

AUTISM SPECTRUM DISORDERS –
LEGAL AND FORENSIC PSYCHIATRIC ASPECTS AND REFLECTIONS

Marianne Kristiansson and Karolina Sörman

Abstract

Object: The object of the article is to illustrate and discuss neuropsychiatric correlates in perpetrators with ASD in relation to judicial implications such as the cognitive and volitional aspects of criminal responsibility.

Method: A comprehensive literature search was conducted in PubMed, Cochrane, PsychInfo and Social Citation Index by combining the key words as stated below. All relevant articles written in English, dating from 1980 to present, were included.

Results: Perpetrators with ASD commonly present with severe deficiencies in mind reading capacity and perspective taking that may have implications for imagination, cognition and understanding; a mental handicap that can be very difficult to explain to the court. Up to date however, research on how these deficiencies affect criminal responsibility is still very sparse.

Conclusions: A more refined “mental model” on the neuropsychiatric correlates of ASD is needed in order to facilitate the forensic psychiatric assessment, treatment and risk evaluation of perpetrators with ASD.

Key Words: Asperger syndrome – Autism – Violence – Aggression – Criminal Law – Forensic Psychiatry – Insanity Defense

Declaration of interest: none

Marianne Kristiansson^{1,2} and Karolina Sörman¹

¹ Institution of Clinical Neuroscience, Division of Forensic Psychiatry, Karolinska Institutet, Stockholm, Sweden

² Department of Forensic Psychiatry, National Board of Forensic Medicine, Stockholm, Sweden

Corresponding Author

Marianne Kristiansson, M.D., Ph.D., Institution of Clinical Neuroscience, Division of Forensic Psychiatry P.O.BOX 4044 - SE-141 04 Huddinge, Sweden.

Phone: +46 8 607 15 07, Fax: +46 8 711 71 41, e-mail: marianne.kristiansson@rmv.se

Introduction

Autism spectrum disorders: general characteristics

According to DSM-IV (APA 1994), the core features of autism spectrum disorders, (ASD) compromise severe and sustained impairment in social interaction and social communication as well as development of restricted, repetitive patterns of behaviour, interests and activities (APA 1994). ASD compromise a group of disorders that fall in a dimensional spectrum of severity, with varying forms and intensity.

Asperger syndrome shares the qualitative impairment in social interaction and the repetitive stereotyped behaviours seen in subjects with autism (APA 1994, APA 2000). Unlike autism however, Asperger syndrome is characterized by normal intellectual ability and syntactical speech (APA 1994, APA 2000). It is not clear yet whether Asperger syndrome belongs to the higher functioning end of ASD

or whether it is qualitatively distinct from autism (Murrie et al. 2002). More specifically, it has been suggested that subjects with Asperger syndrome show these tendencies: maintaining of idiosyncratic interests, lack of empathy, naïve one-sided social interaction, limited capacity to form friendships, pedantic and repetitious speech, clumsy movements and odd postures (Murrie et al. 2002). The impaired communication is suggested to include deficits in recognizing humour, irony or sarcasm, as well as the use of gestures, personal space and topic selection (Haskins and Silva 2006). Furthermore, the DSM-IV TR states that Asperger syndrome is not diagnosed if criteria for another specific Pervasive Developmental Disorder or schizophrenia are met (APA 2000).

ASD and criminality

Most subjects with ASD are law abiding and will never commit any violent crime (Katz and Zemishlany 2006, Silva et al. 2004). Ghaziuddin and co-authors

SUBMITTED OCTOBER 2007, ACCEPTED DECEMBER 2007

estimated a prevalence of aggression related to Asperger syndrome as low as 2.7%, which most certainly is not above the prevalence rate for violence in the general population (Ghaziuddin et al. 1991). It has been questioned in literature whether a relation between ASD and aggression/violence exists at all, and it has been suggested that associated aggression can be accounted for by comorbid psychiatric diagnoses, rather than the ASD per se (Palermo 2004).

Since the present article is restricted to the forensic context however, it will deal exclusively with perpetrators with ASD. Even though only a minority of subjects with ASD are offensive, they seem far more prevalent in forensic samples than in general community samples (Scragg and Shah 1994, Siponmaa et al. 2001, Haskins and Silva 2006).

When studying the prevalence of Asperger syndrome in a forensic psychiatric secure hospital, Scragg and Shah found that 1.5-2.3% of the patients had Asperger syndrome, a figure substantially higher than in the general population (Scragg and Shah 1994). Likewise, Hare and colleagues screened 1305 subjects in all English special forensic hospitals and found that 2.4% of the patients had ASD, and another 2.4% were found to have uncertain ASD (Hare et al. 1999). In a retrospective file-based study from Sweden assessing all young subjects (n= 126, 15-22 years old) that had undergone forensic psychiatric assessment during a specific period of time, the authors found that 3% (n= 112) of the subjects that could be classified retrospectively had Asperger syndrome and 12% had Pervasive Developmental Disorder NOS (not otherwise specified) (Siponmaa et al. 2001). At the time of publication, these figures were regarded as astonishingly high, but only a few years later they were replicated in a prospective study by Soderstrom and co-workers (Soderstrom et al. 2004).

Throughout literature, there are reports of unusual and strange criminal acts conducted by subjects with Asperger syndrome, and according to Katz and Zemishlany, the criminal acts include physical and sexual assaults, arson, harassing phone calls, theft, attempted murder, murder and possibly even serial murders (Katz and Zemishlany 2006). Other authors have pointed out fire-related crimes to be among the most frequently committed crimes by perpetrators with higher functioning ASD. In a study by Siponmaa et al., 10 (63%) out of 16 crimes of arson were perpetrated by subjects with higher functioning ASD (Siponmaa et al. 2001).

Features in ASD relevant to criminal acts

Subjects with ASD tend to gravitate towards life long physical and psychological isolation (Silva et al. 2004), which has been pointed out as a predisposing factor for the development of maladaptive behaviour including criminality (Tantam 1988, Silva et al. 2004). Depending on the social context and individual vulnerability, isolation might foster development of intrusive thoughts, daydreams and fantasies (Meloy 2000). Already in the 1980's Tantam described 60 individuals, out of whom 46 had autistic traits, who presented odd behaviour without being psychotic and

socially isolated. Nearly half of the group had been involved in antisocial behaviour at some stage and almost a quarter had committed criminal offences (Tantam 1988). Further traits that are proposed to underlie violence and aggression in subjects with ASD include outrage, membership card in a deviant group (Tantam 2003), or violent outbursts if disturbed or prevented from spending a great deal of time on special areas of interests (Katz and Zemishlany 2006).

In a case report from the US, Schwartz-Watts discuss three cases of murder assessed by perpetrators with Asperger syndrome (Schwartz-Watts 2005). The case reports describe features related to ASD such as extreme irritability and frustration when confronted with physical touch, fascination with and collection of guns and swords reflecting stereotyped interests, as well as odd explanations and imaginations of what injuries could result in and difficulties in recognizing facial expressions and verbal cues (Schwartz-Watts 2005).

Another interesting deficit sometimes described in adult subjects with Asperger syndrome is deficient internal coherence and associated compartmentalization, where one event seems to occur "in a separate room, completely dissociated from other rooms" (Silva et al. 2004). According to Haskins and Silva, this deficit may lead to the creation of a psychological niche where inner preoccupations can flourish (Haskins and Silva 2006). In its most extreme form, this tendency has been suggested to exist in some sexual serial killers with high functioning autism who live highly compartmentalized lives split into one "prosocial component" in which they tend to function as law-abiding citizens, and one "antisocial" component represented by a sexually predatory lifestyle. This compartmentalizing way of experiencing and remembering events could also explain why some perpetrators with ASD completely deny the crime that they have committed despite solid forensic evidence presented to them.

Further characteristics in perpetrators with Asperger syndrome have been described by Murrie et al. who studied six cases in forensic settings and noted features such as interpersonal naiveté, sexual frustration and immediate confession (Murrie et al. 2002). Tendencies to immediately confess to the police, as well as a lack of previous criminal record distinguish offenders with Asperger syndrome from most other individuals referred for forensic psychiatric evaluation. Based on those features, Murrie et al. discussed that the illegal behaviour in those perpetrators may stem from a combination of social impairments and a desire for attachment or sexual experience (Murrie et al. 2002). Most probably however, subjects with ASD have troubles modulating their need for rewards according to environmental demands, rules and legislations, since this requests an ability to read social signals and comprehend what is beneficial for the group, by taking the perspective of other people.

Aim

The aim of the present article is to discuss neuropsychiatric correlates such as lack of empathy and compulsions, in relation to the cognitive and volitional

aspects of criminal responsibility. The judicial discussion will be initiated by a brief comment on the legal frameworks in Europe regarding mentally disordered offenders, with special reference to Sweden. Furthermore, suggestions for future research will be discussed briefly.

Case presentations

The following case presentations serve to illustrate neuropsychiatric correlates in perpetrators with ASD. Both cases are based on data sources from each defendant's forensic psychiatric assessment act, (including statements from the assessing team) and the subsequent forensic psychiatric opinion.

Case 1

The first case involved a 34 year old defendant charged with attempted murder for shooting a psychologist that took part in a custody evaluation on his daughter.

Already as a child, the defendant developed special routines regarding everyday activities and engaged in stereotyped and repetitive interests such as playing with Lego, drawing and building aeroplanes and cars. At the age of 7, the defendant's mother developed a bipolar disorder which clearly affected his childhood and forced him to take a disproportional degree of responsibility. In school he was considered "geeky" and was very easily irritable when corrected by the teachers. He refused to show up on exams unless he had learnt all the material by heart in order to make sure that he would score the highest grade. During lessons, he usually distracted himself by repetitive acts such as underlining certain words in the books without being asked to do so. He achieved excellent grades in school, but reportedly had no friendships or romantic relationships. In college, it took him one extra year to graduate due to his perfectionist manners. When he entered the work force, he began to have substantial difficulties due to his idiosyncratic routines.

There was no history of criminality or substance abuse, but at the age of 22 he initiated outpatient psychiatric contact due to what his treating professionals described as obsessive-compulsive symptoms, which forced him to clean his room ten times a day and spending time pondering on historical facts and technical specialities. Later that spring, he was signed into a work rehabilitation programme, which he disliked since he felt it was "below his dignity". At the rehabilitation programme, he met his wife who also had psychiatric problems. They moved into an apartment in central town, which he spent hours renovating "in a perfectionist manner". His wife got pregnant and rather soon she started develop recurring psychoses.

A couple of months before the incident, a child custody evaluation was initiated, which the defendant found extremely stressful. As a desperate attempt to gain an external statement to their favour, he and his wife contacted a private child psychologist (the victim). In contrast however, she stated that their daughter suffered from signs of depression and panic reactions.

Later that year, his wife developed an acute psychosis and was readmitted to a psychiatric hospital. At that point, their daughter was taken care of by the social services under the act of child mistreatment, all of which led the defendant to develop a maladaptive stress reaction. He was admitted to a psychiatric emergency unit where he claimed that he was desperate and could no longer handle the situation. Just before Christmas he was signed out and on New Years Eve 2000, he went to the psychologist's home and shot her in the head. The victim was severely injured but survived. When arrested, the defendant quickly confessed the crime and did not feel any obvious remorse or guilt.

During the forensic psychiatric assessment, the defendant described that he was terrified of getting too close to other people, since that might pull him into activities that would distract him from spending time in front of the computer. His main interest was photography and in different computer programs, he spent hours modifying photos of female models in order to create "perfect pictures" of women. Interpersonally he presented as somewhat paranoid and even narcissistic, with limited ability to take the perspective of another person. He was diagnosed with Asperger syndrome due to the extent of his social impairments and idiosyncratic interests and got sentenced to inpatient compulsory forensic psychiatric treatment.

Case 2

The second case involved a 27 year old defendant, charged with first-degree murder of a woman who had lived in the same house block as him. He had no earlier convictions and did not abuse any drugs. He had no previous contact with psychiatric or social services and his network consisted solely of his parents living nearby.

The prosecutor stated that the defendant had assaulted his victim physically several times and after killing her had ejaculated besides her body, as confirmed by DNA evidence. Before leaving the apartment, he took her pants with him. Moreover, he described how he had returned twice to her apartment to study the body, since he wanted to learn more about women.

The defendant confessed and when the case was subjected to criminal investigation analysis, the crime scene was characterized as disorganised. At the arrest, his computer was confiscated and was found to contain documents describing the planning of the murder as well as statements about thoughts and feelings that he had had during the last years and after the offence.

He was raised in an ordinary family with no heredity for mental disorders and with good socio-economic state. His early psychomotor development was described as normal though he was a shy, reserved and quiet child who preferred playing alone and was often afraid of doing new things. He had no history of Conduct Disorder or antisocial life style. He was a bed wetter up to the age of 11. His school achievements were above average, but in the fifth grade there was a declination possibly as he was experiencing peer rejection and bullying. His peers found him odd and even if he wanted to be with them, he often established contact in a way that they considered strange. In the military services he was conceived as tense and

vulnerable for stress and was not able to participate in the required activities. He started to study at a technical school but never graduated. He never had any girlfriends, and since he was very interested in history, he spent most of his spare time reading or writing.

About one year before the offence, he showed signs of being depressed and irritable. At the same time, he started documenting his difficulties to make contact with women. He created fantasies; first about a woman at his work and then about the victim. In his diary he described his thoughts about women and expressed great difficulties in understanding their behaviour and how they are thinking. At one occasion he asked the victim out for a cup of coffee, but with no success. As he started feeling more and more rejected he started to think about revenge and killing someone, first anyone but after some months the victim specifically. He paid close attention to her routines and developed a stalking-like behaviour towards her. His thoughts were more and more occupied by learning more about her, the way she smelled and what her body looked like. One night he broke into her flat and stabbed her to death, without any prior communication with her, according to his own statement. When arrested he showed no sign of regret or remorse.

In the forensic psychiatric report he was described as tense, controlled, preoccupied by the offence and his fantasies, focused on details, willing to speak with others but without reciprocity in social interactions and relations. Assessment identified his intelligence level to be above normal. He was diagnosed as suffering from a personality disorder not otherwise specified with phobic, dissociative and schizoid traits. He was sentenced to inpatient compulsory forensic psychiatric care. At the forensic hospital he was reassessed and found to have Asperger disorder.

Neuropsychiatric correlates in perpetrators with ASD

Lack of empathy

Empathy is an extremely complex construct with a multitude of different definitions (Blair 2008). A common classification however is that empathy consists of cognitive and affective aspects (Decety and Jackson 2004, Blair 2008) and it has been suggested that deficient cognitive empathy is a recurring trait in perpetrators with ASD (Silva et al. 2004, Rogers et al. 2007), manifested through reduced abilities to read social signals and cues like facial expressions, vocalization and gestures (Katz and Zemishlany 2006).

At the core of the empathic deficit in ASD lies an inability to attribute mental states to others, commonly denoted as a deficient theory of mind, ToM (Kleinman et al. 2001, Blair 2008). ToM (or mentalization) refers to the ability to estimate the cognitive, perceptual and affective life of others as well as of the self (Haskins and Silva 2006) and deficiencies in ToM are sometimes referred to as “mind blindness” (Frith 2001, Haskins and Silva 2006), in other words an actual decreased capacity to read social cues and to understand the meaning of an act (Frith 2001). Perpetrators with higher functioning ASD have shown marked difficulties in

understanding that another person has a different emotional cognitive experience of a shared event (Haskins and Silva 2006). This characteristic however seems quite specific to ASD; psychopaths on the other hand do not seem to show any deficiencies in the ability to represent mental states (Blair 2008) but are more often reported to present deficient emotional empathy, characterized as deficient response to the emotional displays by others (Blair 2008). Moreover, moral development also seems to differ between the two different diagnoses where it has been argued that children with autism show relatively preserved moral judgements (as long as the judgement does not require the representation of the intent of the perpetrator), which psychopaths do not (Blair 2008).

Functional Magnetic Resonance Imaging (fMRI) studies have presented results suggesting that the perceived fairness of others may have an impact on brain reactivity as well as behaviour (Singer et al. 2006). From a clinical point of view, it is not uncommon that subjects with autistic traits easily feel offended and experience that others are not fair. This might lead them to vengeful behaviour (Tantam 2003); planning and committing crimes in order to, from their viewpoint, restore the balance. The defendant in our first case presentation regarded the shooting of his psychologist as something necessary in order to “restore the balance” and it was only later when his wife told him that the woman he had shot probably also had a family, that he regretted his act.

Compulsions

Other behaviours that most certainly influence empathic ability are preoccupations and compulsions, which are known autistic traits. According to Bejerot, these features could be looked upon as similar to the characteristics of obsessive-compulsive disorder, OCD (Bejerot 2007). Both defendants in our case presentations showed marked compulsive traits; the first defendant tackled his internal and external pressure in a compulsive way through acting rather than withdrawing and reflecting. The second defendant displayed compulsive behaviour through strong obsessions with one particular woman and the stalking-like behaviour that he developed towards her. Stalking-like behaviour specifically has been investigated and commented by various researchers, and it has been suggested that subjects with ASD are more likely to engage in inappropriate courting behaviours and are more likely to focus their attention upon celebrities, strangers, colleagues and ex-partners and to pursue their target longer than controls (Stokes et al. 2007). That research further pinpoints the importance of correctly assessing the diagnosis of ASD when individuals are prosecuted under stalking legislations in various jurisdictions (Stokes et al. 2007). In serial killers specifically, the extreme lack of empathy underlying sexual serial homicide has been proposed to stem from preoccupations with details, lack of imagination and an inability to interpret social signals and facial expressions (Silva et al. 2002).

Legal frameworks regarding mentally disordered offenders:

Europe

The variations in legal regulations governing assessment, placement and treatment of mentally ill offenders in the European Union member states is still rather poorly researched (Dressing et al. 2007). A study aiming to provide a structured description and cross-boundary comparison of legal frameworks regulating diversion and treatment of mentally disordered offenders in the EU-member states stated that the legal frameworks varied markedly across the members (Dressing et al. 2007). The survey showed that the member states rather provide a variety of codes, laws or acts regulating different aspects of forensic cases, rather than an all-embracing forensic legislation in a clear code or statute (Dressing et al. 2007). Forensic legislation is under constant change and review and apart from the wide variation in legal frameworks, another difficulty in comparing different member states relates to the legal terminology applied to describe the mental state in the defendants. Quite commonly the terminology is non-specific; embracing all kinds of mental disorders and allowing a broad scope in their construction (Dressing et al. 2007). According to the survey, the largest consensus evolves around the inclusion of major mental illnesses such as schizophrenia and other psychotic disorders within forensic legislation, and the largest variation evolved around the inclusion of addiction, neurotic disorders and personality disorders (Dressing et al. 2007). In a group of member states, (e.g. England and Wales, France, Ireland), a suspect is not considered mentally ill or disordered within the terms of the relevant legislation, even in severe cases of addiction, and in Italy, article 92/93 of the Italian Penal Code admits no insanity claim for subjects who commit a crime whilst intoxicated (Dressing et al. 2007). Another diversion between different member states relates to whether the concept of criminal responsibility in mentally disordered offenders is incorporated into the legal frameworks of member states. In England Wales and Ireland, diminished criminal responsibility is only an issue in cases of homicide and for the insanity defence (all offences), even though these regulations are reported to rarely be relied upon in routine practice (Dressing et al. 2007). Sweden however is the only country within EU where criminal responsibility is not applied at all as a legal concept (Dressing et al. 2007).

Sweden and criminal responsibility

Criminal responsibility is founded on the concept of free will, according to which human beings can choose rationally between right and wrong (Dressing et al. 2007). Already back in the Greek and Roman antiquity, it was believed that mentally ill offenders lacked criminal responsibility and therefore should be offered care rather than punishment (Dressing et al. 2007). Free will and responsibility are complex concepts, which also may vary over time periods and between societies. Even though the legal frameworks

vary widely between different legal systems, criminal responsibility commonly constitutes a combination of two judicial aspects; *mens rea*, the mental element or purpose of the crime and *actus reus*, the physical element of the crime. These elements involve two different aspects; a cognitive and a volitional one respectively. The cognitive aspect evolves around the capacity to understand the meaning of an act and also refers to the ability to differentiate right from wrong, all which requires functional ToM. The volitional aspect relates to compulsive behaviour and the ability to control impulses and to adopt one's performance according to a given situation. Since both *mens rea* and *actus reus* relate to the neurocognitive functioning of the defendant, they should be regarded as resulting from various factors such as biological, medical, psychological and social.

In Sweden, a subject found guilty of a crime is held responsible for that crime regardless of mental illness. However, according to the Swedish Criminal Code, a person who has been found guilty of a crime must not be sentenced to prison if the crime was committed under the influence of a Severe Mental Disorder, (SMD). All psychotic states, severe depression with strong intention to commit suicide and severe personality disorders/neuropsychiatric disorders combined with marked compulsiveness or impulsivity with psychotic features, are considered to be SMDs according to the legislation. Moreover, in some cases, severe dementia and severe mental retardation may be regarded as SMDs. In order to assess the degree of mental disorder, the subject is referred to undergo a forensic psychiatric assessment. In Sweden, approximately 600 major forensic psychiatric assessments are performed every year. The assessment is performed by a team consisting of a forensic psychiatrist in charge of the assessment, a psychologist, a medical social worker and staff from the ward. If the forensic psychiatric opinion states that someone suffered from a SMD at the time of the committal of the crime, it is reasonable to presume that the degree of mental disorder and psychosocial dysfunction is severe.

Results from a Swedish register based pilot study (data not yet published) shows that between year 2000 and 2006, 4326 major forensic psychiatric reports were performed and in 7% of the cases, the subjects were assigned a diagnosis of ASD/Asperger syndrome. In 68% of these cases, the forensic psychiatric opinion stated that the charged crime was committed under the influence of a SMD according to the Swedish Criminal/ Penal code, the judicial concept that prohibits sentence to prison. Among the subjects from the total study group that were possible to follow up, (n = 4323), 48%, were judged to have a SMD, a figure that was proportionally higher in the group of subjects with ASD/Asperger syndrome (t-test, independent sample, two tailed, $p < 0.05$). This leads us to the suggestion that in Sweden there is a tendency to consider subjects with ASD as more severely mentally ill, in comparison to the average subject that undergoes forensic psychiatric assessment. As Sweden do not apply a concept of criminal responsibility however, it is difficult to compare these figures with results from other countries.

ASD and criminal responsibility

Do perpetrators with ASD have a guilty mind? In order to answer that question, the *severity* of the subject's neuropsychiatric deficiencies and psychosocial dysfunction must be assessed, which is the actual core complication. Even though perpetrators with ASD do not present ordinary psychotic symptoms, they display deficiencies in mind reading capacity and perspective taking that may have implications for imagination, cognition and understanding; a mental handicap that can be very difficult to explain to the court. In our first case presentation, the defendant possessed a kind of "autistic fantasy" that represented a calmer, safer and more predictable world than the real one. In the second case presentation, the defendant was markedly preoccupied with fantasies concerning the victim, preoccupations that were so strong that they later developed into disturbances in perception and the internal representation of reality. This in turn resulted in severe mental impairment, very much like a psychosis.

The isolated and odd lifestyle of subjects with ASD/Asperger syndrome might lead to the development of a detached psychological structure sometimes nearly psychotic, with defective reasoning and a marked reduction of cognition. Even though subjects with Asperger syndrome and neurodevelopmental disorders may have sufficient cognitive capabilities to comprehend the law, it is reasonable to suggest that the inability of these subjects to assess social situations and appreciate other's point of view constitute the main cause for the violent behaviour and criminal offences in perpetrators with ASD (Katz and Zemishlany 2006). Some authors suggest that perpetrators with ASD/Asperger syndrome might be regarded as unable to *intend* to commit a criminal act, according to what that concept commonly constitutes, and therefore could be regarded as unfit to stand trial, even though they do not suffer from a psychotic illness (Katz and Zemishlany 2006). Another distinct characteristic in perpetrators with ASD is the inability to comprehend consequences of criminal actions and how they impact other people (Katz and Zemishlany 2006). Since a legal hearing involves a proceeding that requests reading of complex social cues, Katz and Zemishlany therefore suggest that some of these subjects cannot be expected to deal with a hearing adequately (Katz and Zemishlany 2006). The broad range of impairments in perpetrators with ASD might cause divergent forensic opinion regarding whether they have a severe mental disorder affecting their degree of responsibility or not (Haskins and Silva 2006). This is still poorly researched however.

Suggestions for future research

Future studies on the neuropsychiatric correlates of ASD could focus on the drives and intentions that motivate the odd criminal behaviour manifested by perpetrators with ASD. In contrast to antisocial or psychopathic perpetrators who rather seem governed by basic rational rewards such as sex, food control and power, perpetrators with ASD seem to have more blurred, bizarre and irrational intentions. Possibly, they find their primary gratitude from complex reward

processes such as attachment, revenge or rehearsing of fantasies, resulting in preoccupations, odd communication and revenge. These processes might as well as primary rewards activate the dopaminergic reward system and create a state of pleasure, gratitude and homeostasis (Walter et al. 2005).

Risk prediction, which has been increasingly debated during the last couple of years, is an essential part of the forensic psychiatric assessments in several jurisdictions. Considering the risk of reoffending in perpetrators with ASD/Asperger syndrome, it might be beneficial to highlight the cognitive and volitional aspects of criminal liability. These aspects, especially the cognitive one, are rarely comprehensively assessed in the risk assessment/prevention process; which is highly worrying. It is very difficult to replicate the authenticity of complex social situations which require a degree of mentalization and it is highly debatable whether structural check lists such as HCR-20 (Webster 1997) are tailored to target perpetrators with ASD specifically. Parsons and Mitchell have described one potential approach to overcome this; a virtual reality in social skills training for subjects with ASD (Parsons and Mitchell 2002). According to them, role-playing within virtual environments could promote mental simulation of social events and offer opportunities for training and learning new strategies at repeated times. Our research group has also recently designed a computer based simulation programme designed for such training in forensic psychiatry and within the prison system. This programme aims to present a more realistic approach to cognitive training in order to teach the patient how to evaluate and reflect upon other's as well as their own behaviour. Through simulated interactions, the patients are expected to gain an insight into and an improved ability to, understand social situations, judge different behavioural outcomes and consequences and find solutions to solve problems without using any violence (Wijk et al. 2007, manuscript in preparation). One highly complex social interaction that is difficult to capture in clinical settings is empathic accuracy. According to Roeyers et al. empathic deficits may only be apparent when sufficiently complex naturalistic assessment methods are used, e.g. videotaped interactions (Roeyers et al. 2001). In this simulated interaction, the empathic accuracy of the subject is defined as the degree to which the subject infers the subjective experience of a target person in a naturally occurring conversation (Roeyers et al. 2001).

In conclusion, more research is needed on neuropsychiatric correlates in ASD in order to develop a more refined "mental model" on the disorder. Such a "mental model" would facilitate the forensic psychiatric assessment, treatment and risk evaluation on perpetrators with ASD, in Sweden as well as internationally.

References

- American Psychiatric Association (APA) (1994). *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. American Psychiatric Association, Washington DC.
- American Psychiatric Association (APA) (2000). *Diagnostic and Statistical Manual of Mental Disorders*, Text revision.

- American Psychiatric Association, Washington DC.
- Bejerot S (2007). An autistic dimension: A proposed subtype of obsessive-compulsive disorder. *Autism: the international journal of research and practice* 11, 101-110.
- Blair RJ (2008). Fine cuts of empathy and the amygdala: Dissociable deficits in psychopathy and autism. *Quarterly journal of experimental psychology* 61, 157-170.
- Decety J, Jackson PL (2004). The functional architecture of human empathy. *Behavioral and cognitive neuroscience reviews* 3, 71-100.
- Dressing H, Salize HJ, Gordon H (2007). Legal frameworks and key concepts regulating diversion and treatment of mentally disordered offenders in European Union member states. *European psychiatry: the journal of the Association of European Psychiatrists* 22, 427-432.
- Frith U (2001). Mind blindness and the brain in autism. *Neuron* 32, 969-979.
- Ghaziuddin M, Tsai L, Ghaziuddin N (1991). Brief report: violence in Asperger's syndrome, a critique. *Journal of autism and developmental disorders* 21, 349-354.
- Hare DJ, Gould J, Mills R, Wing L (1999). A preliminary study of individuals with autistic spectrum disorders in three special hospitals in England. Available at <http://www.nascymru.autism.org.uk/content/1/c4/38/68/3hospitals.pdf> Accessed January 25, 2008.
- Haskins BG, Silva JA (2006). Asperger's disorder and criminal behaviour: forensic-psychiatric considerations. *The journal of the American Academy of Psychiatry and the Law* 34, 374-384.
- Katz N, Zemishlany Z (2006). Criminal responsibility in Asperger's syndrome. *The Israel journal of psychiatry and related sciences* 43, 166-173.
- Kleinman J, Marciano PL, Ault RL (2001). Advanced theory of mind in high-functioning adults with autism. *Journal of autism and developmental disorders* 31, 29-36.
- Meloy JR, Rivers L, Siegel L, Gothard S, Naimark D, Nicolini JR (200). A replication study of obsessional followers and offenders with mental disorders. *Journal of forensic sciences* 45, 147-152.
- Murrie DC, Warren JI, Kristiansson M, Dietz PE (2002). Asperger's syndrome in forensic settings. *International journal of forensic mental health* 1, 59-70.
- Palermo MT (2004). Pervasive developmental disorders, psychiatric comorbidities and the law. *International journal of offender therapy and comparative criminology* 48, 40-48.
- Parsons S, Mitchell P (2002). The potential of virtual reality in social skills training for people with autistic spectrum disorders. *Journal of intellectual disability research* 46, 430-443.
- Roeyers H, Buysse A, Ponnet K, Pichal B (2001). Advancing advanced mind-reading tests: Empathic accuracy in adults with a pervasive developmental disorder. *Journal of child psychology and psychiatry, and allied disciplines* 42, 271-278.
- Rogers K, Dziobek I, Hassenstab J, Wolf OT, Convit A (2007). Who cares? Revisiting empathy in Asperger syndrome. *Journal of autism and developmental disorders* 37, 709-715.
- Schwartz-Watts DM (2005). Asperger's disorder and murder. *The journal of the American Academy of Psychiatry and the Law* 33, 390-393.
- Scragg P, Shah A (1994). Prevalence of Asperger's Syndrome in a secure hospital. *The British journal of psychiatry: the journal of mental science* 165, 679-682.
- Silva JA, Ferrari MM, Leong GB (2002). The case of Jeffrey Dahmer: sexual serial homicide from a neuropsychiatric developmental perspective. *Journal of forensic sciences* 47, 1347-1359.
- Silva JA, Leong GB, Ferrari MM (2004). A neuropsychiatric developmental model of serial homicidal behavior. *Behavioral sciences and the law* 22, 787-799.
- Singer T, Seymour B, O'Doherty JP, Stephan KE, Dolan RJ, Frith CD (2006). Empathic neural responses are modulated by the perceived fairness of others. *Nature* 439, 466-469.
- Siponmaa L, Kristiansson M, Jonson C, Nydén A, Gillberg C (2001). Juvenile and young adult mentally disordered offenders: The role of child neuropsychiatric disorders. *The journal of the American Academy of Psychiatry and the Law* 29, 420-426.
- Stokes M, Newton N, Kaur A (2007). Stalking and social and romantic functioning among adolescents and adults with autism spectrum disorders. *Journal of autism and developmental disorders* 37, 1969-1986.
- Soderstrom H, Sjodin AK, Carlstedt A, Forsman A (2004). Adult psychopathic personality with childhood-onset hyperactive and conduct disorder – a central problem constellation in forensic psychiatry. *Psychiatry research* 121, 271-280.
- Tantam D (1988). Lifelong eccentricity and social isolation. I. Psychiatric, social, and forensic aspects. *The British journal of psychiatry: the journal of mental science* 153, 777-782.
- Tantam D (2003). The challenge of adolescents and adults with Asperger syndrome. *Child and adolescent psychiatric clinics of North America* 12, 143-163.
- Walter H, Abler B, Ciaramidaro A, Erk S (2005). Motivating forces of human actions. Neuroimaging reward and social interaction, *Brain research bulletin* 67, 368-81.
- Webster CD, Douglas KS, Eaves D, Hart SD (1997). Assessing risk for violence. Version 2. Simon Fraser University, Vancouver.