diagnosed participants showed significantly higher scores on the fantasy subscale than undiagnosed ($F(1, 78)=4.33$, $p=0.041$). Conversely, perspective taking was not significantly different between diagnosed and non-diagnosed groups. However, the perspective taking subtest may not accurately measure ones perspective taking ability, but rather *ones view of* or *attempts in* that ability, which may be overestimated in people with higher levels of autistic traits.

Further, it is possible that the IRI was ineffective as a measure of perspective taking in individuals with higher levels of autistic traits due to issues with language. However,

this is unlikely given that the personal distress subtest of the IRI was significantly predictive of autistic traits as hypothesized, indicating that the abilities required to answer accurately were not beyond people with ASD. Alternatively, the Autism Quotient (AQ) may be insensitive to autistic-specific cognitive impairments such as Theory of Mind in the general population (Kunihara, Senju, Dairoku, Wakabayashi & Hasegawa, 2006). And as mentioned previously, it is possible that the items on the perspective taking subtest of the IRI measure attempts at perspective taking rather than one's success at achieving this. For example, one's answer to item 8, "I try to look at everybody's side to a disagreement before I make a decision" could be scored equally high irrespective of whether individuals are able to 'see everybody's side to a disagreement' or not. People with higher levels of autistic traits may put more effort into trying to take the perspective of others and as a result show better perspective taking skills than some with lower levels of autistic traits who believe that little effort is required and possess poorer skills. Hence the PT subscale on the IRI may not be effective at discriminating between an individual who may have high levels of autistic traits and has difficulty with perspective taking from an individual with low levels of autistic traits and no such difficulties, where both have the same intentions

Although not all the individuals with ASD in this study scored above the clinical cut-off of 32, the majority (77%) scored at or above the lower cut-off of 26. Therefore, most of the individuals with a diagnosis of ASD will have contributed to the effects observed at the higher end of the distributions in the statistical models developed in this study. In addition, the mean score for avoidant attachment was 3.7 in this study (see table 21), which is higher than that quoted by Fraley (2014), at 2.92. Also the mean AQ in this

study was 20.81, which is higher than that quoted for the control group (16.4) and student group (17.6) by Baron-Cohen and colleagues (2001), which were likely to have contained some individuals with ASD.

Further, the Diagnosed group of participants showed significantly higher scores on anxious attachment, AQ and primary and secondary psychopathic traits than the undiagnosed group (see table 33). However, the design of a regression model that is able to accurately depict the relationships hypothesized requires a mixed sample that fairly represents each point along the autistic and psychopathic continua. Hence, a proportion of participants at each extreme was necessary. The collection of data over the Internet may target specific personality types, to which the regression model was sensitive, such as those with higher than average levels of avoidant attachment and autistic traits. Thus, it is essential that the extremes are included. However, collection of data over the Internet may have resulted in a greater proportion of the extremes compared to alternative forms of data collection.

The indirect effect of anxious attachment upon autistic traits suggests that greater levels of anxious attachment may lead to greater levels of avoidant attachment and are predictive of greater levels of autistic traits. However, anxious attachment alone was not significantly predictive of autistic traits. Rather, higher levels of autistic traits were predicted by higher levels of personal distress leading to higher levels of anxious attachment, and consequently, higher scores on avoidant attachment. This serially mediated effect was significant ($p<0.0005$) accounting for a moderate 22% of the variance in the level of autistic traits. Since personal distress experienced through the

observation of negative emotions in others is likely to lead to greater anxiety in interpersonal relationships leading to the perception of others as threatening, higher levels of personal distress may result in the avoidance of closeness and reliance on others, i.e. avoidant attachment behaviour. Therefore the result appears consistent with current understanding of ASD.

It cannot be claimed from the results that higher levels of personal distress lead to or cause higher levels of autistic traits since the methodology employed was one of observation involving no manipulation or time relative measurements. Rather, it can be said that the association of greater personal distress with higher levels of autistic traits reflect the complex relationship between personal distress and attachment anxiety and avoidance that may be associated with higher levels of autistic traits and the associated interpersonal difficulties (Taylor, Target & Charman, 2008). However, caution should be used when using the AQ as a measure of autistic traits since this may also inadvertently measure anxious and avoidant attachment. Hence in samples that vary substantially from the mean on other psychological measures, the AQ may produce spurious results.

Equally, anxious attachment is likely to trigger feelings of personal distress when in emotionally charged situations with others. The avoidant behaviours characteristics of avoidant attachment are likely to predispose an individual to poor social skills, which may appear as autistic-like behaviours. Hence it is possible that the AQ and the ECR-R are measuring a common underlying construct associated with attachment behaviour expressed through social skills. Consequently the prediction of higher levels of autistic

traits by personal distress through attachment anxiety and avoidance may be a reflection of anxiety driven, less social behaviour rather than avoidant behaviour, leading to higher scores on the AQ. This is in accordance with Davis' (1983) finding that higher scores on personal distress were predictive of social anxiety, shyness and interpersonal difficulties.

Higher levels of personal distress are known to be associated with lower levels of empathic concern (Brown, Harkins & Beech, 2012; Davis, 1983) and higher levels of personal distress have been found in people with ASD (Rogers et al., 2007). This is likely to be a psychological protective strategy and therefore, it is unsurprising in this model that a higher level of personal distress and lower level of empathic concern predict higher levels of autistic traits because people with higher levels of autistic traits tend to experience higher levels of interpersonal stress (Dubin, 2009; Tantam, 2013). This may eventually result in further reductions in the experience of empathic concern above and beyond that experienced by people with lower levels of autistic traits.

At lower levels of empathic concern higher levels of primary psychopathic traits significantly predicted higher levels of autistic traits (see figure 4) and this relationship accounted for 44.3% of the variance in autistic traits ($p<0.0001$). Primary psychopathy, which is associated with a shallow and manipulative personality type (Karpman, 1948), was significantly predictive of the level of autistic traits through an interaction with empathic concern, which was contrary to the hypothesized model. However, at higher levels of empathic concern, higher levels of primary psychopathic traits were associated with lower levels of autistic traits, although this did not reach a level of significance. It

is possible that at low levels of empathic concern, primary psychopathic traits may be expressed as high levels of autistic traits, as measured by the LSRP and AQ.

It cannot be concluded from these results that high levels of primary psychopathic traits cause high levels of autistic traits when empathic concern is low. Where individuals experience high levels of personal distress and the cost of responding empathically is high (Davis, 1996), which might be the case where autistic traits and attachment anxiety and avoidance are high, then the empathic response may reduce which could be expressed as higher levels of psychopathic traits. Hence, the Levenson Self Report Psychopathy questionnaire (LSRP) may be measuring the behaviours and beliefs associated with some other underlying construct involving high levels of anxious and avoidant attachment i.e. insecure attachment. Higher levels of psychopathy have been frequently linked to insecure attachment (van Idjzendoorn et al., 1997), thus they may be intrinsically related through a bidirectional relationship.

People who score highly on attachment anxiety and attachment avoidance are classified as ‘Fearful-avoidant” and tend to experience hyperactive and deactivated attachment systems (Barthlomew, Henderson & Dutton, 2001). College students who scored higher in attachment anxiety and attachment avoidance, i.e. fearful avoidant attachment, reported more primary psychopathic traits measured by the ECR-R and the LSRP (Mack, Hackney, and Pyle, 2011). Selbom (2010) provides evidence for the primary psychopathy component of the LSRP to consist of egocentric and callous factors consistent with Factor 1 of the PCL-R.

Thus, individuals whose attachment systems are hyperactive and deactivated tend to report more primary psychopathy traits consistent with the interpersonal and affective items in the PCL-R. In addition, Murphy (2007) compared the PCL-R profiles of male inpatients with Asperger's Syndrome with non-Asperger's patients in high security care. The results indicated that the scores on the affective features (callous, shallow affect, lack of remorse/guilt, low empathy and failure to accept responsibility for ones own actions) were higher for the Asperger's patients. Therefore consideration of the underlying reasons for higher scores when measuring psychopathy in people with ASD is advised (Murphy, 2007).

Since the AQ has been criticized for poor specificity (Turner, 2014; Bishop & Seltzer, 2012) and low internal consistency, expressed as values for Cronbach's alpha that fall below levels of adequacy (e.g. Bishop and Seltzer, 2012), it is likely that the AQ also measures personality traits associated with a hyperactive attachment system such as, hyper-arousal and hyper-vigilance in addition to those associated with a deactivated attachment system, such as social avoidance. The AQ also measures only a subset of autistic features and may therefore, identify a rather stereotypical profile of traits, present only in some people with ASD and some without ASD. Hence, it is possible that higher AQ scores in this model may reflect an underlying fearful-avoidant personality type that may be present in individuals with and without ASD. A fearful-avoidant attachment style is characterized by a negative view of the self and other, which underlies a fear of rejection leading to a fear of intimacy and avoidance (Barthlomew, Henderson & Dutton, 2001). This state of existence is reflected in individuals who desire closeness and crave the approval of others yet avoid closeness due to the

anticipation of rejection (Bartholomew, 1990), a state commonly experienced by many individuals with ASD.

However, this may not be the case equally for males and females. Although avoidant attachment and personal distress were positively and significantly predictive of autistic traits in males, only avoidant attachment was positively and significantly predictive of autistic traits in females. Further, females with ASD do not tend to present with the same behavioural and psychological profiles as males with ASD, such as social problems (Attwood, 2007), which can make diagnosis in females more challenging (Lai et al., 2011). Hence, it is possible that higher levels of autistic traits in females were not predicted by higher levels of personal distress because females with higher levels of autistic traits do not generally experience such high levels of personal distress in interpersonal situations. However, it is also possible that this effect is a reflection of the particular sample of males and females in this study. Overall, females showed significantly higher scores on perspective taking and empathic concern, which is in accordance with previous research showing females to have generally higher scores on the IRI than males. (Davis, 1983).

Females in this study had significantly lower scores on autistic traits than males. Although scores on the IRI and AQ were not highly correlated, they showed significant moderate correlations (see table 22) and may therefore mask a mediating or moderating relationship, which would be worth investigating further (Hayes, 2008; 2009). Nonetheless, the AQ has been criticized for its bias towards males due to mixed results with females and males, as females diagnosed with ASD tend to obtain lower scores on

the AQ than males (e.g. Baron-Cohen et al., 2001; Hurst, Mitchell, Kimbrel, Kwapil & Nelson-Gray, 2007). Therefore, the AQ may be less sensitive to autistic traits and associated psychological and behavioural constructs in females. Thus, if the AQ is a less effective measure of the level of autistic traits in females, for a mixed gender sample, the results are likely to be skewed towards male traits and not represent the female portion effectively producing biased results. Moreover, this indicates that the study of autistic traits in females and males may benefit from being conducted separately when using current measures of autistic traits.

The results from testing hypothesis two indicate that, in the proposed model, offending can be predicted only by secondary psychopathy, empathic concern and indirectly by autistic traits through personal distress and secondary psychopathy. However, autistic traits and personal distress were not significantly directly predictive of offending. Perspective taking, fantasy, anxious and avoidant attachment and primary psychopathy were not significantly predictive of the report of having committed an offence. The regression relationship between empathic concern and offending is quite weak but positive as indicated by B=0.1801, p=0.0249 in the mediated model. An increase in a score of 1 in empathic concern increases the likelihood of having *reported* committing an offence by 1.2. This shows an opposing effect to the one hypothesised, which proposed less empathic concern to be associated with having committed an offence. This is in accordance with some findings reported by Bevan and colleagues (2004). Rather than exploring alternative explanations for their findings the authors criticizing the IRI for its poor validity with institutionalised offenders.

However, there are alternative reasons why higher levels of empathic concern may be predictive of the report of having committed and offence. There is a distinct difference between having committed an offence and disclosing the commission of an offence. A prediction of disclosure of committing an offence does not predict ones propensity to commit a crime per se. Rather, this relies upon the honesty of participants and their willingness to disclose their offending history, irrespective of the nature and severity of the offence. It is possible that a positive relationship between offending and empathic concern was found because those disclosing the commission of an offence felt more empathic concern towards the research and their commitment towards participation and were therefore more willing to disclose. It is also possible that those participants who committed a crime and felt more empathic concern, also felt more guilt associated with their criminal activity and therefore were more inclined to disclose.

Also, higher levels of empathic concern may be associated with a greater likelihood of reporting the commission of an offence since it is possible that people who experience higher levels of empathic concern feel more concern regarding the impact of their honesty upon others. Hence, the relationship between empathic concern and the likelihood of reporting the commission of an offence may be conditional upon a participant's view of the importance of the research process and their participation, perhaps reflecting the nature of the sample in this study. Essentially, this study may have attracted participants who have a higher level of empathic concern, overall.

Conversely, the £5 voucher offered for participation may have attracted a more acquisitive type of person. Hence, it is possible that the 'successful psychopath' in the

community, capable of empathy but lacking in guilt and shame (Mullins-Nelson, Salekin & Leistico, 2006) found the idea of participating rather attractive, leading to the proposed model.

The type of offences reported by participants in this study was relatively minor and the majority involved theft (shoplifting) or the possession of drugs. Lauterbach and Hosser (2014) found significant differences between violent and non-violent offenders on all subscales of the IRI. More violent offenders showed significantly lower scores on empathic concern, perspective taking and fantasy but not personal distress. Hence, the positive relationship between the report of ones offending and greater empathic concern in this study may be in part due to the non-violent nature of the offenders in this sample. This is in accordance with findings by Bevan and colleagues (2004). In addition, if empathy is subdued in violent offenders due to their offending (Marshall et al., 2011; Steverson & Palmer, 2011), then this is not likely to occur where crimes are minor and infrequent, such as in the sample in this study. These effects could also account for the lack of significance in attachment anxiety and avoidance in the prediction of offending since insecure attachment is highest in violent offenders (Van Ijzendoorn et al., 1997). The offence types in this study (tax evasion, drug possession, shoplifting, breaking and entering etc.) involve a less obvious victim, and therefore may not necessitate lower levels of empathic concern.

The prediction of the reporting of the commission of an offence was also predicted by secondary psychopathy. Using the LSRP with offenders, Lynam, Whiteside and Jones (1999) found those who reported drug related problems over the previous year showed

higher secondary psychopathic traits relative to primary psychopathic traits. In this present study 38% of the participants who reported the commission of an offence committed drug related crimes therefore the prediction of offending through greater empathic concern and secondary psychopathy is in accordance with the results of previous research. Further, this suggests a more neurotic personality type (Lynam et al., 1999; Miller, Gaughan & Pryor, 2008) that is characteristic of secondary psychopathy due to higher levels of traits anxiety (Karpman, 1948). This may also account for the prediction of the commission of an offence by higher levels of empathic concern.

Although the level of autistic traits does not significantly directly predict the report of offending, a serially mediated relationship was found between autistic traits through personal distress leading to secondary psychopathy which predicted report of offending (see figure 6). The total and direct effects of autistic traits on the prediction of the report of offending, though not significant, were negative, suggesting that lower levels of autistic traits may be more likely to predict report of offending. However, higher levels of autistic traits leading to higher levels of personal distress followed by higher levels of secondary psychopathy was shown to significantly predict offending. This is in accordance with research showing that people with ASD have difficulty tolerating the distress of others (Blair, 2008; Sigman et al., 2003). However the 'escape' behaviour of those with higher levels of autistic traits who experience high levels of personal distress in this study, may involve the use of illegal substances in order to reduce that distress and therefore may account for this finding.

The association of higher levels of autistic traits and personal distress with secondary psychopathy in the prediction of offending may be in part due to the nature of a number of the items on the secondary psychopathy subtest of the LSRP. People with higher levels of autistic traits are more likely to score more highly on items such as, "most of my problems are due to the fact that other people just don't understand me", "love is over-rated" and "I find myself in the same kinds of trouble, time after time". This may be a result of the difficulties others have comprehending those with ASD or higher levels of autistic traits and the difficulties people with ASD in turn have forming relationships. In addition, problems in self-awareness make behaviour changes harder for individuals with ASD (Dubin, 2009). Also, learning has been shown to be slower in people with higher levels of autistic traits since their ability to take account of prior information and take this into account in future decision-making is challenged (Pellicano & Burr, 2012).

Thus, these factors suggest that where individuals have higher levels of autistic traits and experience higher levels of personal distress they are more likely to show higher levels of secondary psychopathic traits which could put them at higher risk of minor offences. Similarly, socials skills deficits are cited as risk factors for offending in people with ASD (e.g. Allen et al., 2008; Murphy, 2010; Radley and Shaherbano, 2011), which is in accordance with the mediated relationship found in this study between the level of autistic traits, personal distress and secondary psychopathic traits in the prediction of offending. A high level of autistic traits does not predict offending per se, and neither does a high level of personal distress; rather, a high level of secondary psychopathy may act as a mediator for these characteristics which increases the risk of offending.

Nevertheless, it should be noted that a higher score on a psychopathy questionnaire is not evidence of psychopathy in people with ASD (Murphy, 2007) and raises questions regarding the suitability of such questionnaires for people with higher levels of autistic traits, since higher scores may reflect behavioural difficulties and different communication styles associated with autistic tendencies and not psychopathy.

The rate of offending in the sample was low (20%) and therefore it is unlikely to be sufficiently high to completely capture the complex relationship proposed in the regression model. It is possible that in a larger sample with a higher rate of offending, the model would have sufficient power to detect significant effects between other variables, if indeed they exist. Further it is impossible to control for the influence of external variables upon the tendency to commit offences, and as this study was observational and cross-sectional in design, a causal relationship cannot be assumed, rather the likelihood of reporting the commission of an offence is an association and at best weakly predicted in this sample, by empathic concern, secondary psychopathic traits and the level of autistic traits indirectly through personal distress and secondary psychopathic traits.

It is important to note also, that the mean squared error (MSE) is high for the constants (intercepts) on both model 1 and 2 indicating that omitted variable bias and/or additional non-linear effects may be present. This suggests that additional unknown variables may have improved the fit of the data to the model. Alternatively, more sensitive measures of the variables may have been required and a more complex meditational moderated model developed through more extensive in-depth analysis.

Conclusions

Higher levels of autistic traits from the community sample in this study were significantly associated with higher levels of personal distress and fearful-avoidant attachment. Since high levels of insecure attachment do not cause autism, it is more likely that the AQ and ECR-R measure a common underlying construct. However, it is also possible that autism may cause fearful-avoidant attachment associated with high levels of personal distress, due to the nature of the condition. Therefore, it is unlikely that the AQ is a reliable measure of autistic traits alone in people with ASD who experience high levels of personal distress, but may also tap into insecure attachment. Therefore given the nature of individuals in secure settings it may be inadvisable to use the AQ as a measure of autistic traits or screening tool for institutionalized populations.

Furthermore, it is possible that higher levels of anxious and avoidant attachment are more likely in individuals with higher levels of autistic traits due to high levels of personal distress. The model may be a relatively accurate multi-dimensional illustration of the way that autistic traits increase with personal distress (partially) through anxious and avoidant attachment and, when empathic concern is low, increase with primary psychopathic traits. Contrary to hypothesis one, no inverse relationships were found between autistic traits and psychopathic traits through empathy or attachment. Rather, in this study primary psychopathy and secondary psychopathy were found to be positively associated with autistic traits to a level of significance. Most previous studies highlighting empathy deficits as risk factors for offending in people with ASD and studies investigating the links between psychopathy and ASD have employed groups of people at the high end of the psychopathic and autistic spectra and therefore findings are

likely to be biased towards the extreme end. The community sample in this study represented a continuum of traits and did not employ an exclusive atypical subsample of offenders or autistic and psychopathic participants without a typical comparison group. Hence, the results of this study are likely to be more representative of the breadth of the relationship showing how empathy and attachment vary with autistic and psychopathic traits.

This research adds to the evidence showing that autistic traits in females are associated with some different and some similar characteristics as males. The absence of a significant association between personal distress and the level of autistic traits in females may be a further demonstration of the AQ as an inappropriate measure of autistic traits in females. Conversely, it may suggest that the personal distress scale of the IRI is a useful measure that is able to distinguish empathy related phenotypic characteristics associated with autistic traits. Females with ASD may experience less personal distress when exposed to emotions in others, which may facilitate better social skills and, therefore, fewer deficits that are characteristic of ASD in males.

The empathic concern subtest of the IRI was also predictive of autistic traits through an interaction with primary psychopathic traits. Higher levels of primary psychopathy were associated with higher levels of autistic traits at low levels of empathic concern. This finding would be worth investigating further within forensic populations since the presence of low levels of empathic concern and high levels of autistic traits may be associated with higher levels of primary psychopathic traits in forensic populations. This has relevance in risk assessment, since high levels of psychopathy have been

associated with an increased risk of offending (Harris et al., 2003). Hence, offenders with ASD who show low levels of empathy associated with empathic concern may be worthy of psychopathy assessment.

The prediction of offending through higher levels of empathic concern may have been related to the severity of the offences committed by individuals in this sample, which were minor. This may also be accounted for by the type of person to whom the research appealed and their commitment to the research. Hence a more empathic person having committed minor offences may have been more inclined to participate than a less empathic person who had committed more serious violent offences.

The likelihood of having committed an offence was shown to be significantly predicted by secondary psychopathic traits. Offending was also predicted by a higher level of autistic traits indirectly, through higher levels of personal distress and secondary psychopathic traits. It is possible that the co-occurrence of particular psychological and behavioural factors such as personal distress and psychopathic traits may increase the risk of offending in some individuals with higher levels of autistic traits. Hence, integrating models 1 and 2 highlights a mutual relationship; high levels of personal distress are associated with high levels of autistic traits and an increased likelihood of offending. Higher levels of personal distress associated with insecure attachment are associated with high levels of autistic traits (Model 1; see figure 5). In addition, Model 1 shows that higher levels of autistic traits are associated with higher levels of primary psychopathic traits and low levels of empathic concern. However, Model 2 (see figure 6) shows that the presence of high levels of autistic traits is associated with an increased

likelihood of offending through high levels of personal distress and secondary psychopathic traits. Hence, attachment insecurity, psychopathy and anxiety associated with empathy (personal distress and empathic concern) may be worth investigating further in offenders with ASD as potential risk factors. However, these characteristics may not be reflective of individuals who have committed more serious, violent offences.

Limitations

Methodological Limitations

This study employed an Internet website for the collection of data. Although this was intended to appeal to a wide variety of individuals of all age groups, this is likely to have had some limitations. The research website was advertised through the University of Birmingham email system, targeting a number of science, maths, arts and computer departments, with the aim of obtaining a reasonable proportion of individuals with higher levels of autistic traits. The website was advertised through social media websites (Twitter, Linkedin and Facebook) also, hence only individuals who had access to these websites and/or were able to use a computer were able to participate in this research. Consequently, the data collected was vulnerable to biases associated with participants of higher IQ and higher socio-economic status (SES). Individuals with a higher IQ and higher SES constitute a specific participant group who are less likely to be insecurely attached, have poor empathic ability and less likely to have committed violent offences. However, ASD can theoretically affect any individual regardless of IQ or SES.

Questionnaires rely on good self-knowledge and lack external validity by virtue of their separation from the dynamic nature of emergent properties of self and other and self with environment. The experience of empathy, attachment, psychopathy and autism intrinsically involve others and the environment. Moreover, any research based on questionnaires and survey data is vulnerable to manipulation and dishonesty. It was anticipated that the Internet would provide a medium through which participants felt they could be more honest, since the data was anonymous and no researcher contact was necessary, except by email to obtain a 'thank you' voucher for participation. However, a number of individuals attempted to claim vouchers by quickly answering the questionnaires using the same computer key. There response patterns were apparent and their data was consequently excluded from the study. It is possible that other individuals participated and answered the questionnaires randomly but were not identified, thereby invalidating their data.

The sample would have also benefited from a larger number of people who had reported having committed offences. This may have allowed the regression model for the prediction of offending to grasp some of the finer, less tenuous relationships between attachment and empathy in the prediction of offending. Therefore this research would also benefit from exploration with a forensic population, specifically, population of more violent offenders. The capacity to empathise in individuals who have committed violent offences against an identifiable victim is likely to differ considerably from those offenders who participated in this study. This may allow a deeper study of the relationship between offending, attachment, empathy, autistic traits and psychopathic

traits, perhaps revealing non-linear relationships that may exist when based upon a mixed sample that could be applied to the general population of offenders.

Statistical Limitations

In addition, although the sample size was adequate (n=80), it would have benefited from being bigger. Field (2001) recommends that for multiple regression a sample size of 10-15 cases per predictor is acceptable. This regression used 8 initial predictors with a sample of 80 participants. Therefore the sample size was at the lower limit. Thus, a larger sample size is advisable for future investigation of these regression models.

Also, it should be noted that the factors included in these models are not the only factors to contribute towards the level of autistic traits or offending in people. They are amongst the variables measured and there are likely to be others that are worthy of investigation. Finally, this research has presented two serially mediated and moderated regression models. As models, they are templates to explain the approximations to the relationships between the variables in a set of data and as such they are provisional and open to further development.

Chapter 5

Overall Conclusions

Aims of Thesis

The aims of this thesis were to investigate the risk factors for offending associated with ASD. This is a poorly understood area and creates challenges for clinicians when assessing and managing risk. This issue is becoming more pertinent as all service providers must address the rights of offenders with ASD to access offender behaviour programs with adequately trained staff, by law.

Currently, there are no good practice guidelines for standard risk assessments and clinicians often have to make subjective judgements regarding the nature of risk factors in offenders with ASD which, as Murphy (2013a) has highlighted, can lead to an inaccurate view of the dynamics and assessment of risk. Further, by approaching risk management in the absence of adapted procedures that take into account the subtle differences in the psychological and social disposition of offenders with ASD, an ineffective risk management plan may result. The consequence may be an overly restricting or excessively lenient risk management plan.

Summary of Findings

A review of the literature highlighted a lack of research in this area and further underlined a need for further empirical research. The majority of studies that have been conducted to date investigating risk factors for offending in people with ASD employ

small samples of individuals, mostly male, of different ages, who have received a diagnosis at different ages and during different periods of time, when diagnostic criteria have undergone considerable change. In addition, the studies rarely report the nature and severity of the crimes committed by those participating in the studies. The exception is in case studies and case series studies, but the individuals participating tend to represent unusual cases, therefore the results from these cannot be generalized to the population of offenders with ASD.

Nonetheless, the most frequent themes in the literature examined suggest that empathy deficits and social skills deficits represent notable risk factors. A lack of concern for others, poor perspective taking, poor recognition of facial expressions and a general lack of empathy were cited by 7 studies out of 16 studies that met inclusion and quality assessment criteria. The weighted mean of the quality assessment score for these studies was 85.39%. Only 3 studies cited historical risk factors, having a slightly higher weighted mean quality assessment score of 89.75%. In addition social skills deficits were cited by 13 studies where the weighted mean quality assessment score was lower than that for the papers citing empathy impairments at 79.79%.

Although the studies that cited empathy impairments as risk factors were of quite a high quality, none utilized a measure of empathy to validate their claims of empathy impairments. In addition, a number of the studies that identified social skills deficits as risk factors did so with empathy impairments thus, stressing the link between empathy and social behaviour, perhaps through their common origins in attachment security. In addition, the rate of insecure attachment is very high in offender populations. However,

research into empathy deficits in offenders is inconclusive. This link is also notable in psychopathic disorder resulting in much debate regarding the overlap between ASD and psychopathic disorder.

Some researchers suggest that these social and emotional impairments associated with ASD place those affected at higher risk of offending similar to those affected by psychopathic disorder. However, if this theory were correct then its logical consequence would be a greater rate of offending in people with ASD than that observed. In addition, some evidence suggests empathy impairments in people with ASD may be different from those who have psychopathic disorder (Blair, 2008; Smith, 2009). Further, reduced empathic ability is not necessarily a prerequisite for offending (Jackson & Bonacker, 2006). However, varied samples and empathy measures used may account for varied findings (Jolliffe & Farrington, 2004).

An Integration of Primary and Secondary Research Models

The primary research study leading to the research in this thesis explored the accounts of offending relating to the ability to empathise in a community sample of four offenders with ASD using Interpretative Phenomenological Analysis. The findings suggested that offenders with ASD show a varied capacity to empathise, but this was context dependent and related to their views regarding how emotionally and physically connected they were to others and how victimised they were by others. An interaction between a good or impaired ability for self-awareness and other-awareness appeared to result in 4 particular types of offending and the ability of the participants to desist from offending (see figures 7 and 8 below). This demonstrated parallels with Bartholomew's

(1990) model of attachment in which 4 attachment types develop from the interacting positive or negative view of the self with that of others.

Figure 7: Self-Other Grid from Primary Research Study

SELF – OTHER GRID		
	Other Unknown →Perspective of others' unavailable, blindly following rules, obsessions focus attention inward	**Other Known** → Adaptive behaviour to account for others' emotions; perspective of others' available
Self Unknown →Suggestible, undiagnosed, lost, alienated, mental illness,	**1. Isolated Suffering** Fear and Isolation→ offending as retaliatory (fight or flight) - impulsive or cathartic (Violence and emotional release through actions e.g. speeding)	**3. Guilty Struggle** Dependency, inter-subjective boundaries blurred → Offending justified by deliberated rules to offset perceived consequences of actions on others (e.g. guilt → tidying up; "this is how we sort out problems")
Self Known →Misunderstood by others, diagnosed?, success *and* failure, obsessions focus attention inward	**2. Simulated Value** Approach-Avoidance → Offending may addresses a conscious need ("I didn't get it for Christmas so…"; make-up sex)	**4. Evolving Connectedness** Self as connected and separate → Supported, treatment, self-management – offending stopped

The regression models developed in this more recent, secondary research study were found to map on well to the primary research model. The Self-Other grid developed in the primary research (figure 7 above) is a good representation of the nature of attachment found in this current study. Thus, higher levels of anxious and avoidant attachment are represented by the interaction of self and other unknown, or poor self and other awareness, i.e. isolated suffering. I further propose that where there is an interaction between poor self-awareness and intact other-awareness the likely result is

anxious attachment, perhaps through a lack of self-other distinction, i.e. ‘guilty struggle’.

Regression model 1 developed in this current, secondary research study shows that a higher level of autistic traits may be predicted by a higher level of personal distress mediated by a higher level of anxious and avoidant attachment. These findings are relevant to the position of ‘isolated suffering’. Conversely, where a high level of avoidant attachment is less pertinent, the resulting position is likely to be reflected in the ‘guilty struggle’ where avoidant attachment results from the interaction of good self-awareness in the absence of other-awareness. In addition, according to model 1, where low levels of empathic concern are present, a higher level of primary psychopathic traits predicts a higher level of autistic traits. Thus, in an offender with ASD I suggest that this profile best represents the position of ‘simulated value’.

I further suggest that the position of ‘isolated suffering’ represents a culmination of regression model 1 and regression model 2. Hence, offending from this position is associated with a higher level of autistic traits mediated by a higher level of personal distress and secondary psychopathic traits, as shown in figure 8. In addition, personal distress predicted a high level of autistic traits mediated by high levels of anxious and avoidant attachment i.e. fearful attachment (Fraley et al., 2000). From the primary research model,, ‘isolated suffering’ was a state resulting from high levels of stress due to a lack of self-knowledge and poor awareness of others. Offending from this position appeared to be impulsive or cathartic facilitating connection to the self or others. In this state individuals were withdrawn yet lonely and the perspective of others was

unavailable. The offender was acting from a position of self-perspective and addressing their own needs.

However, ‘simulated value’ represented approach-avoidance behaviours involving some self-awareness in addition to a degree of anxiety yet high levels of avoidance due to impairments in other-awareness. Empathy appeared to be limited and sustained by a state of anger and disappointment with the world and offending was instrumental. This state was most representative of ‘dismissing attachment’ and the most likely to be identified as analogous to primary psychopathy, as described above associated with regression model 1. The nature of the offences associated with this position are likely to be more violent and instrumental and data regarding this type of offence was not collected in the current secondary study.

Conversely, the ‘guilty struggle’ was a state that occurred when the self-awareness was poor yet an emotional awareness of others was accomplished. Offending appeared to be related to poor self-regulation perhaps due to a merging of the empathic boundaries between self and other due to a lack of self-awareness. This position was defended against by adopting rules from others and creating logical justifications for offending behaviour. High levels of attachment anxiety in this state were reflective of ‘preoccupied attachment’.

However, ‘evolving connectedness’ was afforded by the achievement of awareness of the self and other. This appeared to be related to diagnosis, improved understanding of the self and enhanced awareness of others through support resulting in desistance from

offending. This was a stage at which participants felt valued by their culture and by others through diagnosis and ensuing support. Lower levels of attachment anxiety and avoidance were most marked in this state and were representative of 'secure attachment'.

Hence, empathy appeared to be variable and strongly related to attachment type. Also, the interaction of attachment and ability to empathise seemed to influence the dynamics of cognitions upon behaviour and the commission of offences. Consequently, it was hypothesised that the level of autistic traits is influenced by the level of empathy mediated by attachment type and also by the level of psychopathic traits. In addition, it was hypothesised that offending can be predicted by the level of autistic traits, by empathy mediated by attachment type and by the level of psychopathic traits.

The low rate of offending in people with ASD and issues with co-morbid mental health problems in many offenders with ASD in forensic services creates challenges to identifying generic risk factors, when the (small) population of offenders with ASD is so heterogeneous. The general population consists of offenders (convicted and non-convicted), non-offenders, people with ASD and those without ASD. Hence, an internet based method was used to collect data from a community sample with the aim of collecting data over a broad range for each measure, reducing the likelihood of impression management on the measures used and increasing the likelihood of disclosure of offences and genuine experiences and feelings.

The Interpersonal Reactivity Index (IRI; Davis, 1980) was selected for the measurement of empathy in this research since it has reasonably good test–retest reliability (Davis, 1980), internal consistency (Mullins-Nelson et al., 2006) and adequate levels of convergence with other measures of empathy (Baron-Cohen & Wheelwright, 2004; Davis, 1983). It has been shown to have good predictive validity (Bock and Hosser, 2014) and used for research with varied populations including offenders (e.g. Bock & Hosser, 2014; Lauterbach & Hosser, 2007), non-offenders (e.g. Courty et al., 2013; Cusi et al., 2011), learning disabled populations (Kelly, 2014) and people with ASD (Rogers et al., 2007; Shamay-Tsoory et al., 2002).

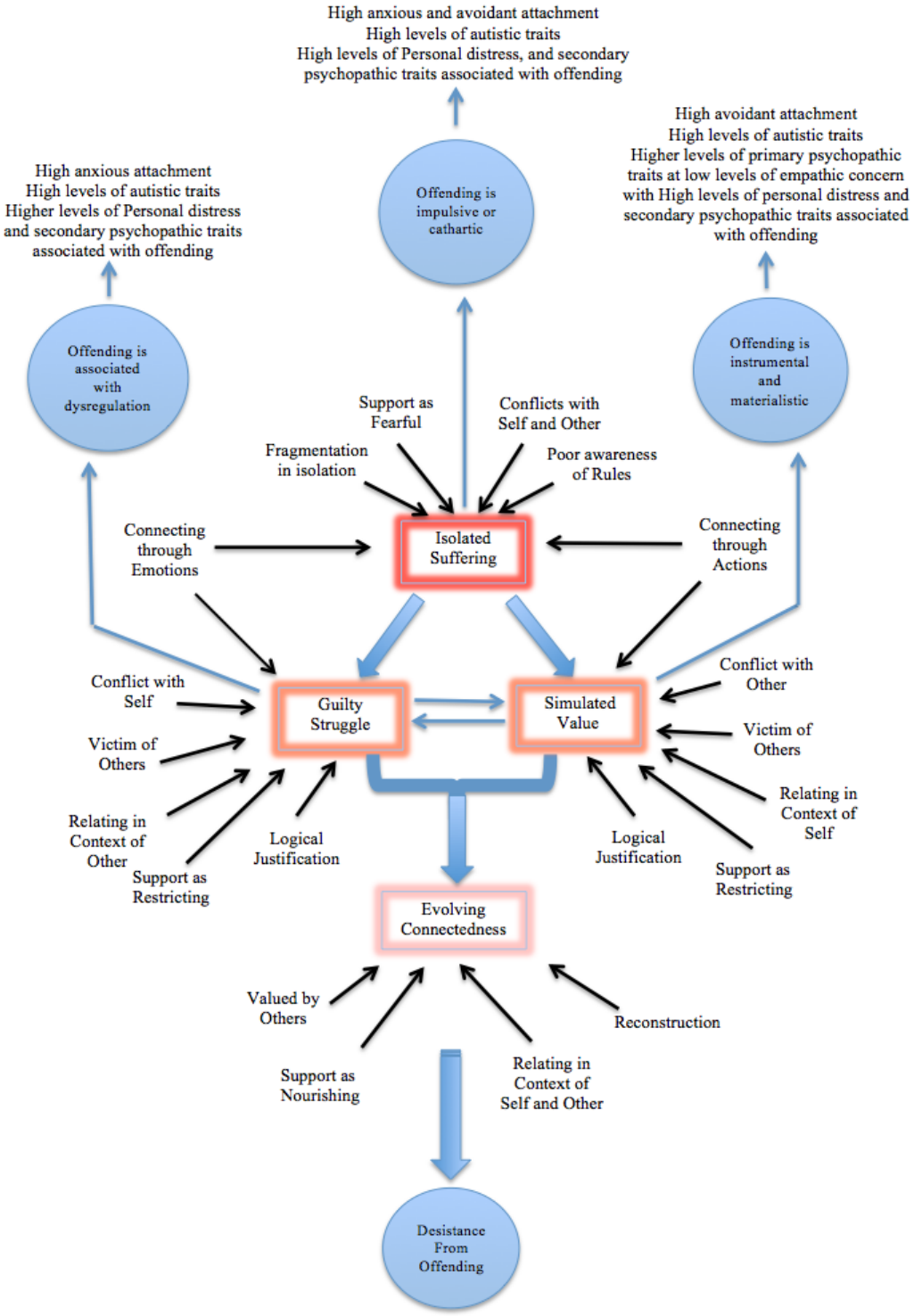
The findings of the research in this thesis show that, as hypothesized, increased affective empathy (self-reported personal distress experienced at the observed adversity of others) is predictive of higher levels of autistic traits, in accordance with findings by Rogers and colleagues (2007), partly through higher levels of anxious and avoidant attachment. In addition, at low levels of affective empathy (empathic concern) higher levels of primary psychopathic traits are predictive of higher levels of autistic traits. These findings are suggestive of a psychological and behavioural profile of autistic traits that may underlie the overlap between autistic and psychopathic traits in the offender population.

In addition, the report of having committed an offence was predicted by higher levels of secondary psychopathic traits and by higher levels of autistic traits through higher levels of personal distress and higher levels secondary psychopathic traits. Thus, in some individuals with higher levels of autistic traits, a simultaneous high level of personal

distress and high level of secondary psychopathic traits may increase the risk of committing minor offences. Due to the nature of the offences reported by participants in this study, this is not likely to be representative of all offenders, in particular individuals who have committed more serious, violent offences. The IRI has shown mixed results in differentiating violent from non-violent offenders, offender types (Marshall et al., 1993; Arnold, 1999; Fisher et al., 1999) and offenders from non-offenders (Burke, 2001 Lindsey et al., 2001; Goldstein et al., 2001) depending upon how well controlled samples are. However, this study employed a community sample of offenders and non-offenders and therefore circumvented some of the issues that may have arisen from comparing an institutionalised with non-institutionalised sample.

Higher levels of autistic traits are predicted by primary psychopathic traits at low levels of empathic concern, and high levels of personal distress, due to fearful-avoidant attachment. Also higher levels of autistic traits are predictive of having committed an offence through high levels of personal distress and secondary psychopathic traits. Hence, fearful-avoidant attachment, empathic concern, personal distress and primary and secondary psychopathic traits may be factors that interact through moderated and mediated relationships to increase the risk of re-offending in people with ASD. However, these may not be linear relationships and this area warrants further investigation.

Figure 8. Model 3: Integration of Models from Primary and Secondary (Model 1 and 2) Research: A dynamic model of Empathy, Attachment and Psychopathic Traits in Offenders with ASD.



Thus, figure 8 shows that model 1 agreed with the findings from the primary research, conducted before this study, suggesting that individuals with ASD i.e. higher levels of autistic traits, experience higher levels of personal distress and higher levels of attachment anxiety and avoidance, i.e. 'isolated suffering'. In addition, at lower levels of empathic concern, primary psychopathic traits were associated with higher levels of autistic traits, suggestive of 'simulated value'. However, it should be noted that the model developed in the primary research was based on male offenders with ASD and model 1 in the current, secondary research, in part, consists of only 2 offenders with a diagnosis of ASD and 14 offenders with no diagnosis of ASD. Therefore, the model obtained from the primary research may not apply to offenders with ASD only, but highlights a dynamic interactive relationship between empathy and attachment generally.

In addition, model 2, showing that the report of having committed an offence was predicted by higher levels of autistic traits, indirectly through higher levels of personal distress leading to higher levels of secondary psychopathy, agreed with the model in the primary research. Thus, it seems that 'guilty struggle, was most accurately represented in model 2. Although anxious attachment was not found to mediate empathy or autistic traits in leading to higher levels of secondary psychopathy, the association of higher levels of autistic traits through personal distress and secondary psychopathy most closely reflect 'guilty struggle'. This type of individual may hold antisocial attitudes and justify offending through a lack of awareness of the consequences upon others. Higher levels of autistic traits leading to higher levels of personal distress in social situations may exacerbate the effect of the justifications and thereby reinforce antisocial

or offending behaviour. The higher levels of secondary psychopathy may be a reflection of emotional dysregulation leading to the commission of offences, which in this study included the possession of illegal substances and shoplifting.

Practical Implications for Risk Management in Offenders with ASD

The treatment of offenders with the purpose of addressing risk factors to reduce the risk of re-offending commonly relies upon successful progress through therapy groups in offender behaviour programs. The development of a strong therapeutic alliance and ability to interact cordially with others in resolving often traumatic emotions to motivate behaviour change is essential in the treatment of offenders and non-offenders alike. However, people with higher levels of autistic traits who experience high levels of personal distress, higher levels of secondary psychopathic traits and/or a fearful-avoidant attachment type, as shown in the regression models in this study, may have great difficulty developing therapeutic relationships and working in therapy groups. The dynamics of these underlying difficulties may represent barriers to the successful access to Ward's (2002) concept of 'primary goods'; for example in the areas of relationships, feeling connected with one's community and being free from stress and turmoil. This could have serious implications for the suitability of and success in therapeutic and rehabilitation programs for forensic and non-forensic populations.

In addition, the understanding of the underlying dynamics of behaviour resulting in the commission of an offence is essential in managing the risk of further offending. Where risk is related to issues with attachment, the development of stable relationships or the experience of high levels of personal distress when in situations of high emotional

arousal, this needs to be understood from an autistic perspective in order for the risk to be managed effectively. Moreover, where ASD and psychopathy overlap there may be an additional risk of offending due to reduced empathic ability. Hence clinicians and practitioners of risk assessments devising risk management plans may benefit from the use of reliable measures of empathy and attachment to inform their formulations of risk.

However, the understanding and assessment of risk in offenders with ASD could be improved by, not only increasing awareness and understanding of ASD amongst service providers in accordance with the Autism Act (2010; 2014), but also putting into practice strategies in accordance with NICE guidelines (NICE, 2014). It is also evident that the treatment of offenders with ASD is likely to be most successful by taking into account the difficulties of working in groups and accommodating these differences by the use of long term 1-1 treatment with a clinician suitably qualified in ASD. Such requirements are essential in promoting secure therapeutic relationships that might overcome the high levels of personal distress leading to high levels of attachment anxiety and avoidance experienced by this client group. This may be particular relevant for insecurely attached individuals where a higher level of autistic traits is associated with a higher level of primary psychopathy and low affective empathy (empathic concern) as shown in Model 1.

Consequently, appropriate treatment pathways for offenders with ASD might commence by addressing impairments in the ability to identify and communicate ones own emotions (i.e. alexithymia). Cultivating skills in this area may create the foundations for improving the ability to differentiate ones emotions from those of

others, thereby developing empathic abilities and ameliorating personal distress, or anxiety, and higher levels of secondary psychopathy (or neuroticism) shown to be associated with offending in Model 2. Treatment should build on these abilities for individuals to develop ways to manage their emotions, in particular high levels of anxiety associated with interpersonal problems (i.e. personal distress) in a more functional manner. The development of these skills, therefore, strengthens internal resources to enable the development of better social skills and stable relationships and so affords better access to primary goods, thereby reducing the risk of re-offending.

Mind Reading interventions, aimed at improving the ability to recognise and understand the emotions of others (Golan & Baron-Cohen, 2006) have been successfully used in adults with Asperger's Syndrome. However, there is no evidence to suggest that this would be effective when used with offenders with ASD, who present a more complex group of people, and more research is required to establish the efficacy of interventions with this population of offenders (Woodbury–Smith & Dein, 2014).

In addition, it is essential that treatment providers account for the difficulties people with ASD have in the generalisation of skills. The ability of offenders with ASD to learn skills in the confines of a therapeutic relationship and change their behaviour in accordance with the demands of varied environments is likely to be impaired. In addition rehabilitation programmes based upon abstract concepts such as changing one's thought processes and attitudes will be too challenging for many individuals with ASD, who require a very logical, concrete approach. Hence, treatment should focus

upon changing behaviour using rule-based concrete approaches to build practical coping strategies that can be applied to varied environments.

Reflections on the Research Process

The study of offending in people with ASD is a highly politically and emotionally loaded arena due to the nature of the condition and the long history of poor treatment of those affected by the condition, be they individuals, families or service providers. Hence, it has been a study in which I have had to 'tread carefully'. In addition, it is challenging to obtain sufficient participants with ASD, who, because of the nature of their condition, are often reluctant to engage with strangers and are difficult to engage. Nonetheless, a substantial number of participants in this study had a formal diagnosis of ASD. This is a similar problem with people who have committed offences. Hence, anonymity is essential. It has been an interesting and exciting journey conducting research over the Internet in order to provide that level of anonymity yet maintain a level of openness regarding the research process.

I have realised through my literature review that there is a dearth of empirical evidence regarding the assessment and support of offenders with ASD with regard to risk management. They are a poorly understood group of offenders who warrant far more attention and support. Accordingly, reliable instruments for the measurement of empathy and attachment in this group of offenders would be useful and appropriate to use in clinical practice.

Limitations and Further Research

The measures used in developing these models are not infallible and have limitations. The AQ and the ECR-R may be sensitive to a similar set of underlying constructs, such as shyness, anxiety and interpersonal functioning, which are significantly and positively correlated with personal distress in the IRI (Davis, 1983). Hence the personal distress subscale of the IRI may be better described as a measure of interpersonal difficulty due to the spontaneous experience of vicarious negative emotions, where empathy is considered a spontaneous rather than a deliberate response to the feelings of others (Meffert et al., 2013). However, the level of personal distress is dependent upon the experience of parallel emotions in others in a similar way to feelings of empathic concern. Hence, it is as equally valid to consider personal distress as a level of empathic response as empathic concern.

In addition, the level of empathy that individuals experience may change according to many different variables, internal and external (Davis, 1996). Evidence exists to suggest that the empathic status of sex offenders changes shortly before the onset of their offending (McKillop et al, 2012), thereby adding support to Davis's (1996) model. Moreover, the primary research leading to the research in this thesis indicated that empathic ability is changeable in offenders with ASD depending upon the point in the timeline of their offending. The measurement of such small, but significant, temporal variations in empathy are afforded by a view of empathy as a continuous rather than a categorical construct, such as is used by the ECR-R. Thus, attachment anxiety and avoidance did not contribute to model 2 perhaps because answers to the ECR-R were based upon current feelings regarding others at the time of offending. Future research

might assess feelings of attachment during the offence period, perhaps by the employment of a vignette of offenders and the utilisation of a more detailed attachment interview.

The IRI has received criticism for its accuracy being literacy dependence (Bevan et al., 2004; Lauterbach & Hosser, 2007), that it is open to impression management and affected by socio-economic status (Jolliffe & Farrington, 2006). However, this is unlikely to have been an issue in this study, which collected data anonymously and used a computer literate community sample obtained from carefully targeted advertisement. However, although the target population for Internet data collection can be tailored to a degree, it is also vulnerable to abuse by unscrupulous individuals willing to compromise research studies.

In addition, it is important to note that the LSRP measures psychopathic traits and not psychopathy per se. It has received criticism for its poor concurrence with the PCL-R, however, evidence in this area is varied. Further, it was created for use with a non-institutionalised population and the PCL-R was designed for use with an institutionalised population, hence the comparison is questionable. The sample in this research was non-instutionalised and as such the LSRP was an appropriate measure. Nonetheless, it is possible that some of the behaviours that are rated in the secondary psychopathy subscale are not uncommon in people with higher levels of autistic traits or ASD, although not as a result of secondary psychopathy but due to higher levels of personal distress and difficulties adapting behaviour to the requirements of ones environment. Hence, the relationship between autistic traits, personal distress and

secondary psychopathic traits in the prediction of having committed an offence must be interpreted with caution.

The difference in empathy scores between females and males on the IRI is in accordance with previous findings (Davis, 1983) showing females to score higher on all subtests, but significantly so on perspective taking and empathic concern. This adds further validity to the data and findings from the research in this thesis. However, the models may not be applicable to female only samples, since the results of the separate regression analyses for hypothesis 1 indicate autistic traits in females not to be significantly predicted by any of the scores on the IRI. However, mediated and moderated relationships are worthy of further investigation in this respect. Nonetheless, these results further support the notion of a different experience and presentation of autistic traits in females in comparison to males. Since empathy is noted as an underlying feature of ASD this has important implications for screening, diagnosis and treatment.

Summary

A review of the literature led to the identification of empathy impairments and social skills deficits as the most commonly cited risk factors for offending in people with ASD. Behaviourally, some offenders with ASD may appear psychopathic due to their mix of empathy impairments and social skills deficits. Whilst, ASD and psychopathy may have similar surface features, the nature of the underlying empathy impairments is thought to be contrasting. The evidence supporting this theory is mixed and therefore inconclusive. However, model 1 from this study provides further evidence in this area

of research, showing that the level of autistic traits cannot be predicted by lower levels of perspective taking (cognitive empathy) or higher levels of empathic concern (affective empathy). However, results from this research indicate that an overlap between psychopathic traits and autistic traits exists when empathic concern is low.

In addition, it is possible that, according to model 2, the increased likelihood of having committed an offence, when predicted significantly by higher levels of autistic traits through higher levels of personal distress and secondary psychopathic traits, is an indication of the way these three variables interact in offenders with ASD. Thus, in offenders with ASD, higher levels of personal distress, leading to higher levels of secondary psychopathic traits, are manifest as empathy impairments and social skills deficits and may significantly increase the risk of re-offending. This is an area worthy of further investigation in addressing the criminogenic needs of, and therefore treatment of, offenders with ASD.

References:

Adshead, G. (2003) chapter 5: Three degrees of security: Attachment and forensic institutions in Pfafflin, F. & Adshead, G. (Eds.). (2003). *A Matter of Security: the application of attachment theory to forensic psychiatry and psychotherapy* (Vol. 25). Jessica Kingsley Publishers.

Ali, F., Amorim, I. S., & Chamorro-Premuzic, T. (2009). Empathy deficits and trait emotional intelligence in psychopathy and Machiavellianism. *Personality and Individual Differences, 47*(7), 758-762.

Ali, F., & Chamorro-Premuzic, T. (2010). Investigating Theory of Mind deficits in nonclinical psychopathy and Machiavellianism. *Personality and Individual Differences, 49*(3), 169-174.

Allen, D., Evans, C., Hider, A., Hawkins, S., Peckett, H. & Morgan, H. (2008). Offending behaviour in adults with Asperger syndrome. *Journal of Autism & Developmental Disorders, 38,* 748–758.

Allen, J. P., Moore, C., Kuperminc, G. P., & Bell, K. (1998). Attachment and adolescent psychosocial functioning. *Child Development*, 69, 1406-1419.

Allen, J.P., Marsh, P., McFarland, C., McElhaney, K.B., Land, D., Jodl, K., & Peck, S. (2002). Attachment and autonomy as predictors of the development of social skills and delinquency during midadolescence. *Journal of Consulting & Clinical Psychology*, 70(1), 56-66.

Allen, V. (2013). Psychopathy and Attachment: Examining the Relationship between Secure Attachment Priming and Psychopathy. Unpublished thesis downloaded from: http://digitalcommons.georgiasouthern.edu/cgi/viewcontent.cgi?article=1850&context=etd

American Psychiatric Association (1994). *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition. Washington DC: American Psychiatric Association.

Andrews, D. A., & Bonta, J. (2003). *The psychology of criminal conduct (3rd ed.).* Cincinnati, OH: Anderson.

Arnold, H. L. (1999). Individual differences in personality factors: A comparison of violent and non-violent offenders. *Unpublished MPhil Thesis*. University of Cambridge.

Attwood, T. (2000). Asperger syndrome: Some common questions: Do girls have a different expression of the syndrome? Available from: www.asperger.org/asperger/asperger_questions.htm#girls

Attwood, T. (2007). *The Complete Guide to Asperger's Syndrome.* London, Jessica Kingsley Publishers.

Baird, G., Simonoff, E., Pickles, A., Chandler, S., Loucas, T., Meldrum, D., et al. (2006). Prevalence of disorder of the autism spectrum in a population cohort of children in South Thames: The special needs and autism project (SNAP). Lancet, 368, 210–215.

Baker, E. Beech, A. & Tyson, M. (2006). Attachment disorganization and its relevance to sexual offending. *Journal of Family Violence, 21 (3),* 221-231.

Banissy, M. J., Kanai, R., Walsh, V. & Rees, G. (2012). Inter-individual differences in empathy are reflected in human brain structure. *NeuroImage*, 62(3), 2034–2039.

Barnett, G. D., Wakeling, H. C., Mandeville-Norden, R. & Rakestrow, J. (2012). How useful are psychometric scores in predicting recidivism for treated sex offenders? International Journal of Offender Therapy and Comparative Criminology, 56(3), 420-446.

Barnett, G. D., & Mann, R. E. (2013). Cognition, empathy, and sexual offending. *Trauma, Violence, & Abuse*, *14*(1), 22-33.

Baron-Cohen, S. (2011). *Zero degrees of empathy: A new theory of human cruelty*. UK, Penguin.

Baron-Cohen, S. (2010). Empathizing, systemizing, and the extreme male brain theory of autism. *Progress in brain research, 186,* 167-175.

Baron- Cohen, S. (1988). An assessment of violence in a young man with Asperger's syndrome. *Journal of Child Psychology and Psychiatry*, 29(3), 351-360.

Baron-Cohen, S. (2001). Theory of mind and autism: a review. *International Review of Mental Retardation*, 23,169-184.

Baron-Cohen, S. and Wheelwright, S., (2004). The empathy quotient (EQ). An investigation of adults with asperger syndrome or high functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders*, 34, 163–175.

Baron-Cohen, S., Lombardo, M., Tager-Flusberg, H., & Cohen, D. (Eds.). (2013). *Understanding Other Minds: Perspectives from developmental social neuroscience*. Oxford University Press.

Barry-Walsh, J. B., & Mullen, P. E. (2004). Forensic aspects of Asperger's syndrome. *Journal of Forensic Psychiatry & Psychology*, 15, 96–107.

Bartholomew, K., Henderson, A. and Dutton, D. (2001). Insecure attachment and abusive partner relationships (p 43-61) in Clulow, C. (Ed.). *Adult attachment*

and couple psychotherapy: The 'secure base' in practice and research. London, Routledge.

Beckett, R. C., & Fisher, D. (1994). Assessing victim empathy: A new measure. Paper presented at the 13th Annual Conference of the Association for the Treatment of Sexual Abusers, San Francisco.

Beech, A., Fisher, D. & Beckett, R. (1998). *STEP 3: An evaluation of the prison sex offender treatment programme.* A Report for the Home Office. Downloaded on 22/11/2012 from http://library.npia.police.uk/docs/homisc/occ-step3.pdf

Beech, A. R., Fisher, D. D., & Thornton, D. (2003). Risk assessment of sex offenders. Professional Psychology: Research and Practice, 34, 339-352.

Beech, A., Friendship, C., Erikson, M., & Hanson, R. K. (2002). The relationship between static and dynamic risk factors and reconviction in a sample of U. K. child abusers. *Sexual Abuse: A Journal of Research and Treatment*, 14, 155–167.

Beech, A. R. & Mitchell, I. J. (2009). Attachment Difficulties in McMurran, M. and Howard, R. (Eds.). *Personality, Personality Disorder and Violence*. West Sussex, John Wiley & Sons Ltd.

Belsky, J. (2002). Developmental origins of attachment styles. *Attachment and Human Development*, 4, 166–170.

Beven, J. P., O'Brien-Malone, A., & Hall, G. (2004). Using the Interpersonal Reactivity Index to assess empathy in violent offenders. *International Journal of Forensic Psychology*, 1, 33–41.

Bird, G., & Cook, R. (2013). Mixed emotions: the contribution of alexithymia to the emotional symptoms of autism. *Translational psychiatry*, *3*(7), 1-8

Bird, G., Silani, G., Brindley, R., White, S., Frith, U., & Singer, T. (2010). Empathic brain responses in insula are modulated by levels of alexithymia but not autism. *Brain*, doi:10.1093/brain/awq060.

Bjorkley, S. (2009). Risk and dynamics of violence in Asperger's syndrome: A systematic review of the literature. *Aggression and Violent Behaviour, 14,* 306-312.

Blacher, J., Kraemer, B., & Schalow, M. (2003). Asperger syndrome and high functioning autism: Research concerns and emerging foci. *Current Opinion in Psychiatry*, 16, 535–542.

Blair, R. J. R. (2008). Fine cuts of empathy and the amygdala: dissociable deficits in psychopathy and autism. *The Quarterly Journal of Experimental Psychology*, 61(1), 157-170.

Blair, R., Colledge, E., Murray, L., & Mitchell, D. (2001). A selective impairment in the processing of sad and fearful expressions in children with psychopathic tendencies. *Journal of Abnormal Child Psychology*, 29, 491-498.

Blair, R. J., Jones, L., Clark, F., & Smith, M. (1997). The psychopathic individual: a lack of responsiveness to distress cues? *Psychophysiology*, 34, 192-198.

Blair, R. J. R., Sellars, C., Strickland, I., Clark, F., Williams, A. O., Smith, M., et al. (1995). Emotion attributions in the psychopath. *Personality and Individual Differences*, 19, 431-437.

Blair, R. J. R., Sellars, C., Strickland, I., Clark, F., Williams, A., Smith, M., Jones, L. (1996). Theory of Mind in the psychopath. *Journal of Forensic Psychiatry*, 7, 15-25.

Bock, E. M., & Hosser, D. (2014). Empathy as a predictor of recidivism among young adult offenders. *Psychology, Crime & Law*, 20(2), 101-115.

Bora, E., Gökçen, S., & Veznedaroglu, B. (2008). Empathic abilities in people with schizophrenia. *Psychiatry research*, 160(1), 23-29.

Bowlby, J. (1980). *Attachment and loss, Volume 3: Loss.* New York. Basic Books.

Brinkley, C. A., Schmitt, W. A., Smith, S. S., & Newman, J. P. (2001). Construct validation of a self report psychopathy scale: Does Levenson's SRPS measure the same construct as Hare's PCL–R? Personality and Individual Differences, 31, 1021-1038.

Browning, A. and Caulfield, L. (2011), "The prevalence and treatment of people with Asperger's Syndrome in the criminal justice system", Criminology and Criminal Justice, Vol. 11 No. 2, pp. 165-80.

Brown, S., Harkins, L., & Beech, A. R. (2012). General and Victim-Specific Empathy Associations With Actuarial Risk, Treatment Outcome, and Sexual Recidivism. *Sexual abuse: a journal of research and treatment*, *24*(5), 411-430.

Brugha, T., McManus, S., Meltzer, H., Smith, J., Scott, F. J., Purdon, S., ... & Bankart, J. (2009). Autism spectrum disorders in adults living in households throughout England: Report from the adult psychiatric morbidity survey 2007. *Leeds: The NHS Information Centre for Health and Social Care*.

Brugha, T. S., McManus, S., Bankart, J., Scott, F., Purdon, S., Smith, J., ... & Meltzer, H. (2011). Epidemiology of autism spectrum disorders in adults in the community in England. *Archives of general psychiatry*, *68*(5), 459-465.

Burke, D. M. (2001). Empathy in sexually offending and non-offending in adolescent males. *Journal of Interpersonal Violence*, 16, 222–233.

Canter, D. & Young, D. (2012). Sexual and violent offenders' victim role assignments: A general model of offending style. *Journal of Forensic Psychiatry & Psychology*, *23*(3), 297-326.

Carey, J., Fox, E., & Spraggins, E. (1988). Replication of structure findings regarding the Interpersonal Reactivity Index. *Measurement and Evaluation in Counseling and Development*, 21, 102–105.

CASP (2000) Critical Appraisal Skills Programme. National Health Service, Uk. Accessed on 17/03/2011: http://www.sph.nhs.uk/what-we-do/public-healthworkforce/resources/critical-appraisals-skills-programme.

Chakrabarti, B. & Baron-Cohen, S. (2013). Understanding the genetics of empathy and the autistic spectrum. In Baron-Cohen, S., Lombardo, M., Tager-Flusberg, H. & Cohen, D. (Eds.). (2013). *Understanding Other Minds: Perspectives from developmental social neuroscience*. Oxford University Press.

Christensen, J., Grønborg, T. K., Sørensen, M. J., Schendel, D., Parner, E. T., Pedersen, L. H., & Vestergaard, M. (2013). Prenatal valproate exposure and risk of autism spectrum disorders and childhood autism. *Jama*, *309*(16), 1696-1703.

Clare, I. and Woodbury-Smith, M. (2009). Chapter 5: Autistic spectrum conditions in Young, S., Kopelman, M. and Gudjonsson, G. (Eds.) *Forensic Neuropsychology in Practice: A Guide to Assessment and Legal Processes*. Oxford, Oxford University Press.

Clare, I., & Woodbury-Smith, M. (2009). Autism spectrum conditions. *Forensic Neuropsychology in Practice: A Guide to Assessment and Legal Processes*, 109.

Clements, J., & Zarkowska, E. (2000). *Behavioural concerns and autistic spectrum disorders: explorations and strategies for change*. Jessica Kingsley Publishers.

Cooke, D. J., & Michie, C. (2001). Refining the construct of psychopathy: Towards a hierarchical model. *Psychological Assessment*, 13, 171-188.

Curwen, T. (2003). The Importance of offence Characteristics, victimization history, hostility, and social desirability in assessing empathy of male adolescent sex offenders. *Sexual Abuse: A Journal of Research and Treatment*, 15(4), 347-364.

Courty, A., Maria, A. S., Lalanne, C., Ringuenet, D., Vindreau, C., Chevallier, C., ... & Berthoz, S. (2013). Levels of autistic traits in anorexia nervosa: a comparative psychometric study. *BMC psychiatry*, 13(1), 222.

Cusi, A. M., MacQueen, G. M., Spreng, R. N., & McKinnon, M. C. (2011). Altered empathic responding in major depressive disorder: relation to symptom severity, illness burden, and psychosocial outcome. *Psychiatry research*, 188(2), 231-236.

Davis, M. H. (1980). Individual differences in empathy: A multidimensional approach. Dissertation Abstracts International, 40(7-B), 3480.

Davis, M. H. (1983a). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, 44, 113-126.

Davis, M. H. (1983b). The effects of dispositional empathy on emotional reactions and helping: A multidimensional approach. *Journal of Personality*, 51, 167-I84.

Davis, M. H. (1996). *Empathy: A social psychological approach*. Boulder: Westview Press.

Dempster, R. J., & Hart, S. D. (2002). The relative utility of fixed and variable risk factors in discriminating sexual recidivists and nonrecidivists. *Sexual Abuse: A Journal of Research and Treatment*, 14, 121–138.

Department of Health. (2009). The Autism Act, Crown Copyright. Downloaded from: http://www.legislation.gov.uk/ukpga/2009/15

Department of Health. (2010). Fulfilling and rewarding lives: the strategy for adults with autism in England. Crown Copyright. Downloaded from: http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/@ps/documents/digitalasset/dh_113405.pdf

Department of Health. (2014). Think Autism Fulfilling and Rewarding Lives, the strategy for adults with autism in England: an update. Crown Copyright. Downloaded from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/299866/Autism_Strategy.pdf

Dissanayake, C. & Crossley, S.A. (1996). Proximity and sociable behaviours in autism: evidence for attachment. *Journal of Child Psychology and Psychiatry*, 37(2): 149- 156.

Ditzen, B., Schmidt, S., Strauss, B., Nater, U. M., Ehlert, U., & Heinrichs, M. (2008). Adult attachment and social support interact to reduce psychological but not cortisol responses to stress. *Journal of psychosomatic research*, 64(5), 479-486.

Dolan, M., & Fullam, R. (2006). Face affect recognition deficits in personality-disordered offenders: association with psychopathy. *Psychological Medicine*, 36, 1563-1539.

D'Orazio, D. (2002). A comparative analysis of empathy in sexually offending and non-offending juvenile and adult males. *Unpublished doctoral dissertation*, California School of Professional Psychology at Alliant University, Fresno.

Dubin, N. (2009). *Asperger syndrome and anxiety: A guide to successful stress management*. Jessica Kingsley Publishers.

Dunn, E., Thorne, K. and Hocken, K. (2013). A brief report on the provision of services for hearing impaired, Intellectually Disabled, ADHD and autistic spectrum offenders at HMP Whatton. *Prison Service Journal*. 208, 26-30

Dyck, M. J., Ferguson, K., & Shochet, I. M. (2001). Do autism spectrum disorders differ from each other and from non-spectrum disorders on emotion recognition tests?. *European child & adolescent psychiatry*, *10*(2), 105-116.

Dziobek, I., Rogers, K., Fleck, S., Bahnemann, M., Heekeren, H. R., Wolf, O. T., & Convit, A. (2008). Dissociation of cognitive and emotional empathy in adults with Asperger syndrome using the Multifaceted Empathy Test (MET). *Journal of autism and developmental disorders*, 38(3), 464-473.

Ehlers, S. & Gillberg, C. (1993). The Epidemiology of Asperger syndrome. A total population study. Journal of Child Psychology and Psychiatry, 34 (8), pp. 1327-1350

Eisenberg, N. (2000). Emotion, regulation, and moral development. *Annual Review of Psychology*, 51, 665-697.

Elsegood, K. J., & Duff, S. C. (2010). Theory of mind in men who have sexually offended against children: A UK comparison study between child sex offenders and nonoffender controls. *Sexual Abuse: A Journal of Research and Treatment*, 22(1), 112-131.

Estay, I., & Paxton, K. (2007). *Counselling People on the Autism Spectrum: A Practical Manual*. Jessica Kingsley Publishers.

Fernandez, Y. M., & Marshall, W. L. (2003). Victim empathy, social self-esteem and psychopathy in rapists. *Sexual Abuse: A Journal of Research and Treatment*, 15, 11–26.

Fisher, D., Beech, A. and Browne, K. (1999). Comparison of Sex Offenders to Non-offenders on Selected Psychological Measures. *International Journal of Offender Therapy and Comparative Criminology*, 43, 473 – 491.

Fitzgerald, M. (2011). Necrophillia and autistic psychopathy. Clinical Neuropsychiatry, 8, 301-302.

Fonagy, P., Leigh, T., Steele, M., steele, H., Kennedy, R., Mattoon, G., Target, M., & Gerber, A. (1996). The relation of attachment status, psychiatric classification, and response to psychotherapy. *Journal of Consulting and Clinical Psychology*, 64:22–31.

Fonagy, P., and Target, M. (1997). Attachment and reflective function: Their role in self-organization. *Developmental Psychopathology*, 9, 679–700.

Fonagy, P., Target, M., Steele, M., & Steele, H. (1997). The development of violence and crime as it relates to security of attachment. In J. D. Osofsky (Ed.), *Children in a Violent Society* (pp. 150-177). New York, Guilford Press.

Fombonne E (2005) Epidemiological studies of pervasive developmental disorder. In: Volkmar F, Paul R, Klin A, Cohen D, editors. *Handbook of Autism and Pervasive Developmental Disorders*. Hoboken, New Jersey, Wiley, pp. 42–69.

Fraley, R. C., Waller, N. G., & Brennan, K. A. (2000). An item response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology*, 78, 350–365.

Frith, U., & Happe´, F. (1994). Autism: beyond ‘‘theory of mind’’. Cognition, 50, 115–132.

Frith, U. & Happe, F. (1996). The neuropsychology of Autism. *Brain*, 119, 1377-1400.

Frith, U. (1991). *Autism and Asperger syndrome*, Cambridge, UK, Cambridge University Press.

Frodi, A., Dernevik, M., Sepa, A., Philipson, J., & Bragesjo, M. (2001). Current attachment representations of incarcerated offenders varying in degree of psychopathy. *Attachment and Human Development*, 3, 269-283.

Gery, I., Miljkovitch, R., Berthoz, S., & Soussignan, R. (2009). Empathy and recognition of facial expressions of emotion in sex offenders, non-sex offenders and normal controls. *Psychiatry research*, 165(3), 252-262.

Ghaziuddin, M., Tsai, L., & Ghaziuddin, N. (1991). Brief report: Violence in Asperger syndrome: A critique. *Journal of Autism and Developmental Disorders*, 21, 349–354.

Gillberg, C. (1992). Autism and autistic-like conditions: Subclasses among disorders of empathy. Journal of Child Psychology and Psy- chiatry, 33, 813–842.

Gleichgerrcht, E., Torralva, T., Rattazzi, A., Marenco, V., Roca, M., & Manes, F. (2013). Selective impairment of cognitive empathy for moral judgment in adults with high functioning autism. Social cognitive and affective neuroscience, 8(7), 780-788.

Goldstein, G., Johnson, C. R., & Minshew, N. J. (2001). Attentional processes in autism. *Journal of autism and developmental disorders*, *31*(4), 433-440.

Goldstein, H., & Higgins-D'Allessandro, A. (2001). Empathy and attachment in relation to violent vs. nonviolent offense history among jail inmates. *Journal of Offender Rehabilitation,* 32, 31–53.

Gould, J. & Ashton-Smith, J. (2011). Missed diagnosis or misdiagnosis: girls and women on the autism spectrum. Good Autism Practice, 2011, Vol.12 (1), pp. 34-41

Grandin, T., & Panek, R. (2013). *The autistic brain: Thinking across the spectrum*. Houghton Mifflin Harcourt.

Hagenmuller F., Rossler W., Endrass J., Rossegger A., Haker H. (2012). Impaired resonance in offenders with psychopathic traits. Neuropsychiatrie. 26 (2), 65-71

Hanson, K. R. (2003). Empathy deficits of sexual offenders: A conceptual model. Journal of Sexual Aggression, 9, 13-23.

Hanson, R. K., & Harris, A. J. R. (2000). Where should we intervene? Dynamic predictors of sex offense recidivism. *Criminal Justice and Behavior*, 27, 6-35.

Happe, F. (1994). An advanced test of theory of mind: Understanding of story characters' thoughts and feelings by able autistic, mentally handicapped, and normal children and adults. *Journal of Autism and Development Disorders*, 24, 129–154.

Hare, R. D. (2003). *The Hare Psychopathy Checklist - Revised (Second Edition).* Toronto, Ontario: Multi-Health Systems.

Harris, G. T., Rice, M. E., Quinsey, V. L., Lalumiere, M. L., Boer, D., & Lang, C. (2003). A multisite comparison of actuarial risk instruments for sex offenders. *Psychological Assessment*, 15, 413–425.

Hayes, A. F. (2008). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, *76*(4), 408-420.

Hayes, A. F. (2014). Process (software for mediation and moderation analysis). Downloaded from http://www.afhayes.com/introduction-to-mediation-moderation-and-conditional-process-analysis.html. 12/07/2014

Hillbrand, M., & Sondik, T. (2012). Commentary: treatment and violence risk mitigation in high-functioning autism spectrum individuals. *Journal of the American Academy of Psychiatry and the Law Online*, *40*(2), 191-192.

Hoffman, M. L. (1977). Sex differences in empathy and related behaviours. *Psychological Bulletin*, 84, 712-722.

Hoffman, M. L. (2000). *Empathy and moral development: Implications for caring and justice*. Cambridge: University Press.

Hogan, R. (1969). Development of an empathy scale. *Journal of Consulting and Clinical Psychology*, 33, 307–316.

Howlin, P. (2004). *Autism and Asperger's syndrome: Preparing for adulthood*, Routledge, Taylor and Francis, London

Huang, X., Weijian, L., Binghai, S,, Haide, C. & Davis, M. H. 2012 The Validation of the Interpersonal Reactivity Index for Chinese Teachers From Primary and Middle Schools. *Journal of Psychoeducational Assessment*, 30(2), 194-204.

Hünefeldt, T., Laghi, F., Ortu, F., & Belardinelli, M. O. (2013). The relationship between 'theory of mind'and attachment-related anxiety and avoidance in Italian adolescents. *Journal of adolescence*, 36, 613–621.

Hurst, R. M., Mitchell, J. T., Kimbrel, N. A., Kwapil, T. K., & Nelson-Gray, R. O. (2007). Examination of the reliability and factor structure of the Autism Spectrum Quotient (AQ) in a non-clinical sample. *Personality and Individual Differences*, 43(7), 1938-1949.

Iria, C. and Barbosa, F. (2009). Perception of facial expressions of fear: comparative research with criminal and non-criminal psychopaths. *Journal of Forensic Psychiatry & Psychology*, 20(1), 66-73.

Ireland, J. L. (1999). Provictim attitudes and empathy in relation to bullying behaviour among prisoners. *Legal and Criminological Psychology*, 4, 41–66.

Jackson, A.L., & Bonacker, N. (2006). The effect of victim-impact training programs on the development of guilt, shame and empathy among offenders. *International Review of Victimology*, 13, 301-324.

Jolliffe, D., & Farrington, D. P. (2004). Empathy and offending: A systematic review and meta-analysis. *Aggression and Violent Behavior*, 9, 441–476.

Jolliffe, D., & Farrington, D. P. (2006). Development and validation of the basic empathy scale. *Journal of Adolescence*, 29, 589–611.

Jones, A. P., Happé, F. G., Gilbert, F., Burnett, S., & Viding, E. (2010). Feeling, caring, knowing: different types of empathy deficit in boys with psychopathic tendencies and autism spectrum disorder. *Journal of Child Psychology and Psychiatry*, 51(11), 1188-1197.

Kaland, N., Callesen, K., Møller-Nielsen, A., Mortensen, E., & Smith, L. (2008). Performance of children and adolescents with Asperger syndrome or high functioning autism on advanced theory of mind tasks. Journal of Autism And Developmental Disorders, 38(6), 1112-1123.

Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child*, 2, 217-250

Karpman, B. (1948). The myth of the psychopathic personality. *American Journal of Psychiatry*, 104, 523-534.

Kawakamia, C., Ohnishic, M., Sugiyamac, T., Somekic, F., Nakamurae, K. and Tsujii, M. (2012). The risk factors for criminal behaviour in high-functioning autism spectrum disorders (HFASDs): A comparison of childhood adversities between individuals with HFASDs who exhibit criminal behaviour and those with HFASD and no criminal histories. *Research in Autism Spectrum Disorders*, 6, 949–957.

Keenan, T., & Ward, T. (2000). A theory of mind perspective on cognitive, affective and intimacy deficits in child sexual offenders. Sexual Abuse: A Journal of Research and Treatment, 12, 49-60.

Kelly, J. (2014). The development and preliminary evaluation of a thinking skills programme for adults with learning disabilities at risk of offending. *Journal of Forensic Practice*. 16(1), 32-45.

Kim, J. H., Choi, S. S., Rhee, M. S., Kim, S. B., Joung, J. S., & Kim, E. H. (2012). Effect of sex offenders treatment program on cognitive and emotional characteristics of mentally ill sex offenders. *Journal of forensic sciences*, 57(6), 1608-1613.

Kline, P. (1986). *A handbook of test construction: Introduction to psychometric design*. Methuen, New York.

Lai, M. C., Lombardo, M. V., Pasco, G., Ruigrok, A. N., Wheelwright, S. J., Sadek, S. A., and Chakrabarti, M., MRC AIMS Consortium, Baron-Cohen, S. (2011). A behavioral comparison of male and female adults with high functioning autism spectrum conditions. *PloS one*, 6(6), e20835.

Lander, G. C., Lutz-Zois, C. J., Rye, M. S., & Goodnight, J. A. (2012). The differential association between alexithymia and primary versus secondary psychopathy. *Personality and Individual Differences*, *52*(1), 45-50.

Langdon, P. E., Murphy, G. H., Clare, I. C. H, Steverson, T. & Palmer, E. J. (2011) Relationships among moral reasoning, empathy, and distorted cognitions in men with intellectual disabilities and a history of criminal offending. *American journal on intellectual and developmental disabilities*, 116(6), 438-456

Långström, N., Grann, M., Ruchkin, V., Sjostedt, G. & Fazel, S. (2009). Risk factors for violent offending in autism spectrum disorder: a national study of hospitalized individuals. *Journal of Interpersonal Violence*. *24*, 1358–1370.

Lauterbach, O. & Hosser, D. (2007). Assessing Empathy in Prisoners – A Shortened Version of the Interpersonal Reactivity Index. *Swiss Journal of Psychology*, 66 (2), 2007, 91–101.

Lerner, M. D., Haque, O. S., Northrup, E. C., Lawer, L., & Bursztajn, H. J. (2012). Emerging perspectives on adolescents and young adults with high-functioning autism spectrum disorders, violence, and criminal law. *Journal of the American Academy of Psychiatry and the Law Online*, *40*(2), 177-190.

Lester, D. & White, J. (2011). Necrophilia in serial killers: is there evidence for Asperger's syndrome. *Clinical Neuropsychiatry*, 8(6).

Levenson, M. R., Kiehl, K. A., & Fitzpatrick, C. M. (1995). Assessing psychopathic attributes in a noninstitutionalised population. *Journal of Personality and Social Psychology*, 68, 151–158.

Levinson, A., & Fonagy, P. (2004). Offending and Attachment: The Relationship between Interpersonal Awareness and Offending in a Prison Population with Psychiatric Disorder. *Canadian Journal of Psychoanalysis/Revue Canadienne de Psychanalyse*. 12, 225–251.

Lilienfeld, S. O., Fowler, K. A., & Patrick, C. (2006). The self-report assessment of psychopathy. *Handbook of psychopathy*, 107-132.

Lilienfeld, S. O., Widows, M. R., & Staff, P. A. R. (2005). Psychopathic Personality InventoryTM-Revised. *Social Influence (SOI)*, *61*(65), 97.

Lindsey, R. E., Carlozzi, A. F., & Eells, G. T. (2001). Differences in dispositional empathy of juvenile sex offenders, non-sex-offending delinquent juveniles, and nondelinquent juveniles. *Journal of Interpersonal Violence*, 16, 510–521.

Lombardo, M. V., Chakrabarti, B., Bullmore, E. T., Sadek, S. A., Pasco, G., Wheelwright, S. J., Suckling, J. & Baron-Cohen, S. (2010). Atypical neural self-representation in autism. *Brain*, *133*(2), 611-624.

Looman, J., & Abracen, J. (2013). The Risk Need Responsivity Model of Offender Rehabilitation: Is There Really a Need For a Paradigm Shift? *International Journal of Behavioral Consultation and Therapy*, 8(3-4).

Lord, C., Rutter, M. & Le Couteur, A. (1994). Autism Diagnostic Interview-revised. *Journal of Autism and Developmental Disorders, 24*, 659-686.

Loucks, N. and Talbot, J. (2007). No One Knows: Identifying and supporting prisoners with learning difficulties and learning disabilities: the views of prison staff. *Prison Reform Trust*, London.

Lynam, D. R., Whiteside, S. & Jones, S. (1999). Self-reported Psychopathy: A validation study. Journal of Personality Assessment. 73, 110-132.

Mack, T. D., Hackney, A. A., & Pyle, M. (2011). The relationship between psychopathic traits and attachment behavior in a non-clinical population. Personality and Individual Differences, 51(5), 584-588.

Main, M. and Soloman, J. (1990). Procedures for identifying infants as disorganized/disorieneted during the Ainsworth Strange Situation. In Greenberg, M. T., Cicchetti, D. and Cummings, E. M. (eds.). *Attachment in the preschool years: Theory, research and intervention* (pp. 134–146). Chicago, University of Chicago Press.

Markram, K., & Markram, H. (2010). The intense world theory–a unifying theory of the neurobiology of autism. *Frontiers in human neuroscience*, *4*.

Marshall, W. L., Hamilton, K. and Fernandez, Y. (2001), Empathy deficits and cognitive distortions in child molesters. *Sexual Abuse: A journal of research and treatment*, 13 (2), 123-130.

Marshall, W. L., Hudson, S. M., Jones, R., & Fernandez, Y. M. (1995). Empathy in sex offenders. *Clinical psychology review*, *15*(2), 99-113.

Marshall, W. L., Jones, R., Hudson, S. M., & McDonald, E. (1993). Generalized empathy in child molesters. *Journal of Child Sexual Abuse*, 2, 61-68.

Mathersul, D., McDonald, S., & Rushby, J. A. (2013). Understanding advanced theory of mind and empathy in high-functioning adults with autism spectrum disorder. *Journal of clinical and experimental neuropsychology*, 35(6), 655-668.

Maunder, R. G., Panzer, A., Viljoen, M., Owen, J., Human, S., & Hunter, J. J. (2006). Physicians' difficulty with emergency department patients is related to patients' attachment style. *Social Science & Medicine*, 63(2), 552-562.

McCall, C. & Singer, T. (2013). Empathy and the brain. In Baron-Cohen, S., Lombardo, M., Tager-Flusberg, H., & Cohen, D. (Eds.), *Understanding Other Minds: Perspectives from developmental social neuroscience*. Oxford, Oxford University Press.

McKillop, N., Smallbone, S., Wortley, R., & Andjic, I. (2012). Offenders' Attachment and Sexual Abuse Onset A Test of Theoretical Propositions. Sexual abuse: a journal of research and treatment, 24(6), 591-610.

Mead, G. H. (1934). *Mind, Self and Society*. Chicago: University of Chicago Press.

Meffert, H., Gazzola, V., den Boer, J. A., Bartels, A. A., & Keysers, C. (2013). Reduced spontaneous but relatively normal deliberate vicarious representations in psychopathy. Brain, 136(8), 2550-2562.

Mehrabian, A., & Epstein, N. (1972). A measure of emotional empathy. *Journal of Personality*, 40, 525–543.

Meyer, B., & Pilkonis, P. A. (2002). Attachment style. In J. C. Norcross (Ed.), *Psychotherapy relationships that work: Therapist contributions and responsiveness to patients* (pp. 367-382). London: Oxford University Press.

Michel, T. M., Herholz, S., Finkelmeier, A., Schneider, F., Brügmann, E., Haeck, M., ... & Habel, U. (2011). The neuronal correlates of empathy in autism spectrum disorders. European Psychiatry, 26, 1467.

Mikulincer, M., Gillath, O., Halevy, V., Avihou, N., Avidan, S., & Eshkoli, N. (2001). Attachment theory and rections to others' needs: Evidence that activation of the sense of attachment security promotes empathic responses. *Journal of personality and social psychology,* 81(6), 1205.

Mikulincer, M., & Shaver, P. R. (2007). *Attachment patterns in adulthood: Structure, dynamics, and change*. New York, Guilford Press.

Miller, J. D., Gaughan, E. T., & Pryor, L. R. (2008). The Levenson Self-Report Psychopathy Scale An Examination of the Personality Traits and Disorders Associated With the LSRP Factors. *Assessment*, 15(4), 450-463.

Miller, J. D., Dir, A., Gentile, B., Wilson, L., Pryor, L. R., & Campbell, W. K. (2010). Searching for a vulnerable dark triad: Comparing factor 2 psychopathy, vulnerable narcissism, and borderline personality disorder. Journal of Personality, 78(5), 1529-1564.

Mills, J. F., Kroner, D. G., & Hemmati, T. (2003). Predicting violent behavior through a static- stable variable lens. *Journal of Interpersonal Violence*, 18, 891-904.

Monahan, S. H. J., Silver, E., Appelbaum, P. S., Robbins, P. C., Mulvey, E. P., et al. (2001). Rethinking Risk Assessment *The MacArthur Study of Mental Disorder and Violence*. New-York, Oxford University Press.

Monahan, J., Steadman, H. 1., Silver, E., Applebaum, P. S., Robbins, P. c., & Mulvey, E. P. et aI. (200I). *Rethinking risk assessment: The MacArthur study of mental disorder and violence*. New York, NY: Oxford University Press.

Montag, C., Heinz, A., Kunz, D., Gallinat, J. (2007). Self-reported empathic abilities in schizophrenia. *Schizophrenia Research*, 92(1–3): 85–89.

Mouridsen, S., Rich, B., Isager, T. & Nedergaard, N. (2008). Pervasive developmental disorders and criminal behaviour. *International Journal of Offender Therapy and Comparative Criminology*, *52 (2)*, 196–205.

Mullins-Nelson, J. L., Salekin, R. T., & Leistico, A. M. R. (2006). Psychopathy, empathy, and perspective-taking ability in a community sample: Implications for

the successful psychopathy concept. *International Journal of Forensic Mental Health*, 5(2), 133-149.

Murphy, D. (2003). Admission and cognitive details of male patients with Asperger's syndrome detained in a special hospital: comparison with a schizophrenia and personality disorder sample. *The Journal of Forensic Psychiatry & Psychology*. *14 (3)*, 506–524.

Murphy, D. (2007). Brief Correspondence: Hare psychopathy checklist revised profiles of male patients with Asperger's syndrome detained in high security psychiatric care. Personal e-mail correspondence, May (2011).

Murphy, D. (2010). Extreme violence in a man with an autistic spectrum disorder: assessment and treatment within high-security psychiatric care. The Journal of *Forensic Psychiatry & Psychology*, 21(3), 462-477.

Murphy, D. (2013a). Risk assessment of offenders with an autism spectrum disorder. *Journal of Intellectual Disabilities and Offending Behaviour*, 4(1/2), 5-5.

Murphy, D. (2013b). Self-reported anger among individuals with an autism spectrum disorder detained in high security psychiatric care: do preoccupations have an influence?. *The Journal of Forensic Psychiatry & Psychology*, (ahead-of-print), 1-13.

Murrie, D. C., Warren, J. I., Kristiansson, M., & Dietz, P. E. (2002). Asperger's syndrome in forensic settings. *International Journal of Forensic Mental Health*, 1, 59–70.

National Institute for Health and Care Excellence (2014) Autism: recognition, referral, diagnosis and management of adults on the autism spectrum, NICE Clinical Guideline 142. London: British Psychological Society & The Royal College of Psychiatrists.

Newman, S. S., & Ghaziuddin, M. (2008). Violent crime in Asperger syndrome: The role of psychiatric morbidity. *Journal of Autism and Developmental Disorders*, 38, 1848–1852.

Nomura, K. & Akai, S. (2012). Empathy with fictional stories: reconsideration of the fantasy scale of the interpersonal reactivity index. *Psychological Reports*, 110, 304-314.

Nylander, L., & Gillberg, C. (2001). Screening for autism spectrum disorders in adult psychiatric out- patients: a preliminary report. *Acta Psychiatrica Scandinavica*, 103(6), 428-434.

Okun, M. A., Shepard, S. A., & Eisenberg, N. (2000). The relations of emotionality and regulation to dispositional empathy-related responding among volunteers-in-training. *Personality and Individual Differences*, 28, 367-382.

Palermo, M.T. (2004). 'Pervasive developmental disorders, psychiatric co-morbidities, and the law'. *International Journal of Offender Therapy and Comparative Criminology,* 48, 40-48.

Pellicano, E., & Burr, D. (2012). When the world becomes 'too real': a Bayesian explanation of autistic perception. *Trends in cognitive sciences, 16*(10), 504-510.

Perry, A. & Shamay-Tsoory, S. (2013). Understanding emotional and cognitive empathy: a neuropsychological perspective. In Baron-Cohen, S., Lombardo, M., Tager-Flusberg, H., & Cohen, D. (Eds.), *Understanding Other Minds: Perspectives from developmental social neuroscience*. Oxford, Oxford University Press.

Piaget, J. (1967). *Six Psychological Studies*. New York, Random House.

Polaschek, D. L. L. (2003). Empathy and victim empathy. In T. Ward, D. R. Laws, & S. M. Hudson (Eds.), Sexual Deviance: Issues and controversies (pp. 172-189). Thousand Oaks, CA: Sage.

Polascheck, D.L. & Reynolds, N. (2001). Assessment and treatment: Violent offenders. In R. Hollin (Ed.), *Handbook of Offender Assessment and Treatment*. Chichester: John Wiley & Sons Ltd.

Prichard, J. C. (1835). *A Treatise on Insanity*. Gilbert and Piper, London, Sherwood.

Purvis, M. (2010). *Seeking a Good Life: Human Goods and Sexual Offending*. Lambert Academic Press, Germany.

Radley, D. and Shaherbano, Z. (2011). Asperger syndrome and arson: a case study. *Advances in Mental Health and Intellectual Disabilities,* 5(6), 32-36.

Ravitz, P., Maunder, R., Hunter, J., Sthankiya, B., & Lancee, W. (2010). Adult attachment measures: A 25-year review. *Journal of Psychosomatic Research*, 69, 419-432.

Renn, P. (2002). The link between childhood trauma and later violent offending: The application of attachment theory in a probation setting. *Attachment and Human Development*, 4, 294-317.

Rich, P. (2006). Attachment and Sexual Offending: Understanding and applying attachment theory to the treatment of juvenile sexual offenders. West Sussex, England, John Wiley and Sons Ltd.

Richell, R., Mitchell, D., Newman, C., Leonard, A., Baron-Cohen, S., & Blair, R. (2003). Theory of mind and psychopathy: Can psychopathic individuals read the 'language of the eyes'? Neuropsychologia, 41, 523-526.

Rizzolatti, G. & Craighero, L. (2004). The mirror-neuron system. *Annual Review of Neuroscince*, 27, 169–192.

Robinson, L., Spencer, M. D., Thomson, L. D., Sprengelmeyer, R., Owens, D. G., Stanfield, A. C., ... & Johnstone, E. C. (2012). Facial emotion recognition in Scottish prisoners. International journal of law and psychiatry, 35(1), 57-61.

Rogers, S. J., Ozonoff S., & Maslin-Cole, C. (1991). A comparative study of attachment behaviour in young children with autism or other psychiatric disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 483–8.

Rogers, J., Viding, E., Blair, R. J., Frith, U. & Happé, F. (2006). Autism spectrum disorder and psychopathy: shared cognitive underpinnings or double hit? *Psychological Medicine*, 36, 1789-1798.

Rogers, K., Dziobek, I., Hassenstab, J., Wolf, O. T. & Convit, A. (2004). Who Cares? Revisiting Empathy in Asperger Syndrome. *Journal of Autism and Developmental Disorders*. 37(4), 709 – 715.

Ross, T. & Pfäfflin, F. (2004). Violence and Attachment; Attachment styles, self-regulation and interpersonal problems in a prison population. In F. Pfäfflin and G. Adshead (Eds.), *A matter of security: The application of attachment theory to forensic psychiatry and psychotherapy* (pp. 225-249). London, Jessica Kingsley.

Rutgers AH, et al. 2004 Autism and attachment: a meta-analytic review. Journal of Child Psychology and Psychiatry, 45, 1123–1134.

Rutter M, Bailey A, Lord C. (2003). *Social Communication Questionnaire (SCQ).* Los Angeles (CA): Western Psychological Services.

Sampio, L. R., Guimarães, P. R. B., Camino, C. P., Formiga, N. S. & Menezes, I. G. (2011). Estudos sobre a dimensionalidade da empatia: tradução e adaptação do Interpersonal Reactivity Index (IRI). *PSICO*, 42(1), 67-76,

Schneck, M. M., Bowers, T. G., & Turkson, M. A. (2012). Sex-role orientation and attachment styles of sex offenders, *Psychological Reports*, 110(2), 624-638.

Shamay-Tsoory, S. G., Tomer, R., Yani, S. & Aharon-Peretz, J. (2002). Empathy Deficits in Asperger Syndrome: a Cognitive Profile. *Neurocase: The Neural Basis of Cognition*, 8(3), 245-252.

Shamay-Tsoory Baron-Cohen, S., Lombardo, M., Tager-Flusberg, H., & Cohen, D. (Eds.). (2013). *Understanding Other Minds: Perspectives from developmental social neuroscience*. Oxford, Oxford University Press.

Shaver, P. R. and Mikulincer, M. (2009). Adult Attachment Strategies and the Regulation of Emotion in, Gross, J. J. (Ed.). *Handbook of Emotion Regulation*, Guilford Press.

Sellbom, M. (2011). Elaborating on the construct validity of the Levenson Self-Report Psychopathy Scale in incarcerated and non-incarcerated samples. Law and human behavior, 35(6), 440-451.

Sibley, C. G., Fischer, R., & Liu, J. H. (2005). Reliability and validity of the revised experiences in close relationships (ECR-R) self-report measure of adult romantic attachment. *Personality and Social Psychology Bulletin*, 31, 1524-1536

Sibley, C. G., & Liu, J. H. (2004). Short-term temporal stability and factor structure of the revised experiences in close relationships (ECR-R) measure of adult attachment. *Personality and Individual Differences*, 36, 969-975

Sigman, M., Mundy, P., Sherman, T., and Ungerer, J. (1986). Social interactions of autistic, mentally retarded and normal children and their caregivers. *Journal of Child Psychology and Psychiatry*, 27, 647–56.

Sigman, M., Dissanayake, C., Corona, R., & Espinosa, M. (2003). Social and cardiac responses of young children with autism. *Autism*, 7, 205-216.

Silani, G., Bird, G., Brindley, R., Singer, T., Frith, C., & Frith, U. (2008). Levels of emotional awareness and autism: an fMRI study. *Social neuroscience*, 3(2), 97-112.

D'Silva, K., Duggan, C., & McCarthy, L. (2004). Does treatment really make psychopaths worse? A review of the evidence. *Journal of personality disorders*, 18(2), 163-177

Simpson, J. A., Kim, J. S., Fillo, J., Ickes, W., Rholes, W. S., Oriña, M. M. & Winterheld, H. A. (2011). Attachment and the management of empathic accuracy in relationship-threatening situations. *Personalaty and Social Psychology Bulletin*, 37(2), 242-254

Singer, T. & Lamm, C. (2009). The social neuroscience of empathy. *Annals of the New York Academy of Sciences*, *1156*(1), 81-96.

Siponmaa, L., Kristiansson, M., Jonson, C., Nyden, A., & Gillberg, C. (2001). Juvenile and young adult mentally disordered offenders: the role of child neuropsychiatric disorders. *Journal of the American Academy of Psychiatry and the Law Online*, *29*(4), 420-426.

Smith, A. (2009). The Empathy Imbalance Hypothesis of Autism: A Theoretical Approach to Cognitive and Emotional Empathy in Autistic Development. *The Psychological Record*, 59, 489-510

Spreng, R.N., McKinnon, M.C., Mar, R.A., Levine, B., 2009. The Toronto Empathy Questionnaire: scale development and initial validation of a factor-analytic solution to multiple empathy measures. *Journal of Personality Assessment* 91, 62–71.

Stein, E. (1989). *On the problem of empathy*. Washington: ICS Publications. (Original work published 1917)

Stokes, M., Newton, N. & Kaur, A. (2007). Stalking and social and romantic functioning among adolescents and adults with autistic spectrum disorder. *Journal of Autism and Developmental Disorders, 37 (10),*1969-1986.

Stotland, E. (1969). Exploratory investigations in empathy. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology*, 4, 271–314. New York, Academic Press.

Stotland, E., Mathews, K., Sherman, S., Hansson, R., & Richardson, B. (1978) *Empathy, fantasy, and helping*. Beverly Hills, Sage Publications.

Stotland, E., Sherman, S. E., & Shaver, K. G. (1971). *Empathy and birth order: Some experimental explorations*. Lincoln, University of Nebraska Press.

Tantam, D. (2013). *Autism Spectrum Disorders Through The Life Span*. London, Jessica Kingsley Publishers.

Tinbergen, N., & Tinbergen, E. A. (1983). Autistic. *Children: New Hope for a Cure. London: George Allen and Unwin*.

Turner, T. & Hamilton-Giachritsis, C. (2013). Flying high and falling hard: A qualitative exploration of empathy in offenders with ASD. Conference presentation. Meeting of Minds 4, Copenhagen, Denmark.

Turner, T. (2014). Autism Research and Bayesian Modelling. *Autonomy, the Critical Journal of Interdisciplinary Autism Studies, 1*(3).

van IJzendoorn, M. H., Feldbrugge, J.T.T.M., Derks, F. C. H., de Ruiter, C., Verhagen, M. F. M. & Philipse, M. W. G. (1997). Attachment representations of personality-disordered criminal offenders. *American Journal of Orthopsychiatry*, 67(3), 449–459.

Vitale, J. E., Smith, S. S., Brinkley, C. A., & Newman, J. P. (2002). The reliability and validity of the Psychopathy Checklist–Revised in a sample of female offenders. *Criminal justice and behavior*, 29(2), 202-231.

Voracek, M., & Dressler, S. G. (2006). Lack of correlation between digit ratio (2D: 4D) and Baron-Cohen's "Reading the Mind in the Eyes" test, empathy, systemising, and autism-spectrum quotients in a general population sample. *Personality and Individual Differences, 41*(8), 1481-1491.

Wachtel, L. E., & Shorter, E. (2013). Autism plus psychosis: A 'one-two punch 'risk for tragic violence?. *Medical hypotheses*, *81*(3), 404-409.

Wahlund, K. & Kristiansson, M. (2006) Offender characteristics in lethal violence with special reference to antisocial and autistic personality traits. *Journal of Interpersonal Violence. 21*, 1081–1091.

Wakabayashi, A., Baron-Cohen, S., Wheelwright, S., & Tojo, Y. (2006). The Autism-Spectrum Quotient (AQ) in Japan: a cross-cultural comparison. *Journal of autism and developmental disorders*, *36*(2), 263-270.

Wallace, G. L., Shaw, P., Lee, N. R., Clasen, L. S., Raznahan, A., Lenroot, R. K., ... & Giedd, J. N. (2012). Distinct cortical correlates of autistic versus antisocial traits in a longitudinal sample of typically developing youth. *The Journal of neuroscience*, *32*(14), 4856-4860.

Walters, A. S., Barrett, R. P., & Feinstein, C. (1990). Social relatedness and autism: current research, issues, directions. *Research in Developmental Disabilities*, 11, 303–26.

Ward, T., Polaschek, D. & Beech, A. R. (2006). *Theories of Sexual Offending*. John Wiley & Sons.

Ward, T. & Salmon, K. (2011). The ethics of care and treatment of sex offenders. *Sexual abuse: a journal of research and treatment*, *23*(3), 397-413.

Ward, T. & Keenan, T. (1999). Child molesters' implicit theories. Journal of Interpersonal Violence, 14, 821-838.

Ward, T., Hudson, S. M., & Marshall, W. L. (1995). Cognitive distortions and affective deficits in sex offenders: A cognitive deconstructionist interpretation. Sexual Abuse: A Journal of Research and Treatment, 7, 67-83.

Ward, T. (2002). The management of risk and the design of good lives. *Australian Psychologist*, 37, 172-179.

Wechsler, D. (1986). *The Wechsler Intelligence Test – Revised (WAIS-R).* Sidcup, Kent: the Psychological Corporation.

Wechsler, D. (1988). *The Wechsler Memory Scale – Revised (WMS-R*). Sidcup, Kent: the Psychological Corporation.

Wiehe, V. (2003). Empathy and narcissism in a sample of child abuse perpetrators and a comparison sample of foster parents. *Child Abuse and Neglect*, 27, 541-555.

Williams, K. M., & Paulhus, D. L. (2004). Factor structure of the Self-Report Psychopathy scale (SRP-II) in non-forensic samples. *Personality and Individual Differences*, 37(4), 765-778.

Wing, L. (1980). The MRC handicaps, behaviour & skills (HBS) schedule. Acta Psychiatrica Scandinavica, 62(S285), 241-248.

Wing, L. (1988). The continuum of autistic characteristics. In E. Schopler & G. M. Mesibov (Eds), *Diagnosis and assessment in autism*. New York: Plenum Press.

Wing, L. (1996). *The Autistic Spectrum***,** Robinson, London.

Wood, E. & Riggs, S. (2008). Predictors of Child Molestation Adult Attachment, Cognitive Distortions, and Empathy. *Journal of interpersonal violence*, 23(2), 259-275.

Wood, E. & Riggs, S. (2009). Adult attachment, cognitive distortions, and views of self, others, and the future among child molesters. *Sexual abuse: a journal of research and treatment*, 21(3), 375-390.

Woodbury-Smith, M., Clare, I., Holland ,A., Kearns, A., Staufenberg, E. & Watson, P. (2005) A case-control study of offenders with high functioning autistic spectrum disorders. *The Journal of Forensic Psychiatry & Psychology, 16 (4),* 747–763.

Woodbury-Smith, M., Clare I., Holland, A. & Kearns, A. (2006). High functioning autistic spectrum disorders, offending and other law-breaking: findings from a community sample. *The Journal of Forensic Psychiatry & Psychology, 17 (1),* 108–120.

Woodbury-Smith, M., & Dein, K. (2014). Autism Spectrum Disorder (ASD) and Unlawful Behaviour: Where Do We Go from Here? *Journal of autism and developmental disorders*, *44*(11), 2734-2741.

World Health Organization. (1992). *The ICD-10 international classification of mental and behavioral disorders: Clinical descriptions and diagnostic guidelines.* Geneva, Switzerland: Author.

Appendix 1: Search Results for Systematic Literature Review

Ovid Technologies, Inc.

Search for: remove duplicates from 2 [limit 1 to yr="1980 -Current"]

Results: 10

Database: PsycARTICLES Full Text, Embase <1974 to 2014 August 28>, CAB Abstracts <1973 to 2014 Week 34>, Embase Classic <1947 to 1973>, HMIC Health Management Information Consortium <1979 to July 2014>, Journals@Ovid Full Text <August 28, 2014>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1946 to Present>, PsycINFO <1967 to August Week 4 2014>

Search Strategy:

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1 ((ASD or autis* or asperger*) and (risk* or dynamic* or characteristic*) and (offen* or crim* or recidivis* or reoffen*) and (prison* or psychiatr* or forensic)).mp. [mp=ti, ab, tx, ct, sh, hw, tn, ot, dm, mf, dv, kw, bt, id, cc, nm, kf, px, rx, an, ui, tc, tm] (1501)

2 limit 1 to yr="1980 -Current" (1491)

3 remove duplicates from 2 (1266)

Applied Social Sciences Index and Abstracts (ASSIA)

S 1	((all(ASD*) OR all(asperger*) OR all(autis*)) AND (all(risk*) OR all(dynamic*) OR all(characteristic*)) AND (all(offen*) OR all(crim*) OR all(recidivis*) OR all(reoffen*)) AND (all(prison*) OR all(psychiatr*) OR all(forensic))) AND peer(yes)	Applied Social Sciences Index and Abstracts (ASSIA), ebrary® e-books	12°

Cochrane Central Register of Controlled Trials : Issue 7 of 12, July 2014

There is 1 result from 800283 records for your search on '(ASD or autis* or asperger*) and (risk* or dynamic* or characteristic*) and (offen* or crim* or recidivis* or reoffen*) and (prison* or psychiatr* or forensic) in Title, Abstract, Keywords in Trials'

Web of Science

Set	Results		Edit Sets	Combine Sets AND OR	Delete Sets
# 1	25	**TOPIC:** ((ASD or autis* or asperger*) and (risk* or dynamic* or characteristic*) and (offen* or crim* or recidivis* or reoffen*) and (prison* or psychiatr* or forensic)) *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH Timespan=All years*	Edit	Select to combine sets.	Select to delete this set.

Intute:

Your search for (ASD or autis* or asperger*) and (risk* or dynamic* or characteristic*) and (offen* or crim* or recidivis* or reoffen*) and (prison* or psychiatr* or forensic) produced no records

Campbell Systematic Reviews

	ID	Search	Hits	Del.	Export
	0	keywords is (ASD OR autis* OR asperger*) AND (risk* OR dynamic* OR characteristic*) AND (offen* OR crim* OR recidivis* OR reoffen*) AND (prison* OR psychiatr* OR forensic)	0		

TRIP Databases

115 results for "(ASD or autis* or asperger*) and (risk* or dynamic* or characteristic*) and (offen* or crim* or recidivis* or reoffen*) and (prison* or psychiatr* or forensic)"

115 results

- All Secondary Evidence
    - Evidence-based Synopses 11
    - Systematic Reviews 3
    - Guidelines
        - Aus & NZ 9
        - Canada 2
        - UK 43
        - USA 15
        - Other 3
- Clinical Q&A 0
- Key Primary Research 0
- Controlled Trials 0
- Extended Primary Research 1
- Case Reports 0
- eTextbooks 28

Appendix 2: Quality Assessment Checklist - Case Control Study

Quality Criteria	**Met (score 2)**	**Partially met (score 1)**	**Not met (score 0)**	**Unknown (score 0)**
General				
1. Are the aims of the study clear?				
2. Is the study relevant for my research question?				
3. Have suggestions for further research been made?				
4. Is the study methodology appropriate?				
Sampling and selection Bias				
5. Were the cases representative of distinct populations?				
6. Were there systematic exclusions of relevant participants due to confounding variables e.g. severe mental health problems?				
7. Are there any confounding variables that have not been accounted for?				
8. Have confounding variables been sufficiently accounted for?				
9. Were the groups adequately matched?				

Measurement Bias				
10. Were the assessment tools validated for all cases included in the study?				
11. Were the methods used for gathering data on risk factors the same for all cases?				
12. Were all participants diagnosed for an ASC using the same criteria in all groups (e.g. DSM-IVor ICD-10)?				
Reporting Bias				
13. Were the reported findings/inferences justified by the results?				
14. Was the sample sufficiently large to justify generalisation of findings?				
Ethics				
15. Have ethical issues been adequately addressed?				
16. Was participant consent obtained?				
17. Was the appropriate statistical analysis carried out?				
18. Has confidentiality or anonymity been maintained?				
Exclusion Bias				
19. Were participants excluded for				

similar criteria in all groups?				
20.Did the researchers acknowledge potential bias in the study due to exclusion?				
21. Was bias introduced by a low response rate?				

Appendix 3: Quality Assessment Checklist – Cross-sectional Study

Quality Criteria	**Met (score 2)**	**Partially met (score 1)**	**Not met (score 0)**	**Unknown (score 0)**
General				
1. Are the aims of the study clear?				
2. Is the study relevant for my research question?				
3. Is the study methodology appropriate?				
4. Have suggestions for further research been made?				
Sampling and selection Bias				
5. Was the sample representative of a distinct population?				
6. Were there systematic exclusions of relevant participants due to confounding variables e.g. severe mental health problems?				
7. Are there any confounding variables which have not been accounted for?				
8. Have confounding variables been				

sufficiently accounted for?				
Measurement and methodological Bias				
9. Were the assessment tools used validated for the population in the study?				
10. Were the methods used for gathering data on risk factors the same for all participants in the sample?				
11. Were all participants diagnosed for an ASC using the same criteria in all groups (e.g. DSM-IVor ICD-10)?				
12. Was the appropriate statistical analysis carried out?				
Reporting Bias				
13. Were the reported findings/inferences justified by the results?				
14. Was the sample sufficiently large to justify generalisation of findings?				
Ethics				
15. Have ethical issues been				

adequately addressed?				
16. Was participant consent obtained?				
17. Has confidentiality or anonymity been maintained?				
Exclusion Bias				
18. Were participants excluded based on similar criteria?				
19. Was bias introduced by a low response rate?				
20. Did the researchers acknowledge potential bias in the study due to exclusion?				

Appendix 4: Quality Assessment Checklist – Case Series Study

Quality Criteria	**Met (score 2)**	**Partially met (score 1)**	**Not met (score 0)**	**Unknown (score 0)**
General				
1. Are the aims of the study clear?				
2. Is the study relevant for my research question?				
3. Have suggestions for further research been made?				
Sampling and selection Bias				
4. Were the cases representative of distinct populations?				
5. Were there clear explicit inclusion criteria?				
6. Was there any follow-up reported?				
7. Were the individuals adequately matched?				
Measurement Bias				
8. Were the methods used				

for gathering data on risk factors the same for all cases?				
Reporting Bias				
8. Were the methods used for gathering data on risk factors valid?				
9. Were the reported findings/inferences justified by the results?				
10. Was the sample sufficiently large to generate useful findings (>4)?				
Ethics				
11. Have ethical issues been adequately addressed?				
12. Was participant consent obtained?				
13. Has confidentiality or anonymity been maintained?				
Exclusion Bias				
14. Did the researchers				

acknowledge potential bias in the study (e.g. access to participants, automatic exclusions)?				

Appendix 5: Quality Assessment Checklist – Case Study

Quality Criteria	**Met (score 2)**	**Partially met (score 1)**	**Not met (score 0)**	**Unknown (score 0)**
General				
1. Are the aims of the study clear?				
2. Is the study relevant for my research question?				
3. Is the case study sufficiently rich in detail?				
4. Have suggestions for further research been made?				
Sampling and selection Bias				
5. Is the case representative of a distinct population (offenders with ASD)?				
6. Were there clear explicit inclusion criteria?				
7. Was there any follow-up reported?				
Measurement Bias				
8. Were the methods used for gathering data on risk factors				

valid?				
Reporting Bias				
9. Were the reported findings justified by the results				
10. Were case formulations developed by a team?				
Ethics				
11. Have ethical issues been adequately addressed?				
12. Was participant consent obtained?				
13. Has confidentiality or anonymity been maintained?				
Exclusion Bias				
14. Did the researchers acknowledge potential bias in the study (e.g. access to participants, automatic exclusions)?				

Appendix 6: INTERPERSONAL REACTIVITY INDEX (IRI)

Identifier: _____

Age: _____ years

Length of time in prison: _____Years _____ months

Index Offence :_____

The following statements ask about your thoughts and feelings in a variety of situations. For each item, show how well it describes you by choosing the appropriate number on the scale at the top of the page: 1, 2, 3, 4, or 5. When you have decided on your answer, fill in the blank next to the item. **READ EACH ITEM CAREFULLY BEFORE RESPONDING.** Answer as honestly and as accurately as you can. Thank you.

ANSWER SCALE:

1 2 3 4 5

DOES NOT DESCRIBE ME WELL — DESCRIBES ME VERY WELL

__ 1. I daydream and fantasize, with some regularity, about things that might happen to me.

__ 2. I often have tender, concerned feelings for people less fortunate than me.

__ 3. *I sometimes find it difficult to see things from the "other guy's" point of view.*

__ 4. *Sometimes I don't feel very sorry for other people when they are having problems.*

__ 5. I really get involved with the feelings of the characters in a novel.

__ 6. In emergency situations, I feel apprehensive and ill-at-ease.

__ 7. *I am usually objective when I watch a movie or play, and I don't often get completely caught up in it.*

__ 8. I try to look at everybody's side of a disagreement before I make a decision.

__ 9. When I see someone being taken advantage of, I feel kind of protective towards them.

__ 10. I sometimes feel helpless when I am in the middle of a very emotional situation.

__ 11. I sometimes try to understand my friends better by imagining how things look from their perspective.

__ 12. *Becoming extremely involved in a good book or movie is somewhat rare for me*.

__ 13. *When I see someone get hurt, I tend to remain calm*.

__ 14. *Other people's misfortunes do not usually disturb me a great deal*.

__ 15. *If I'm sure I'm right about something, I don't waste much time listening to other people's arguments*.

__ 16. After seeing a play or movie, I have felt as though I were one of the characters.

__ 17. Being in a tense emotional situation scares me.

__ 18. *When I see someone being treated unfairly, I sometimes don't feel very much pity for them.*

__ 19. *I am usually pretty effective in dealing with emergencies.*

__ 20. I am often quite touched by things I see happen.

__ 21. I believe that there are two sides to every question and try to look at them both.

__ 22. I would describe myself as a pretty soft-hearted person.

__ 23. When I watch a good movie, I can very easily put myself in the place of a leading character.

__ 24. I tend to lose control during emergencies.

__ 25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while.

__ 26. When I'm reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.

__ 27. When I see someone who badly needs help in an emergency, I go to pieces.

__ 28. Before criticizing somebody, I try to imagine how I would feel if I were in their place.

Appendix 7: Experiences in Close Relationships-Revised (ECR-R) Questionnaire

Instructions: The statements below concern how you feel in emotionally intimate relationships with others. This could be a parent, a romantic partner or a friend. We are interested in how you *generally* experience relationships, not just in what is happening in a current relationship. Respond to each statement by ticking a box to indicate how much you agree or disagree with the statement.

	Strongly Disagree	Dis-agree	Dis-agree Some what	Neutral	Agree Somew hat	Agree	Strongly Agree
1. I'm afraid that I will lose other peoples love.							
2. Others really understand me and my needs.							
3. I often worry that others will not want to stay with me.							
4. It's easy for me to be affectionate with others.							
5. I often worry that other people don't really love me.							
6. I find it easy to depend on people close to me.							
7. I worry that others won't care about me as much as I care about them.							
8. I feel comfortable depending on others.							
9. I often wish that other's feelings for me							

were as strong as my feelings for them.							
	Strongly Disagree	Dis-agree	Dis-agree Some what	Neutral	Agree Some what	Agree	Strongly Agree
10. I talk things over with others I am close to.							
11. I worry a lot about my relationships.							
12. I tell the people that I am close to just about everything.							
13. When people I am close to are out of sight, I worry that they might become interested in someone else.							
14. When I show my feelings for others, I'm afraid they will not feel the same about me.							
15. I rarely worry about the people I am close to leaving me.							
16. The people I am close to make me doubt myself.							
17. I do not often worry about being abandoned.							
18. I find that							

those I am close to don't want to get as close as I would like.							
	Strongly Disagree	Dis-agree	Dis-agree Some what	Neutral	Agree Some what	Agree	Strongly Agree
19. It helps to turn to others in times of need.							
20. Sometimes people I am close to change their feelings about me for no apparent reason.							
21. I find it relatively easy to get close to others.							
22. My desire to be very close sometimes scares people away.							
23. It's not difficult for me to get close to others							
24. I'm afraid that once others get to know me, they won't like who I really am.							
25. I usually discuss my problems and concerns with people close to me.							
26. It makes me mad that I don't get the affection and support I need from those I am close to.							

27. I find it difficult to allow myself to depend on others.							
	Strongly Disagree	Dis-agree	Dis-agree Some what	Neutral	Agree Some what	Agree	Strongly Agree
28. I am nervous when others get too close to me.							
29 I worry that I won't measure up to other people.							
30. Others only seem to notice me when I'm angry.							
31. I prefer not to show those I am close to how I feel deep down.							
32. I feel comfortable sharing my private thoughts and feelings with people close to me.							
33. I am very comfortable being close to others							
34. I don't feel comfortable opening up to others							
35. I prefer not to be too close to others							
36. I get uncomfortable							

when others want to be very close.							

Appendix 8: The Adult Autism Spectrum Quotient (AQ)

Ages 16+

FOR RESEARCH USE ONLY.

How to fill out the questionnaire

Below are a list of statements. Please read each statement very carefully and rate how strongly you agree or disagree with it by circling your answer.

DO NOT MISS ANY STATEMENT OUT.

Examples

E1. I am willing to take risks.	definitely agree	slightly agree	slightly disagree	definitely disagree
E2. I like playing board games.	definitely agree	slightly agree	slightly disagree	definitely disagree
E3. I find learning to play musical instruments easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
E4. I am fascinated by other cultures.	definitely agree	slightly agree	slightly disagree	definitely disagree

1. I prefer to do things with others rather than on my own.	definitely agree	slightly agree	slightly disagree	definitely disagree
2. I prefer to do things the same way over and over again.	definitely agree	slightly agree	slightly disagree	definitely disagree
3. If I try to imagine something, I find it very easy to create a picture in my mind.	definitely agree	slightly agree	slightly disagree	definitely disagree
4. I frequently get so strongly absorbed in one thing that I lose sight of other things.	definitely agree	slightly agree	slightly disagree	definitely disagree
5. I often notice small sounds when others do not.	definitely agree	slightly agree	slightly disagree	definitely disagree
6. I usually notice car number plates or similar strings of information.	definitely agree	slightly agree	slightly disagree	definitely disagree
7. Other people frequently tell me that what I've said is impolite, even though I think it is polite.	definitely agree	slightly agree	slightly disagree	definitely disagree

8. When I'm reading a story, I can easily imagine what the characters might look like.	definitely agree	slightly agree	slightly disagree	definitely disagree
9. I am fascinated by dates.	definitely agree	slightly agree	slightly disagree	definitely disagree
10. In a social group, I can easily keep track of several different people's conversations.	definitely agree	slightly agree	slightly disagree	definitely disagree
11. I find social situations easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
12. I tend to notice details that others do not.	definitely agree	slightly agree	slightly disagree	definitely disagree
13. I would rather go to a library than a party.	definitely agree	slightly agree	slightly disagree	definitely disagree
14. I find making up stories easy.	definitely agree	slightly agree	slightly disagree	definitely disagree
15. I find myself drawn more strongly to people than to things.	definitely agree	slightly agree	slightly disagree	definitely disagree
16. I tend to have very strong interests which I get upset about if I can't pursue.	definitely agree	slightly agree	slightly disagree	definitely disagree
17. I enjoy social chit-chat.	definitely agree	slightly agree	slightly disagree	definitely disagree
18. When I talk, it isn't always easy for others to get a word in edgeways.	definitely agree	slightly agree	slightly disagree	definitely disagree
19. I am fascinated by numbers.	definitely agree	slightly agree	slightly disagree	definitely disagree
20. When I'm reading a story, I find it difficult to work out the characters' intentions.	definitely agree	slightly agree	slightly disagree	definitely disagree
21. I don't particularly enjoy reading fiction.	definitely agree	slightly agree	slightly disagree	definitely disagree
22. I find it hard to make new friends.	definitely agree	slightly agree	slightly disagree	definitely disagree
23. I notice patterns in things all the time.	definitely agree	slightly agree	slightly disagree	definitely disagree

24. I would rather go to the theatre than a museum.	definitely agree	slightly agree	slightly disagree	definitely disagree
25. It does not upset me if my daily routine is disturbed.	definitely agree	slightly agree	slightly disagree	definitely disagree
26. I frequently find that I don't know how to keep a conversation going.	definitely agree	slightly agree	slightly disagree	definitely disagree
27. I find it easy to "read between the lines" when someone is talking to me.	definitely agree	slightly agree	slightly disagree	definitely disagree
28. I usually concentrate more on the whole picture, rather than the small details.	definitely agree	slightly agree	slightly disagree	definitely disagree
29. I am not very good at remembering phone numbers.	definitely agree	slightly agree	slightly disagree	definitely disagree
30. I don't usually notice small changes in a situation, or a person's appearance.	definitely agree	slightly agree	slightly disagree	definitely disagree
31. I know how to tell if someone listening to me is getting bored.	definitely agree	slightly agree	slightly disagree	definitely disagree
32. I find it easy to do more than one thing at once.	definitely agree	slightly agree	slightly disagree	definitely disagree
33. When I talk on the phone, I'm not sure when it's my turn to speak.	definitely agree	slightly agree	slightly disagree	definitely disagree
34. I enjoy doing things spontaneously.	definitely agree	slightly agree	slightly disagree	definitely disagree
35. I am often the last to understand the point of a joke.	definitely agree	slightly agree	slightly disagree	definitely disagree
36. I find it easy to work out what someone is thinking or feeling just by looking at their face.	definitely agree	slightly agree	slightly disagree	definitely disagree
37. If there is an interruption, I can switch back to what I was doing very quickly.	definitely agree	slightly agree	slightly disagree	definitely disagree
38. I am good at social chit-chat.	definitely agree	slightly agree	slightly disagree	definitely disagree
39. People often tell me that I keep going on and on about the same thing.	definitely agree	slightly agree	slightly disagree	definitely disagree
40. When I was young, I used to enjoy playing games involving pretending with other children.	definitely agree	slightly agree	slightly disagree	definitely disagree
41. I like to collect information about categories of	definitely	slightly	slightly	definitely

things (e.g. types of car, types of bird, types of train, types of plant, etc.).	agree	agree	disagree	disagree
42. I find it difficult to imagine what it would be like to be someone else.	definitely agree	slightly agree	slightly disagree	definitely disagree
43. I like to plan any activities I participate in carefully.	definitely agree	slightly agree	slightly disagree	definitely disagree
44. I enjoy social occasions.	definitely agree	slightly agree	slightly disagree	definitely disagree
45. I find it difficult to work out people's intentions.	definitely agree	slightly agree	slightly disagree	definitely disagree
46. New situations make me anxious.	definitely agree	slightly agree	slightly disagree	definitely disagree
47. I enjoy meeting new people.	definitely agree	slightly agree	slightly disagree	definitely disagree
48. I am a good diplomat (i.e. person who can keep the peace)	definitely agree	slightly agree	slightly disagree	definitely disagree
49. I am not very good at remembering people's date of birth.	definitely agree	slightly agree	slightly disagree	definitely disagree
50. I find it very easy to play games with children that involve pretending.	definitely agree	slightly agree	slightly disagree	definitely disagree

Appendix 9: Levenson Self Report Psychopathy (LSRP) Questionnaire

1 = Disagree strongly 3 = Agree somewhat

2 = Disagree somewhat 4 = Agree strongly

1. I am often bored. 1 2 3 4

2. In today's world, I feel justified in doing anything I can get away with to succeed. 1 2 3 4

3. Before I do anything, I carefully consider the possible consequences. 1 2 3 4

4. My main purpose in life is getting as many goodies as I can. 1 2 3 4

5. I quickly lose interest in tasks I start. 1 2 3 4

6. I have been in a lot of shouting matches with other people. 1 2 3 4

7. Even if I were trying very hard to sell something, I wouldn't lie about it. 1 2 3 4

8. I find myself in the same kinds of trouble, time after time. 1 2 3 4

9. I enjoy manipulating other people's feelings. 1 2 3 4

10. I find that I am able to pursue one goal for a long time. 1 2 3 4

11. Looking out for myself is my top priority. 1 2 3 4

12. I tell other people what they want to hear so that they will do what I want them to do. 1 2 3 4

13. Cheating is not justifiable because it is unfair to others. 1 2 3 4

14. Love is overrated. 1 2 3 4

15. I would be upset if my success came at someone else's expense. 1 2 3 4

16. When I get frustrated, I often "let off steam" by blowing my top. 1 2 3 4

17. For me, what's right is whatever I can get away with. 1 2 3 4

18. Most of my problems are due to the fact that other people just don't understand me. 1 2 3 4

19. Success is based on survival of the fittest; I am not concerned about the losers. 1 2 3 4

20. I don't plan anything very far in advance. 1 2 3 4

21. I feel bad if my words or actions causes someone else to feel emotional pain. 1 2 3 4

22. Making a lot of money is my most important goal. 1 2 3 4

23. I let others worry about higher values; my main concern is with the bottom line. 1 2 3 4

24. I often admire a really clever scam. 1 2 3 4

25. People who are stupid enough to get ripped off usually deserve it. 1 2 3 4

26. I make of point of trying not to hurt others in pursuit of my goals. 1 2 3 4

Appendix 10: Website Front Page

Hello, you are now at...

A research study to improve understanding of how social skills and behaviour are affected by empathy and attachment.

* Requires twenty minutes of your time *
* Easy answer questions *
* Contributing an important area of research *
* Fully anonymised *

This study is conducted on behalf of the University of Birmingham

Click "About the researcher & research" to take part.

Questions & Answers | **About the researcher & research** | Withdraw from this study

The rest of this site is SSL encrypted to protect your anonymity and security.

Site designed and maintained by Nerds-Central Limited

Appendix 11: Researcher and Research Information Pages on the Research Website

My Background...

I am a student with the University of Birmingham studying for my doctorate and training to become a forensic psychologist.

This study is conducted on behalf the University of Birmingham and supervised by Dr Caroline Oliver, Department of Psychology, University of Birmingham, Edgbasten, Birmingham, UK.

This research has full ethical approval from the University of Birimgham

In this research I am trying to improve understanding of how social skills and behaviour are affected by empathy and attachment. This is because I am interested in the rehabilitation of offenders with autism, or Autistic Spectrum Disorders (ASD). ASD is a developmental condition involving difficultly understanding, communicating with and interacting with others. Sometimes people who are antisocial and people who have autistic traits behave in similar ways.

However, they are different problems that people have and need different kinds of support. I have an idea that this is because people with autistic traits have different kinds of relationship difficulties to people with other social impairments. I also think that the way they empathise with people is different too.

I am trying to find out if their relationships and empathy are linked and if this can tell me something about the different reasons why some people with ASD have come to commit offences. Knowing this may help people with ASD get the right kind of help.

Back To Main Page | **About this study** | Ask a question

Click on "About This Study" to participate

Appendix 12: Participant Information Pages on the Research Website

PARTICIPATION...
To participate you must:

Be 18 years old or more.

And what will I have to do...?
After you have thought about participating and read all this information about the study, if you agree to participate you will read a consent page. There are 5 questionnaires consisting of about 145 questions in total. The questionnaires are all multiple-choice questions except for some at the beginning where I ask you some questions about you specifically, e.g you age and gender. The answers to ALL your questions will be anonymous. I am not able to give you your scores on the questionnaires. You only consent to participate once you submit your questionnaires to me. These will be encrypted and only observable by my research supervisor and me. The questionnaires will ask you about your relationships and how you understand people's feelings. They are very short questions and there is no writing involved, only to answer a few questions at the beginning about if you have a conviction and what your offence was. The entire set of questions and questionnaires will take you approximately 20 minutes to complete.

There is information on the website that will advise you what you can do if you feel distressed or worried by answering questions about feelings and relationships. If you do require support with difficult feelings it can help to talk to someone. Different people find different things helpful. You may find it reassuring to have a plan in case you do become distressed or concerned. The following may be worth a try:

1. Talk to a family member who you get on well with.
2. Chat with a trusted friend over the Internet, by telephone or in person.
3. Make an appointment and visit your GP (family Doctor) or therapist (if you have one).
4. Contact The Samaritans on their website at: www.samaritans.org/, or telephone them on one of these numbers: 08457 90 90 90 (if you live in the UK and Northern Ireland) OR 1850 60 90 90 (if you live in the Republic of Ireland)

If you have any questions about this research study then you can message me by following the links on the website and I will post the answer on the Question and Answer page of the website.

I will not be able to trace any of the information you give to me back to you.
If you ask a question using the website messaging system I will try my best to respond within 48 hours. I will post the questions and answers on the website (without a personal identifier) to preserve your anonymity.

Anyone can participate as long as they are 18 years old or more.

What's in it for me...?
Although I cannot give you your score on the questionnaires, a short summary of the findings of my research will be posted on the website when the study has finished. This summary will show a brief description of collated results but no individual scores.

Advantages of participating are:
1. It will help the psychologist with her research and training.
2. It may help you to help people with autistic spectrum disorder or behavioural problems.

Disadvantages of participating are:
1. The questionnaires may ask questions about your life, which may be upsetting to answer.
2. It may be worrying to disclose information to someone you do not know well.

What if I change my mind and want to withdraw?
You will be asked to put a unique identifier on the consent and question forms on the website which I strongly advise you to write down and save or copy into a computer document and save.

I will need this if you wish to withdraw from the study so that I can delete your answers to the questions and any analysed data.

The website has a 'withdrawal link' to do this, it is anonymous and will be sent straight to me.

The latest date you can withdraw is August 15th 2014.

Please do not worry about withdrawing; nobody will be upset or annoyed with you and it is your right as a participant.

Thank you very much for reading this, I hope you decide to participate!
Theresa Turner
Department of Psychology
University of Birmingham

To continue you must read the consent information then continue to the questionnaires. Make sure you press the 'submit' button so that I receive them.

To Participate | Ask a question

Click "To Participate" to take part.

Appendix 13: Summary of Important Information for Participants Page on the Website

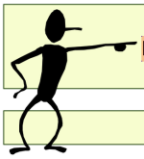
A SUMMARY OF THE
IMPORTANT INFORMATION ABOUT THIS STUDY

ANONYMITY

I will not ask for your name or address. All information given to me will be anonymous so it will not be possible to trace it back to you. Only my supervisor (also a psychologist) and I will see the information before it is summarised and analysed.

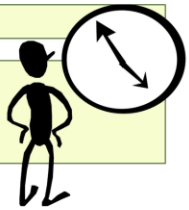
WITHDRAWING

You will be asked to put a unique identifier on the consent and question forms on the website which I strongly advise you to write down and save or copy into a computer document and save.
I will need this if you wish to withdraw from the study so that I can delete your answers to the questions and any analysed data.
The website has a 'withdrawal link' to do this, it is anonymous and will be sent straight to me.



Latest date you can withdraw is' change to August 15th 2014.
Please do not worry about withdrawing; nobody will be upset or annoyed with you and it is your right as a participant.

FEEDBACK



I will provide you with feedback by posting a summary of the findings on this website. I am aiming to have the results posted by December 2014.
Please note that once the study has been completed it may be published in a journal but no information will ever be associated with you personally.

Theresa Turner
Department of Psychology
University of Birmingham

Not Interested to Participate | **Interested to Participate** | Ask a question

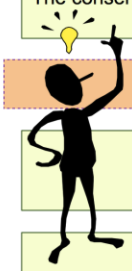
Click "Interested to Participate" to take part.

Appendix 14: Participant Consenting Information Form on the Website

To Participate...

If you would like to participate you MUST complete the consent form **and** the question forms and submit all of them so that you can participate.

The consent form tells me that you understand what the study is about, how to withdraw and that you agree to allow me to study your answers to the questions..



Make sure you create a memorable unique identifier (e.g. suny17) and put it on the consent form ***and*** on the question-answer form so that *your* consent form can be linked with *your* answers and nobody elses.

When you click on the 'Consent and Question Forms' button, this will open into a new page containting the consent form. Please complete this and send it to me by clicking the 'Submit' button at the bottom of the page.

When you click on the 'Submit' button on the consent form, this will open into a new page with the first question form. Please complete each form and send it to me by clicking the 'Submit' button at the bottom of the page. When you submit a form, the next will open automatically.

Consent and Question Forms | Ask a question

Click "Consent and Question Forms" to take part.

Appendix 15: Participant Consent Form on the Website

Consent to Participate in Research Form
Research study: How social skills and behaviour are affected by empathy and attachment

This study aims to identify and understand any links between empathy and close relationships in people with autistic traits or social difficulties or both.

- I have agreed to participate in this research, which will involve completing the questionnaires provided on the computer.
- I have read the information about the research and understand it.

I understand that neither the questionnaires nor data will have my name on them but a personal identifier instead that I have chosen. I will keep a record of my personal identifier so that my questionnaire data can be identified and destroyed if I decide to withdraw.

All the information I provide will be anonymous and my completed questionnaires will only be seen by the researcher and her supervisor. However, the collated data (mine and other peoples) will be analysed and the results of this analysis will not be confidential.

I accept that other people will read the results of the research and it may be published in a journal but no individual will be identified and all comments will be about the whole group of participants.

I understand that I can withdraw consent before 30th June 2014 but in order to do so I must make a note of the unique personal identifier that I will choose and message this to the researcher through the website following instructions on the website. By submitting my completed questionnaires I consent to participate.

Please type your 6 digit Unique Identifier here and make a copy of it which you then keep safe.

Please type the date which you submit this form here.

DD MM YYYY

Today's Date: / /

Please fill in any missing questions then a 'submit' button will appear in the box below.
Click that button to finish:

Please enter your 6 digit unique identifier.

When filling in any forms from this point on please do not use the browser back button
or reload a page or cut/copy and past a page location in the location bar of your browser.

Appendix 16: Demographics Page on the Website

Empathy, Attachment and Social Skills

Have you filled in the consent form? If not click here fill it in then carry on. I am sorry but I cannot include your responces in the study without you completing the consent form.

Please answer the following questions as best you can. Questions 1 to 9 require short answers or selecting prepared answers and questions 10 to 17 require longer answers (100 to 200 words if possible). Please use the same unique identifier on all your forms. When you have finished and filled in all the questions, click the submit button at the bottom of the page to send your responses to me.

1. Please write the same 6 digit unique identifier here, which you created for your consent form.

123dog

2. What age are you now?

- 18-22 years
- 23-27 years
- 28-32 years
- 33-37 years
- 38-42 years
- 43-47 years
- 48-52 years
- 53-57 years
- 58-63 years
- 64-68 years
- 69 years and above

3. What gender are you?

- Male
- Female
- Transexual
- Neutral
- Other (please specify)

4. Do you have a diagnosis of autistic spectrum disorder?

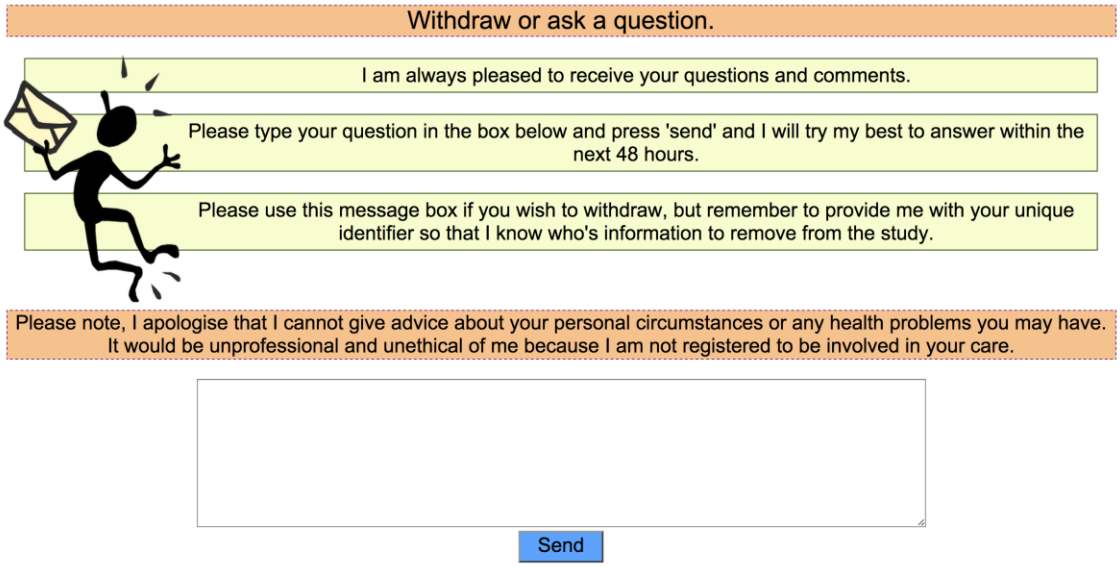
- Yes
- No

5. Have you ever comitted an offense/crime?

- Yes
- No

Please enter your current age.

Appendix 17: Withdrawal and Ask a Question Page on Website



Appendix 18: Questions and Answers Page on Website

Welcome to the question and answer page.

Can I participate more than once?

I am sorry but no you are not allowed to participate more than once. If I have suspicions that a person has participated numerous times to obtain vouchers or invalidate results I retain the right to exclude data and voucher requests and for the benefit of the study and for fairness with regards to authentic participants.

Is it possible to get a copy of the research write up findings? It seems very interesting.

A summary of the findings of the research will be put on the website for people to read.

Will my answers be kept private?

Your answers to the questionnaires will only be seen by my supervisor and me.
It is important you give honest answers for the benefits of the research and for reasons of fairness to others who have participated in this study.
I reserve the right to exclude from the study any questionnaires that appear to be answered randomly.

"I let off steam by blowing my top." Does that mean shouting?

'Blowing your top' is a rather old-fashioned term for loosing your temper, so yes, it can involve shouting.

Ask a question Go back to front page

Appendix 19: Thank You and Debrief Page on Website

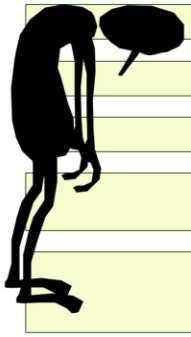
Thanks for supporting this research!

Please note: *All the vouchers have now be claimed. However, I am still very grateful for your continued support of this research.*

Please feel free to visit the website again if you would like to find out what the findings of the study are.

Many people find that talking about their feelings and relationships can be distressing.

If you feel confused, distressed, angry or any other emotions, which you find difficult to cope with please talk to someone. Different people find different things helpful. You could try one or more of the following ways:



Talk to a family member who you get on well with.

Chat with a trusted friend over the Internet, by telephone or in person.

Make an appointment and visit your GP (family Doctor) or therapist (if you have one).

Contact The Samaritans on their website at: www.samaritans.org/, or telephone them on one of these numbers:

08457 90 90 90 (if you live in the UK and Northern Ireland)
OR
1850 60 90 90 (if you live in the Republic of Ireland)

Ask a question | Go back to front page

Appendix 20: Method and Rationale for Multiple Linear Regression Analysis of Hypothesis 1

Demographics

Table 19: Age Range Split by Gender

Age Range in years	Gender	
	Female	Male
18-22	9	9
23-27	8	11
28-32	3	3
33-37	4	7
38-42	4	6
43-47	3	5
48-52	2	1
53-57	1	1
58-63	1	1
64-68	1	0
	36	44

Multiple Linear Regression Analysis

The multiple regression analysis carried out on the data, used a hierarchical entry in accordance with findings from current research, as described in chapters 1, 2, 3 and 4. The variables were added in accordance with a hierarchy of relevance as likely predictors of level of autistic traits (AQ). Variables from the empathy measure (IRI) were entered in the order: perspective taking, empathic concern, personal distress and fantasy. The empathy variables were then followed by attachment anxiety and avoidance (from the ECR-R). These were followed by primary and secondary psychopathy (from the LSRP).

The model is significant from step 2 until step 4 at which point R^2=0.184, $p_{(F\ change)}$=0.904 on the addition of Fantasy into the model. Following the addition of anxious attachment avoidant attachment and primary psychopathy, at steps 5, 6 and 7

respectively, the model maintains a level of significance at step 7 where, R^2=0.421, $p_{(F\ change)}$=0.049. The model becomes non significant on the addition of secondary psychopathy at step 8.

A second hierarchical stepwise regression was carried out, omitting the variables that were shown to be insignificant predictors at each step of the regression, including only those variables that were significant contributors to the model at some step in the analysis. This was carried out to optimize the model by retaining only the significant predictors. The most significant predictor was entered into the model first, followed by the next most significant predictor and so on, until all predictors were entered. On the addition of significant predictors, a model that reached levels of significance always ensued, until a non-significant predictor was added to the model, at which point the model fell below the level of significance. A number of predictors fell above and below the level of significance (i.e. anxious attachment, primary psychopathy and empathic concern) when the model as a whole fell above and below levels of significance. These predictors were used as indicators of mediating or moderating relationships.

Table 22. Correlation Coefficients for Hierarchical Regression Analysis Predicting Level of Autistic Traits

		AQ	PT	PD	EC	FA	ANX	AVO	PRI	SEC
Pearson Correlation	Autism Quotient	1	-0.137	0.34	-0.286	0.027	0.388	0.507	0.353	0.348
	Perspective Taking	-0.137	1	-0.016	0.494	0.252	0.111	0.137	-0.222	-0.205
	Personal Distress	0.34	-0.016	1	-0.075	0.286	0.476	0.116	0.189	0.381
	Empathic Concern	-0.286	0.494	-0.075	1	0.29	-0.042	-0.186	-0.479	-0.042
	Fantasy	0.027	0.252	0.286	0.29	1	0.387	0.023	0.079	0.241
	Anxiety (attachment)	0.388	0.111	0.476	-0.042	0.387	1	0.457	0.251	0.401
	Avoidance (attachment)	0.507	0.137	0.116	-0.186	0.023	0.457	1	0.122	0.192
	Primary Psychopathy	0.353	-0.222	0.189	-0.479	0.079	0.251	0.122	1	0.504
	Secondary Psychopathy	0.348	-0.205	0.381	-0.042	0.241	0.401	0.192	0.504	1
Sig. (1-tailed)	Autism Quotient	.	0.112	0.001	0.005	0.407	0	0	0.001	0.001
	Perspective Taking	0.112	.	0.443	0	0.012	0.164	0.113	0.024	0.034
	Personal Distress	0.001	0.443	.	0.255	0.005	0	0.152	0.047	0
	Empathic Concern	0.005	0	0.255	.	0.005	0.356	0.05	0	0.354
	Fantasy	0.407	0.012	0.005	0.005	.	0	0.421	0.244	0.016
	Anxiety (attachment)	0	0.164	0	0.356	0	.	0	0.012	0
	Avoidance (attachment)	0	0.113	0.152	0.05	0.421	0	.	0.14	0.044
	Primary Psychopathy	0.001	0.024	0.047	0	0.244	0.012	0.14	.	0
	Secondary Psychopathy									

Table 23. Coefficients of Regression Model for Exploratory Hierarchical Regression Analysis Predicting Level of Autistic Traits

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	25.183	3.652		6.895	0
	Perspective Taking	-0.184	0.151	-0.137	-1.223	0.225
2	(Constant)	16.566	4.391		3.773	0
	Perspective Taking	-0.177	0.143	-0.132	-1.241	0.218
	Personal Distress	0.462	0.145	0.338	3.181	0.002
3	(Constant)	22.288	5.027		4.433	0
	Perspective Taking	-0.004	0.16	-0.003	-0.027	0.978
	Personal Distress	0.438	0.142	0.32	3.081	0.003
	Empathic Concern	-0.374	0.172	-0.261	-2.18	0.032
4	(Constant)	22.186	5.13		4.325	0
	Perspective Taking	-0.007	0.163	-0.005	-0.043	0.966
	Personal Distress	0.432	0.151	0.316	2.858	0.006
	Empathic Concern	-0.379	0.177	-0.264	-2.135	0.036
	Fantasy	0.017	0.139	0.014	0.121	0.904
5	(Constant)	20.396	4.978		4.097	0
	Perspective Taking	-0.06	0.158	-0.044	-0.379	0.706
	Personal Distress	0.263	0.159	0.193	1.661	0.101
	Empathic Concern	-0.305	0.173	-0.213	-1.766	0.081
	Fantasy	-0.096	0.14	-0.081	-0.689	0.493
	Anxiety	1.777	0.666	0.323	2.667	0.009

	(attachment)					
6	(Constant)	12.516	4.952		2.527	0.014
	Perspective Taking	-0.197	0.148	-0.146	-1.33	0.188
	Perspective Taking	0.329	0.146	0.24	2.257	0.027
	Personal Distress	-0.15	0.162	-0.105	-0.925	0.358
	Empathic Concern	-0.025	0.129	-0.021	-0.194	0.846
	Fantasy	0.515	0.685	0.094	0.751	0.455
	Anxiety (attachment)	2.533	0.635	0.437	3.991	0
7	Avoidance (attachment)	5.304	6.041		0.878	0.383
	Perspective Taking	-0.192	0.145	-0.143	-1.324	0.19
	Personal Distress	0.322	0.143	0.235	2.255	0.027
	Empathic Concern	0.011	0.178	0.007	0.059	0.953
	Fantasy	-0.065	0.128	-0.054	-0.508	0.613
	Anxiety (attachment)	0.29	0.681	0.053	0.425	0.672
	Avoidance (attachment)	2.613	0.623	0.451	4.194	0
	Primary Psychopathy	0.15	0.075	0.216	2.005	0.049
8	(Constant)	5.272	6.076		0.868	0.389
	Perspective Taking	-0.168	0.157	-0.125	-1.074	0.287
	Personal Distress	0.307	0.148	0.224	2.069	0.042
	Empathic Concern	-0.02	0.195	-0.014	-0.104	0.917
	Fantasy	-0.068	0.129	-0.057	-0.528	0.599
	Anxiety (attachment)	0.254	0.69	0.046	0.369	0.714

	Avoidance (attachment)	2.563	0.639	0.442	4.012	0
	Primary Psychopathy	0.131	0.089	0.189	1.476	0.144
	Secondary Psychopathy	0.073	0.18	0.051	0.405	0.687

Table 24. Model Summary for Exploratory Hierarchical Regression Analysis Predicting Level of Autistic Traits

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.137a	0.019	0.006	6.793	0.019	1.497	1	78	0.225	
2	.364b	0.133	0.11	6.427	0.114	10.121	1	77	0.002	
3	.429c	0.184	0.152	6.276	0.051	4.75	1	76	0.032	
4	.429d	0.184	0.14	6.317	0	0.015	1	75	0.904	
5	.505e	0.256	0.205	6.075	0.072	7.111	1	74	0.009	
6	.624f	0.389	0.339	5.542	0.133	15.925	1	73	0	
7	.649g	0.421	0.365	5.43	0.032	4.02	1	72	0.049	
8	.650h	0.422	0.357	5.462	0.001	0.164	1	71	0.687	2.106

a Predictors: (Constant), Perspective Taking

b Predictors: (Constant), Perspective Taking, Personal Distress

c Predictors: (Constant), Perspective Taking, Personal Distress, Empathic Concern

d Predictors: (Constant), Perspective Taking, Personal Distress, Empathic Concern, Fantasy

e Predictors: (Constant), Perspective Taking, Personal Distress, Empathic Concern, Fantasy, Anxiety (attachment)

f Predictors: (Constant), Perspective Taking, Personal Distress, Empathic Concern, Fantasy, Anxiety (attachment), Avoidance (attachment)

g Predictors: (Constant), Perspective Taking, Personal Distress, Empathic Concern, Fantasy, Anxiety (attachment), Avoidance (attachment), Primary Psychopathy

h Predictors: (Constant), Perspective Taking, Personal Distress, Empathic Concern, Fantasy, Anxiety (attachment), Avoidance (attachment), Primary Psychopathy, Secondary Psychopathy

i Dependent Variable: Autism Quotient

Table 25. Coefficients of Regression Model for Optimising Hierarchical Multiple Linear Regression Analysis Predicting Level of Autistic Traits

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.028	2.18		4.6	0
	AVO	2.937	0.566	0.507	5.192	0
2	(Constant)	3.618	2.954		1.225	0.224
	AVO	2.744	0.542	0.474	5.068	0
	PD	0.389	0.128	0.285	3.046	0.003
3	(Constant)	11.182	4.797		2.331	0.022
	AVO	2.553	0.54	0.441	4.727	0
	PD	0.376	0.126	0.275	2.99	0.004
	EC	-0.264	0.133	-0.184	-1.979	0.051
4	(Constant)	11.236	4.815		2.334	0.022
	AVO	2.362	0.613	0.408	3.854	0
	PD	0.329	0.144	0.241	2.287	0.025
	EC	-0.271	0.134	-0.189	-2.023	0.047
	ANX	0.434	0.646	0.079	0.672	0.504

Table 26. Model Summary for Optimising Hierarchical Regression Analysis Predicting Level of Autistic Traits

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.507a	0.257	0.247	5.912	0.257	26.952	1	78	0	
2	.580b	0.337	0.319	5.621	0.08	9.277	1	77	0.003	
3	.608c	0.369	0.344	5.518	0.033	3.918	1	76	0.051	
4	.611d	0.373	0.34	5.538	0.004	0.452	1	75	0.504	1.896
a Predictors: (Constant), AVO										
b Predictors: (Constant), AVO, PD										
c Predictors: (Constant), AVO, PD, ANX										
d Predictors: (Constant), AVO, PD, ANX, EC										
e Dependent Variable: AQ										

Mediation and Moderation Analysis

Possible mediating and moderating relationships between variables were explored by identifying the patterns of significance of the predictors as they were entered into the models and the resulting significance of the model as a whole. In the exploratory regression analysis, personal distress was a significant contributor to the model at steps 2-4 and empathic concern was a significant contributor at steps 3 and 4, in the exploratory multiple regression analysis. However, at step 5 on the addition of anxious attachment into the model, empathic concern and personal distress became non-significant, despite showing a strong significant correlation to autistic traits (see Table 22). Similarly at step 6 anxious attachment became non-significant on the addition of avoidant attachment despite moderate significant correlation with autistic traits, and personal distress became significant, indicating a possible moderating or mediating relationships between these variables.

Meditational analysis was carried out using a 2000 sample Bootstrapping procedure (Hayes, 2008; 2009; 2013). Although Barry and Kenny (1986) recommend that the direct effect between predictor and outcome variables should be significant before mediation or moderation analysis is worthwhile performing. In this study, the significance of the direct effect between anxious attachment predicting the level of autistic traits varied and in the mediation analysis was not significant, where b=0.1507, p=0.8174. However, the indirect effect was significant where, *b*=1.2529, BCaCI (0.6465, 1.9861), supporting the technique advocated by Hayes (2008; 2009). Significance is quoted in Bootstrap confidence intervals as this has higher power than the Sobel (significance quoted in p) test which is regarded as more conservative an more likely to result in type 2 errors. Bootstrap confidence intervals are quoted for 95%

certainty, where a confidence interval that does not encompass zero is regarded as significant, since this indicates a 95% certainty that the coefficient obtained is not zero.

Hayes (2008) maintains that many mediation and moderation relationships are missed using this method and researchers should follow theory in making decisions regarding exploratory mediation analysis. Theory and previous research, as mentioned in chapter 1 of this thesis and including the primary research leading to this current study (Turner and Hamilton-Giachritsis, 2013) has indicated that empathy is mediated by attachment in people with autism.

Empathic concern, primary psychopathy and personal distress were included as covariates in the calculations since they were significant contributors to the level of autistic traits in the initial model and highlighted as possible indirectly (mediating) or directly contributing variables.

Previous research, as mentioned in chapters 1, 2 3 and 4 of this thesis and the exploratory multiple regression analysis suggested that personal distress may be mediated by anxiety (in attachment) in predicting level of autistic traits. Since anxiety (in attachment) had previously been shown to be mediated by avoidant attachment (see above) in predicting the level of autistic traits, further mediation analysis was carried out. This analysis revealed a multiple serial mediating relationship between personal distress and autistic traits through anxious attachment and avoidant attachment.

Three possible pathways were analysed as shown below:

1. Personal distress→ anxious attachment→ autistic traits

2. Personal distress→ anxious attachment→ avoidant attachment →autistic traits
3. Personal distress→ avoidant attachment →autistic traits

The only significant indirect effect was pathway 2, where *b*= 0.1518, BCaCI (0.0780, 0.2600), although the inclusion of avoidant attachment into the pathway did not make a significant contribution to the overall effect, compared to pathway 1, pathway 1 was not significant. Comparison of confidence intervals indicated that pathway 2, which includes avoidant attachment, was the most likely model of the mediating relationship between personal distress and autistic traits through anxious and avoidant attachment.

This multiple serial partial mediating relationship was incorporated into the larger, initial regression model, with personal distress and empathic concern as covariates giving the indirect effect, The total effect of personal distress on autistic traits shows *b*=0.3911, p=0.0076, whilst the direct effect of personal distress on autistic traits has *b*=0.3165, p=0.0283. For the indirect, multiple serially mediated effect, *b*= 0.1380, BCaCI (0.0669, 0.2658); R^2=0.2210, p=0.0003. The multiple regression model predicting the level of autistic traits through empathy and attachment is shown in Table 27.

Table 27. Multiple Serially Mediated Model of Personal Distress on Level of Autistic Traits Through Anxious and Avoidant Attachment

	Consequent								
	M1 (ANX)			M2 (AVO)			Y (AQ)		
Antecedent	Coefficient	SE	p	Coefficient	SE	p	Coefficient	SE	p
X (PD)	0.1102			-0.325	0.0268	0.2294	0.3165	0.1415	0.0283
M1 (ANX)	-	-	-	0.5083	0.1096	<0.000	0.1507	0.6505	0.8174
M2 (AVO)	-	-	-	-	-	-	2.4651	0.6040	0.0001
Covariant (EC)	0.0241	0.0294	0.4141	-0.536	0.0282	0.0610	-0.1280	0.1510	0.3991
Covariant (PRI)	0.0268	0.0145	0.0683	-0.0108	0.0141	0.4463	0.1444	0.0742	0.0555
Constant	0.4531	1.0972	0.6808	3.9633	1.0500	0.0003	4.0783	5.9908	0.6808
	R^2=0.2596 F(3, 76)=8.8816 p<0.000			R^2=0.2580 F(4, 75)=6.5197 p=0.0001			R^2=0.4035 F(5, 74)=10.0123 p<0.000		

Table 28. Moderated Effect of the Level of Primary Psychopathic Traits by Empathic Concern on the level of Autistic Traits.

	Coefficient	SE	t	p
Intercept	-17.0498	11.2797	-1.5116	0.1350
X (PRI)	0.8487	0.3297	2.5744	0.0121
M (EC)	0.7486	0.4266	1.7551	0.0834
XM (EC x PRI)	-0.0288	0.0131	-2.1898	0.0317
Covariant (ANX)	-0.0598	0.6417	-0.0932	0.9260
Covariant (AVO)	2.3842	0.5902	4.0397	0.0001
Covariant (PD)	0.3256	0.1381	2.3583	0.0210
	R^2=0.4403 F(6 73)=9.5708 MSE=28.1250 p<0.000			

Appendix 21: Method and Rationale for Post-hoc Analysis

Age Effects

Table 29. Model Summary for Optimising Hierarchical Multiple Regression Analysis Predicting Level of Autistic Traits Controlled by Age

Model Summary[j]										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.231[a]	0.053	0.041	6.672	0.053	4.408	1	78	0.039	
2	.253[b]	0.064	0.04	6.677	0.011	0.884	1	77	0.35	
3	.390[c]	0.152	0.119	6.398	0.088	7.867	1	76	0.006	
4	.448[d]	0.2	0.158	6.253	0.048	4.545	1	75	0.036	
5	.448[e]	0.201	0.147	6.294	0	0.027	1	74	0.871	
6	.519[f]	0.27	0.21	6.058	0.069	6.884	1	73	0.011	
7	.631[g]	0.398	0.339	5.539	0.128	15.325	1	72	0	
8	.654[h]	0.428	0.363	5.438	0.03	3.689	1	71	0.059	
9	.654[i]	0.428	0.355	5.474	0.001	0.09	1	70	0.765	2.128
[a] Predictors: (Constant), AgeCode										
[b] Predictors: (Constant), AgeCode, PT										
[c] Predictors: (Constant), AgeCode, PT, PD										
[d] Predictors: (Constant), AgeCode, PT, PD, EC										
[e] Predictors: (Constant), AgeCode, PT, PD, EC, FA										
[f] Predictors: (Constant), AgeCode, PT, PD, EC, FA, ANX										
[g] Predictors: (Constant), AgeCode, PT, PD, EC, FA, ANX, AVO										
[h] Predictors: (Constant), AgeCode, PT, PD, EC, FA, ANX, AVO, PRI										
[i] Predictors: (Constant), AgeCode, PT, PD, EC, FA, ANX, AVO, PRI, SEC										
[j] Dependent Variable: AQ										

Table 30. Coefficients for the Optimising Hierarchical Multiple Regression Analysis Predicting Level Autistic Traits Controlled by Age

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	23.236	1.375		16.905	0
	AgeCode	-0.69	0.329	-0.231	-2.099	0.039
2	(Constant)	26.412	3.646		7.245	0
	AgeCode	-0.643	0.333	-0.216	-1.933	0.057
	PT	-0.141	0.15	-0.105	-0.94	0.35
3	(Constant)	18.231	4.551		4.006	0
	AgeCode	-0.43	0.328	-0.144	-1.312	0.194
	PT	-0.149	0.144	-0.111	-1.035	0.304
	PD	0.417	0.149	0.305	2.805	0.006
4	(Constant)	23.698	5.135		4.615	0
	AgeCode	-0.4	0.321	-0.134	-1.249	0.216
	PT	0.018	0.161	0.013	0.111	0.912
	PD	0.397	0.146	0.29	2.725	0.008
	EC	-0.365	0.171	-0.254	-2.132	0.036
5	(Constant)	23.881	5.289		4.515	0
	AgeCode	-0.413	0.331	-0.138	-1.246	0.217
	PT	0.022	0.164	0.016	0.134	0.894
	PD	0.403	0.152	0.295	2.647	0.01
	EC	-0.358	0.178	-0.249	-2.013	0.048
	FA	-0.023	0.142	-0.019	-0.163	0.871
6	(Constant)	21.985	5.142		4.276	0
	AgeCode	-0.379	0.319	-0.127	-1.187	0.239
	PT	-0.032	0.159	-0.024	-0.203	0.839
	PD	0.24	0.159	0.175	1.506	0.136
	EC	-0.287	0.173	-0.2	-1.659	0.101
	FA	-0.131	0.142	-0.11	-0.919	0.361
	ANX	1.745	0.665	0.317	2.624	0.011
7	(Constant)	13.921	5.133		2.712	0.008
	AgeCode	-0.302	0.292	-0.101	-1.034	0.304
	PT	-0.172	0.15	-0.128	-1.152	0.253
	PD	0.309	0.147	0.226	2.104	0.039
	EC	-0.138	0.163	-0.096	-0.85	0.398
	FA	-0.054	0.132	-0.045	-0.409	0.684
	ANX	0.511	0.685	0.093	0.746	0.458
	AVO	2.489	0.636	0.429	3.915	0

8	(Constant)	6.763	6.268		1.079	0.284
	AgeCode	-0.256	0.288	-0.086	-0.889	0.377
	PT	-0.171	0.147	-0.128	-1.167	0.247
	PD	0.305	0.144	0.223	2.118	0.038
	EC	0.015	0.178	0.01	0.082	0.935
	FA	-0.088	0.131	-0.074	-0.673	0.503
	ANX	0.295	0.682	0.054	0.433	0.667
	AVO	2.573	0.626	0.444	4.112	0
	PRI	0.145	0.075	0.208	1.921	0.059
9	(Constant)	6.679	6.315		1.058	0.294
	AgeCode	-0.246	0.292	-0.082	-0.841	0.403
	PT	-0.155	0.158	-0.115	-0.979	0.331
	PD	0.295	0.149	0.215	1.975	0.052
	EC	-0.009	0.196	-0.006	-0.045	0.965
	FA	-0.089	0.131	-0.075	-0.679	0.499
	ANX	0.268	0.692	0.049	0.388	0.699
	AVO	2.537	0.641	0.438	3.958	0
	PRI	0.131	0.089	0.188	1.466	0.147
	SEC	0.055	0.182	0.039	0.3	0.765
[a] Dependent Variable: AQ						

The effects of age were examined to establish if there were any confounding effects in order for this to be taken into consideration in the regression model. Age was entered at step 1, as the sole variable, and was significantly predictive of the level of autistic traits. When the other variables for the regression model were entered, from step 1 onwards, this effect disappeared and no effects of age were observed.

Gender Effects

Gender was entered at step 1 and shown to be a significant predictor of autistic traits in the model where b=-0.231, p=0.039. The data was split by gender and multiple regression analysis carried out on the 4 variables that had demonstrated significant contribution to the whole model in the initial exploratory regression analysis

Table 31. Model Summary for Optimising Hierarchical Multiple Regression Analysis Predicting Level of Autistic Traits Split by Gender

GENDER	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
						R Square Change	F Change	df1	df2	Sig. F Change	
Female	1	.075a	0.006	-0.024	6.092	0.006	0.192	1	34	0.664	
	2	.149b	0.022	-0.037	6.132	0.017	0.562	1	33	0.459	
	3	.287c	0.082	-0.004	6.033	0.06	2.094	1	32	0.158	
	4	.287d	0.082	-0.036	6.129	0	0.005	1	31	0.942	
	5	.442e	0.195	0.061	5.834	0.113	4.21	1	30	0.049	
	6	.591f	0.349	0.214	5.338	0.153	6.83	1	29	0.014	
	7	.630g	0.397	0.246	5.228	0.048	2.24	1	28	0.146	
	8	.655h	0.429	0.26	5.179	0.032	1.533	1	27	0.226	2.031
Male	1	.058a	0.003	-0.02	7.131	0.003	0.143	1	42	0.707	
	2	.554b	0.307	0.273	6.02	0.303	17.933	1	41	0	
	3	.577c	0.333	0.283	5.978	0.026	1.571	1	40	0.217	
	4	.577d	0.333	0.265	6.052	0	0.024	1	39	0.876	
	5	.607e	0.369	0.286	5.965	0.036	2.155	1	38	0.15	
	6	.707f	0.501	0.42	5.378	0.131	9.741	1	37	0.003	
	7	.710g	0.504	0.407	5.435	0.003	0.234	1	36	0.632	
	8	.711h	0.505	0.392	5.505	0.001	0.087	1	35	0.77	2.27
a Predictors: (Constant), PT											

Table 32. Coefficients for the Optimising Hierarchical Multiple Regression Analysis Predicting Level Autistic Traits Split by Gender

GENDER	Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
Female	1	(Constant)	20.905	4.839		4.32	0
		PT	-0.082	0.187	-0.075	-0.438	0.664
	2	(Constant)	17.456	6.7		2.605	0.014
		PT	-0.064	0.189	-0.059	-0.339	0.737
		PD	0.16	0.213	0.13	0.75	0.459
	3	(Constant)	23.818	7.923		3.006	0.005
		PT	0.067	0.207	0.062	0.325	0.747
		PD	0.117	0.211	0.095	0.551	0.585
		EC	-0.334	0.231	-0.277	-1.447	0.158
	4	(Constant)	24.115	9.008		2.677	0.012
		PT	0.066	0.212	0.06	0.31	0.759
		PD	0.121	0.223	0.099	0.542	0.592
		EC	-0.332	0.236	-0.276	-1.408	0.169
		FA	-0.016	0.218	-0.013	-0.074	0.942
	5	(Constant)	18.038	9.072		1.988	0.056
		PT	0.05	0.202	0.046	0.249	0.805
		PD	-0.056	0.23	-0.045	-0.243	0.81
		EC	-0.218	0.232	-0.181	-0.942	0.354
		FA	-0.06	0.209	-0.05	-0.288	0.776
		ANX	2.012	0.98	0.387	2.052	0.049
	6	(Constant)	13.322	8.495		1.568	0.128
		PT	-0.146	0.199	-0.133	-0.73	0.471
		PD	-0.008	0.211	-0.007	-0.04	0.968
		EC	-0.087	0.218	-0.072	-0.398	0.693
		FA	0.094	0.2	0.077	0.468	0.643
		ANX	0.29	1.113	0.056	0.261	0.796
		AVO	2.356	0.901	0.542	2.613	0.014
	7	(Constant)	3.794	10.476		0.362	0.72
		PT	-0.109	0.197	-0.1	-0.555	0.583
		PD	0.059	0.211	0.048	0.28	0.781
		EC	0.062	0.235	0.051	0.262	0.795

		FA	0.076	0.196	0.063	0.388	0.701
		ANX	-0.05	1.113	-0.01	-0.044	0.965
		AVO	2.421	0.884	0.557	2.739	0.011
		PRI	0.169	0.113	0.271	1.497	0.146
	8	(Constant)	4.331	10.387		0.417	0.68
		PT	0.049	0.233	0.045	0.211	0.834
		PD	-0.066	0.233	-0.054	-0.285	0.778
		EC	-0.105	0.269	-0.087	-0.39	0.699
		FA	0.013	0.201	0.011	0.065	0.949
		ANX	0.008	1.104	0.002	0.008	0.994
		AVO	2.134	0.906	0.491	2.356	0.026
		PRI	0.052	0.146	0.084	0.355	0.725
		SEC	0.391	0.316	0.311	1.238	0.226
Male	1	(Constant)	24.575	5.767		4.261	0
		PT	-0.096	0.253	-0.058	-0.378	0.707
	2	(Constant)	11.395	5.778		1.972	0.055
		PT	-0.12	0.214	-0.073	-0.561	0.578
		PD	0.77	0.182	0.551	4.235	0
	3	(Constant)	15.913	6.777		2.348	0.024
		PT	0.013	0.238	0.008	0.055	0.957
		PD	0.756	0.181	0.541	4.178	0
		EC	-0.303	0.242	-0.181	-1.253	0.217
	4	(Constant)	16.126	6.995		2.305	0.027
		PT	-0.003	0.262	-0.002	-0.013	0.99
		PD	0.745	0.196	0.533	3.797	0
		EC	-0.318	0.263	-0.19	-1.211	0.233
		FA	0.031	0.195	0.027	0.156	0.876
	5	(Constant)	16.867	6.912		2.44	0.019
		PT	-0.087	0.265	-0.053	-0.33	0.743
		PD	0.599	0.217	0.429	2.757	0.009
		EC	-0.3	0.259	-0.179	-1.158	0.254
		FA	-0.055	0.201	-0.049	-0.274	0.786
		ANX	1.346	0.917	0.251	1.468	0.15
	6	(Constant)	6.37	7.082		0.899	0.374
		PT	-0.128	0.239	-0.078	-0.534	0.596
		PD	0.665	0.197	0.476	3.374	0.002
		EC	-0.135	0.24	-0.081	-0.564	0.576

		FA	-0.126	0.183	-0.112	-0.69	0.495
		ANX	0.492	0.871	0.092	0.565	0.575
		AVO	2.959	0.948	0.405	3.121	0.003
	7	(Constant)	4.217	8.427		0.5	0.62
		PT	-0.14	0.243	-0.085	-0.578	0.567
		PD	0.639	0.206	0.457	3.1	0.004
		EC	-0.07	0.277	-0.042	-0.254	0.801
		FA	-0.146	0.189	-0.13	-0.773	0.445
		ANX	0.466	0.882	0.087	0.529	0.6
		AVO	3.012	0.964	0.413	3.123	0.004
		PRI	0.052	0.107	0.07	0.484	0.632
	8	(Constant)	3.872	8.617		0.449	0.656
		PT	-0.148	0.247	-0.09	-0.597	0.555
		PD	0.651	0.212	0.465	3.063	0.004
		EC	-0.032	0.31	-0.019	-0.103	0.918
		FA	-0.159	0.197	-0.141	-0.809	0.424
		ANX	0.514	0.908	0.096	0.566	0.575
		AVO	3.105	1.026	0.425	3.025	0.005
		PRI	0.07	0.126	0.096	0.561	0.579
		SEC	-0.07	0.238	-0.048	-0.294	0.77

Appendix 22: Method of Analysis and Rationale for Hypothesis 2

Table 34. Descriptive Statistics Comparing Participants Reporting and Not Reporting Offending

	OFFENCE REPORTED	Mean	Std. Deviation
PT	No	23.73	4.958
	Yes	23.56	5.668
	Total	23.7	5.07
PD	No	18.03	5.036
	Yes	19.25	4.782
	Total	18.27	4.981
EC	No	24.47	4.697
	Yes	27.56	4.242
	Total	25.09	4.75
FA	No	23.13	5.476
	Yes	25.25	6.486
	Total	23.55	5.712
ANX	No	3.8609	1.2221
	Yes	4.1	1.33116
	Total	3.9087	1.23966
AVO	No	3.6797	1.16567
	Yes	3.6438	1.25484
	Total	3.6725	1.17592
AQ	No	21.11	7.031
	Yes	19.63	5.92
	Total	20.81	6.814
PRI	No	31.69	10.09
	Yes	29.75	8.591
	Total	31.3	9.788
SEC	No	20.22	4.589
	Yes	23.13	5.084
	Total	20.8	4.803

Table 35. Classification Table[a] for Binary Logistic Regression for the Prediction of Offending

	Observed		Predicted		
			OFFENDING		Percentage Correct
			No offence reported	Offence reported	
Step 1	OFFENDING	No offence reported	64	0	100
		Offence reported	15	1	6.3
	Overall Percentage				81.3
Step 2	OFFENDING	No offence reported	62	2	96.9
		Offence reported	13	3	18.8
	Overall Percentage				81.3
[a] The cut value is .500					

Binary logistic regression analysis was carried out using a forward stepwise entry on all variables for the IRI, AQ, LSRP and ECR-R to predict offending. The results indicate that the model including empathic concern as a predictor of offending accurately classifies offending/not offending overall 81.3% of the time. This is a slight improvement on the null model, in which only the regression constant (intercept of the regression line on the y axis) is included in the regression equation, accurately classifying participants 80% of the time.

In addition, -2 log likelihood reduced from 80.64 to 74.156 on the inclusion of empathic concern and 67.768 on the inclusion of secondary psychopathy. However, the model is more accurate at predicting offending (18%) compared to the null model using the

constant alone (0%) since the null model predicts all participants to report no offence committed indicating no improvement in predictive power of the model by the inclusion of variables, compared to only the constant, in the regression equation

In addition, $R^2_{(Nagelkerke)}=0.225$, $\chi^2(2)=12.296$, $p=0.002$ showing that the model incorporating empathic concern and secondary psychopathy is significantly different compared to the model composed of the regression constant alone and therefore it is a more accurate fit to the data

Table 36. Model Summary for Binary Logistic Regression for the Prediction of Offending

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	74.156a	0.071	0.113
2	67.768b	0.142	0.225
a Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.			
b Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.			

Table 37. Binary Logistic Regression for the Prediction of Offending

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1a	EC	0.158	0.07	5.14	1	0.023	1.171
	Constant	-5.499	1.897	8.405	1	0.004	0.004
Step 2b	EC	0.189	0.076	6.281	1	0.012	1.208
	SEC	0.168	0.071	5.583	1	0.018	1.183
	Constant	-9.987	2.914	11.748	1	0.001	0
a Variable(s) entered on step 1: EC.							
b Variable(s) entered on step 2: SEC.							

Table 38. Results of Mediation Analysis for Logistic Regression Predicting the Commission of an Offence by the Level of Autistic Traits Through the Level of Personal Distress and Secondary Psychopathic Traits.

	M1 (PD)				M2 (SEC)				Y(OFF)			
	Coefficient	SE	t	p	Coefficient	SE	t	p	Coefficient	SE	z	p
Constant	12.3853	3.8332	3.2240	0.0019	10.3294	3.7663	2.7426	0.0076	-9.7342	3.3644	-2.8933	0.0038
X (AQ)	0.2535	0.0817	3.1011	0.0027	0.1856	0.0800	2.3212	0.0230	-0.0459	0.0515	-0.8914	0.3727
M (SEC)	-	-	-	-	-	-	-	-	0.1686	0.0737	2.2884	0.0221
Covariant (PD)	-	-	-	-	0.2853	0.1051	2.7141	0.0082	0.0489	0.0692	0.7062	0.4800
Covariant (EC)	0.0256	0.1173	0.2179	0.8281	0.0556	0.1082	0.5140	0.6087	0.1801	0.0803	2.2424	0.0249
	R^2=0.1160 F(2 77)=5.0527 MSE=22.5009 p<0.0087				-2LL=66.6901 CoxSnell=0.1540 Nagelkirk=0.2434				R^2=0.2020 F(3 76)=6.4141 MSE=19.1386 p<0.0006			