Psychopathology and neuropsychological functioning among male and female prisoners in England and Wales

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PSYCHOPATHOLOGY AND NEUROPSYCHOLOGICAL FUNCTIONING AMONG MALE AND FEMALE PRISONERS IN ENGLAND AND WALES

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PhD

Abstract

Gender differences in the presentation and psychological function of prisoners is an increasingly prominent issue in day to day management, treatment outcome, and risk reduction. However, research in this area is not well developed, and little is known about the gender-specific associations between psychopathy, personality disorder (PD) and criminal histories, or differences in neuropsychological function between male and female prisoners. This is an important area to evaluate when considering recent government initiatives to develop services for individuals with dangerous and severe personality disorder (DSPD), where male and female offenders are seen as having an equivalent level of risk and need. For intervention and management strategies to be most responsive to the needs of these individuals, we need to know more about the gender-specific differences in psychopathology and neuropsychological functioning.

This study explored psychopathy, PD, criminality, and neurocognitive performance in a large cohort sample of 620 serious male and female prisoners incarcerated in penal establishments across England and Wales. It examined prevalence and performance rates and the associations between these measures, paying particular interest to gender-specific relationships. Multivariate regression analysis demonstrated divergent relationships between facets of psychopathy, features of PD, criminality, and neuropsychological functioning among male and female prisoners.

Female prisoners scoring highly on antisocial features of psychopathy were more antisocial than their male equivalents regarding Antisocial PD and lifetime robbery offences. Affective features of psychopathy were associated with a higher degree of Borderline PD traits and violent history in women specifically. Additionally, deficient emotional processing among female prisoners was further impaired by high rates of Borderline PD. In contrast, risky decision-making in men was specifically linked to affective features of psychopathy and antisocial behavioural traits. These results are discussed in terms of gender-specific interventions and treatment efficacy, which may help inform needs analysis for treatment providers.

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Chapter 1: Introduction

Individuals with personality disorder (PD) are eminent within a range of mental health services by nature of their psychopathology and poor prognosis. Specifically, persons with a diagnosis of PD tend to experience difficulties in interpersonal relationships, appropriate reasoning, affect, and impulse control difficulties (Robins & Reiger, 1991; Maden, 1996; Vollm et al, 2004, British Psychological Society, 2006). Recently, government initiatives have sought to develop services for individuals with dangerous and severe personality disorder (DSPD), and assessment and treatment units are currently being piloted across in England and Wales (including a 12 bedded unit for women).

According to published guidelines (Probation Circular, 2008), individuals are considered suitable for DSPD services if they:

a) have a severe personality disorder;
   For men, this is defined as: a PCL-R score of 30+; a PCL-R score of 25 - 29 and at least one PD diagnosis other than Antisocial PD; or 2 or more PD's. This criterion has been modified slightly for women, and is defined as: a PCL-R score of 25+; a PCL-R score of 18 - 24 and at least two PD diagnoses other than Antisocial PD; or 3 or more PD's;
b) present as a risk of greater than 50% of committing a serious offence; and
c) the risk they present is functionally linked to their personality disorder.

Although pilot services for men have been running since 2000, assessments and treatment services for women have been under development more recently. However, when implementing this new service for women, it is vital to consider important findings regarding gender differences in offending behaviour, the prevalence and presentation of personality disorders, and of psychopathy (Maden, 1996, Salekin et al, 1997; Grann, 2000; Logan, 2002; Vitale et al, 2002, Cale & Lilienfeld, 2002; Forouzan, 2003 (cited in Forouzan & Cooke, 2005); Warren et al, 2003; Strand & Belfrage, 2005). Women not only constitute a smaller proportion of the prison population in England and Wales (approximately 6% of offenders in custody are women, NOMS, 2005; 2008), they also differ from male offenders in terms of their criminogenic risk and need.

A recent review of the characteristics and vulnerabilities of women within HM Prison services recommended a more focussed, gender specific approach to working with female offenders (The Corston Report, 2007). One of the subsequent objectives outlined in a recent government report (NOMS, 2008) was that women sentenced to custody should have access to *'facilities and interventions…appropriate to their needs'* and that, due to their heterogeneous psychopathology, *'decisions about risk, need, eligibility and suitability for an intervention should be based on a thorough individual assessment' (pp. 15).*

Nevertheless, research into the psychopathological presentation of female prisoners, and how this relates to intervention and management strategies, is quite limited. Very little is known about the specific differences between male and female prisoners in sentenced UK populations, particularly regarding cognitive and emotional functioning. The current study, therefore, specifically addresses the clinical and neuropsychological characteristics of male and female prisoners with a history of serious offending and antisocial behaviour who may fall within the remit of DSPD services. The aim of this research is to generate psychopathological and neuropsychological data to test certain preliminary conjectures and force theoretical development in this area.

This review critically considers what is already known about female prisoners with a history of serious offences, and how the literature on the neuropsychology of both male and female psychopathic offenders can help develop preliminary hypotheses.

1. The psychopathology of prisoner populations

Firstly, the prominent literature in the field of psychopathy, PD, and offending behaviour shall be reviewed, with particular attention paid to any observed gender differences.

i) Psychopathy

Psychopathy is a complex personality disorder characterised by specific behavioural, affective, and interpersonal features. In his work *The Mask of Sanity*, Cleckley (1982) identified 16 specific criteria for psychopathy, including superficial charm, unreliability, lack of remorse, failure to learn from experience, pathological egocentricity, and inadequately motivated antisocial behaviour. Subsequently, the Psychopathy Checklist-Revised (PCL-R: Hare, 1991, 2003) was developed on the basis of an operationalisation of Cleckley's clinical observations. The PCL-R is a highly standardised instrument for measuring psychopathy in forensic populations. It has shown good reliability and construct validity in a range of contexts and cultures (Hare et al, 1990; 2000; Elizabeth, 1993; Forth et al, 1996; Cooke & Michie, 1999; Cooke, Kosson, & Michie, 2001; Vitale & Newman, 2001; Skilling et al, 2002; Bolt et al, 2004; Morana et al, 2005).

According to Hare (1991), the total PCL-R score, which can range from 0-40, provides an estimate of the extent to which the individual matches a prototypical psychopath. The cut-off for caseness, however, has been controversial and reported to vary between cultures (e.g. Morana, Arboleda-Flórez & Camara, 2005). A score of 30, for example is widely used in male forensic populations across North America, whereas lower cut-off scores of 25 or over have been recommended in UK populations (e.g. Cooke et al, 2005) and with female offender samples (e.g. Warren et al, 2003). On the other hand, some researchers have suggested that psychopathy is not a distinct clinical entity and is best assessed as a dimensional construct (Marcus, John, & Edens, 2004; Edens et al, 2006; Lynam & Derefinko, 2006).

Unsurprisingly, due to the defining characteristics of the disorder, individuals with a high level of psychopathy are more likely to break the law and be sentenced to prison. Indeed, prevalence rates of psychopathy within forensic institutions are historically much higher (ranging from 3-21%; Cooke, 1995; Salekin et al, 1997; Hare et al, 2000;

Hare, 2001; Loucks & Zamble, 2000; Vitale et al, 2002; Logan & Blackburn, 2009) than in community samples (ranging from 1-2%; Neumann & Hare, 2008; Coid et al, 2009b). Also, as the PCL-R items incorporate many, but not all, of the personality traits contained in the specification of Antisocial PD (according to standard criteria of the American Psychiatric Association,1994), a strong correlation has been reported between the two (Blackburn & Coid, 1998; Widger, Hare, & Rutherford, 1996; Skilling et al, 2002).

In addition to controversy surrounding the cut-off score for identifying cases of psychopathy, there has also been disagreement in the recent literature regarding the structure of psychopathy, as reflected in the psychometrics of the PCL-R (see Chapter 2 for a full review).

Gender differences

Although there is an increasing evidence-base of studies of psychopathy in women, this area of research is still limited when compared to what is known about psychopathy in men. Nevertheless, there are some studies which suggest that the prevalence of psychopathy, and the underlying psychopathology in female offenders, is different from their male counterparts. For example, the prevalence of psychopathy amongst forensic populations tends to be higher in male offenders (15-31%) than female offenders (11-15%) (Salekin et al, 1997, Grann, 2000; Logan, 2002; Warren & South, 2006; Coid et al, 2009a, 2009b), although inconsistent cut-off criteria make direct comparisons between the studies quite difficult. Furthermore, mean scores on self-report measures of psychopathy have been reported to be lower in various female populations, including undergraduate students (Forth et al, 1996; Lilienfeld & Andrews, 1996), civil psychiatric patients (Vitacco, Neumann, & Jackson, 2005), forensic psychiatric patients and incarcerated offenders (Grann, 2000; Weizmann-Henelius et al, 2004).

Moreover, there is evidence that the presentation and underlying structure of psychopathy is different in female compared to male samples (Grann, 2000; Cale & Lilienfeld, 2002; Vitale et al, 2002; Warren et al, 2003; Forouzan, 2003 (cited in Forouzan & Cooke, 2005); Weizmann-Henelius et al, 2004; Strand & Belfrage, 2005; Cunliffe & Gacono, 2005; Verona & Vitale, 2006). For example, Salekin et al (1997) suggested that the original 2 factor structure used to conceptualise psychopathy in

males may not be applicable to females, while the 3 factor model of psychopathy may represent a better fit with female data from incarcerated samples (compared with the 2 factor structure; Jackson et al, 2002; Warren et al, 2003). However, results have not been consistent, with other studies reporting that the 4-facet model portrays an accurate representation of psychopathy in women (e.g. Kennealy et al, 2007).

Regarding the presentation of psychopathy, Strand & Belfrage (2005) assessed 129 female and 499 male offenders using the shortened version of the PCL-R (the PCL:SV; Hart, Cox & Hare, 1995), and reported that female psychopaths differed from their male counterparts by displaying significantly more lying, deceitfulness, and lack of behavioural control. Conversely, the male psychopaths in their sample were distinguished by stronger histories of antisocial behaviour. Moreover, Forouzan (2003; see Forouzan & Cooke, 2005) stated that women also differ from men in their *expression* of psychopathy. Specifically, she reported that female psychopaths may manipulate others through their powers of flirtation, whereas male psychopaths tend to engage in conning behaviour. In turn, this may mean that certain PCL-R items are interpreted differently across gender, as women who score highly on the item 'promiscuous sexual behaviour', for example, may do so as a consequence of them using sex as a means of exploitation. High scores on this item for men, on the other hand, may reflect a specific example of sensation-seeking behaviour. Indeed, in a study evaluating the conceptual issues of psychopathy in women, Forouzan & Cooke (2005) postulate that *'if psychopathy is manifested differently across gender, then the symptoms considered as the best indicators of psychopathy in men may not be appropriate…for identifying psychopathy in women'(pp. 773).*

The current study aims to clarify some of the above issues, by assessing prevalence rates in a sample of male and female prisoners in England and Wales, and investigating how items of the PCL-R relate to other dimensions of psychopathology in an equivalent sample of incarcerated men and women.

ii) Personality Disorder

Within forensic settings, diagnoses of Antisocial, Paranoid, and Borderline PD, as defined using DSM-IV diagnostic criteria (American Psychiatric Association, 1994) are most prevalent (Singelton et al, 1998). Unsurprisingly, therefore, psychopathy is often

associated with comorbid personality disorders, particularly those from Cluster B (Antisocial, Borderline, Histrionic, and Narcissistic). This association is particularly prevalent in forensic populations (Weizmann-Henelius et al, 2004; Hildebrand & de Ruiter, 2004; Warren & South, 2006); but has also been observed in community (Lilienfeld & Andrews, 1996) and inpatient samples (Becker et al, 2000).

Furthermore, the component facets of psychopathy have been reported to have differing relationships (and strengths of relationships) with particular personality disorders. For instance, in a study assessing the distribution of psychopathic traits in relation to PD in male and female prisoners in England and Wales, Coid et al (in press) found that, although adult Antisocial PD was related to all 4 facets of psychopathy, other PDs had more unique effects. Specifically, Schizoid PD and Narcissistic PD were associated interpersonal (F1) and affective (F2) features, whereas Histrionic PD was associated to interpersonal (F1) and lifestyle (F3) features only. Also, an analysis of psychopathy and PD in female offenders in North America revealed additional associations between Schizotypal PD and Total PCL-R scores, and Paranoid PD and Total, F3, and F4 scores (Warren et al, 2003). However, due to the difference in statistical techniques employed in these 2 studies, comparison of the findings is difficult. Therefore, understanding the structure of psychopathy and how it relates to various measures of behaviour and personality in different populations and different genders is centrally important, when drawing conclusions from the current study (and when making judgements about risk).

Gender differences

Aside from psychopathy, differences in Axis II disorders have also been reported between males and females from patient and community samples (Rutherford et al, 1995; Coid et al, 2006), and offender populations (Moffitt et al, 2001). Specifically, in a recent meta-analysis of studies of personality disorder in patient and community samples, Lynam & Widiger (2007) reported that Narcissistic, Paranoid, and Antisocial PDs were more prevalent in men, whereas women were more likely to be diagnosed with Dependent and Histrionic PD. This suggests that a differing prevalence of PD between genders may be present in the current study, which is important to consider when evaluating potential confounders to the analysis.

Regarding *associations* between psychopathy and PD, certain similarities have emerged from studies of male and female prisoners. For instance, psychopathy has been reported to be associated with Cluster B PD traits in both male and female samples (e.g. Warren et al, 2003; Hildebrand & de Ruiter, 2004; Ullrich & Marneros, 2007; Huchzermeier et al, 2007; Rogers, Jordan, & Harrison, 2007; Coid et al, in press). However, it has been argued that psychopathy is underpinned by a more Borderline and Histrionic presentation in women, versus a more Antisocial and Narcissistic presentation in men (Hamburger, Lilienfeld, & Hogben, 1996; Paris, 1997; Singleton et al, 1998; Cale & Lilienfeld, 2002; Warren et al, 2003 Watzke et al, 2006). Nevertheless, findings have not been consistent, with some studies reporting strong associations with Antisocial PD in women (Kennealy et al, 2007), and Borderline PD in men (Huchzermeier et al, 2007).

However, due to the paucity of gender comparison studies in the field; the divergent sample populations, diagnostic measures, and statistical techniques used; and the inconsistencies in controlling for co-morbid disorders; making firm conclusions is difficult.

Overall, there do appear to be important differences in the psychopathology of male and female prisoners, particularly regarding the prevalence and presentation of psychopathy and PD. However, greater clarity is needed, as such differences are crucial to consider when evaluating and planning intervention and management strategies for male and female prisoners, particularly in light of the most recent recommendation of a gender specific approach in working with offenders (The Corston Report, 2007). One of the objectives of the current study is to explore the presentation of psychopathy and PD in an equivalent sample of male and female sentences prisoners in England and Wales, with the aim of elucidating a clearer picture of gender differences in psychopathology.

iii) Offending behaviour

From a criminological perspective, the PCL-R has been found to correlate positively with offending behaviour (Roberts & Coid, 2007), and have good predictive power regarding recidivism in forensic populations (see Hart & Hare, 1996 for a review). For instance, psychopathy has been reported to be associated with higher rates of theft,

and alcohol and drug-related offences (Rasmussen et al, 1999); property crimes (Warren & South, 2006); number of prior arrests (Rutherford et al, 2002); and history of violent offences (Cunliffe & Gacono, 2005; Louth, Hare, & Linden, 1998; Weiler & Widom, 1996).

Regarding recidivism, high scores on the PCL and PCL-R, as well as co-existing Axis II disorders, have been found to be effective predictors of re-offending on release in prisoner and forensic psychiatric samples (Hart, Kropp, & Hare, 1988; Serin, Peters, & Barbaree, 1990; Putkonen et al, 2003; Moran et al, 2003; Stadtland et al, 2005). This strong association between psychopathy and reoffending extends to female offenders; Hemphill, Hare & Wong (1998) found that, within one year of release, the recidivism of female psychopaths was more than twice that of non-psychopaths.

Moreover, this increase in recidivism has been reported in psychopathic offenders across various categories of crime. Looman et al (2005), for example, discovered that sexual offenders with high PCL-R scores who engaged on a programme of sex offender treatment recidivated at a significantly higher rate than low scorers. Similar results have also been obtained in incarcerated (Serin, Mailloux, & Malcolm, 2001) and psychiatric sexual offender samples (Hildebrand, de Ruiter, & de Vogel, 2004), and in violent psychopathic criminals. Specifically, Serin (1996) reported that, from a sample of 81 released prisoners, the PCL-R was the best predictor of violent recidivism (when compared with various actuarial scales). However, in juvenile samples, the predictive ability of the Psychopathy Checklist: Youth Version (PCL: YV) is less well supported (Edens & Cahill, 2007). When broken down into its various factors, studies have shown that Factor 2 accounts for much of the association with violent recidivism (e.g. Patrick & Zempolich, 1998; Langstrom & Grann, 2002; Gray et al, 2003), and recidivism in general (Hemphill et al, 1998). Some studies with female offenders, on the other hand, have provided results to the contrary. Specifically, original Factor 1 scores have been shown to be related to overall rates of re-offending in women (Salekin et al, 1998; Richards, Casey, & Lucente, 2003), and affective features (Facet 2) to violent offending retrospectively (Logan & Blackburn, 2009).

A recent study by Coid and colleagues (in press) analysed specific relationships between PCL-R facet scores (using the 4 factor model) and individual categories of

index offence in a large sample of male and female offenders. Results from the study found that affective features of psychopathy (F2) were significantly associated with offences of minor violence, theft, and criminal damage; lifestyle features (F3) were associated with theft; and antisocial features (F4) with robbery. Although this study did not assess gender differences in these associations, it highlights the importance of considering the facets of psychopathy when evaluating links between criminogenic risk and need.

Gender differences

In general, women tend to commit less crime (of a less serious nature) than men (NOMS, 2005; Prisons Inspectorates for Scotland, 1998). For instance, figures have shown that the most common offences committed by women tend to be theft, child abuse, drug offences, and property crime (Cale & Lilienfeld, 2002; d'Orbán, 1993; Hollin & Palmer, 2005; NOMS, 2005; Messer et al, 2004; Warren & South, 2006). Men, on the other hand, are most often incarcerated for acts of violence, burglary, robbery, and sexual offences (Farrington & Painter, 2004; NOMS, 2005; Watzke et al, 2006).

However, a recent study by Warren & South (2006), reporting high levels of violence in their sample of incarcerated female offenders, indicated that this gender difference may not be as explicit as originally thought. Inconsistencies in the reported level of violence between male and female prisoners could, however, be explained by a recent study by Watzke and colleagues (2006). In their study of incarcerated German offenders, the authors reported a comparable prevalence of violent crime in men and women, but after considering individual violent offences separately, found that women committed homicidal acts nearly seven times as often as men. Therefore, previous views of reduced levels of violent crime in female offenders may be misleading when one considers individual violent acts more specifically.

Consistent with this view, Nicholls et al (2009) suggested that men and women differ in the way they *express* violence. Specifically, from their study of male and female forensic psychiatric patients, they reported that female patients were more likely to be aggressive to staff, whereas male patients were more likely to behave aggressively to fellow patients. Similarly, Maden (1996) suggested that the observed differences between men and women regarding violent offending may in fact be due to the *way* in

which they are violent. From his sample of 301 female offenders in prison, he reported that women are more likely to offend violently and reactively against family members in a domestic context, whereas men are more likely to be violent towards strangers. Likewise, in a developmental context, Marsee and colleagues (2005) have reported a stronger association between psychopathy and relational aggression in girls than in boys. Therefore, it may be the *way* in which women are violent influences the proportion of violent crimes reportedly perpetrated by men and women, rather than there being a difference in the incidence of violence between genders.

Although there is evidence of associations between psychopathy and historical offending behaviour in female samples (Vitale et al, 2002; Logan & Blackburn, 2009), differences in the strength of associations between individual *factors* of psychopathy and recidivism have been reported between genders. Specifically, Hare's original Factor 2 has been associated with re-offending in men (Patrick & Zempolich, 1998; Langstrom & Grann, 2002; Hemphill et al, 1998) versus Factor 1 in women (Salekin et al, 1998). Also, when considering this in terms of PD (and bearing in mind the fact that women are more likely to display Borderline and Histrionic PD traits, and men Antisocial PD; e.g. Paris, 1997; Hartung & Widiger, 1998; Watzke, Ullrich, & Marneros, 2006), the way in which women react to stress, and behave violently would be in line with these findings. Therefore, it may be that the presence of particular PD's in female offenders is partly responsible for the differing pattern of violence and offending behaviour in general.

iv) <u>Axis I disorders</u>

In addition to a high level of co-morbidity between psychopathy and Axis II disorders, previous research has highlighted the complication of further Axis I disorders (including substance abuse, emotional disorders, paranoia, and psychosis) in offender populations, (Cunliffe & Gacono, 2005; Kataoka et al, 2001; Logan, 2002; Narud, Mykletun, & Dahl, 2005; Stuart et al, 2006; Tye & Mullen, 2006), in various cultures (Assadi et al, 2006). Indeed, Maier et al (1995) reported that almost two thirds of PD patients in their study population also had a co-existing Axis I disorder (which themselves have differing relationships with psychopathy). For instance, depression has been found to be inversely related to PCL-R scores in both male (Hare, 2003) and female offenders (Vitale et al, 2002). Drug dependence, on the other hand, has been

positively correlated with psychopathy (Hemphill et al, 1994; Forth et al, 1996), and found to predict independently the frequency of both property and violent crime (McClellan et al, 1997).

Drug dependence has been associated with the severity of Borderline and Antisocial PD in incarcerated female samples (Chapman & Cellucci, 2006), while a study assessing Antisocial PD and psychopathy in a sample of incarcerated women (Warren & South, 2006) discovered that offenders with Antisocial PD produced high scores on measures assessing hostility, paranoia, psychoticism, and somatization. Similar results have been found in males with a history of early criminality (Klinteberg, Humble, & Schalling, 1992).

Furthermore, Coid (1992, 1993, 1998, 2003) reported high levels of Axis I – Axis II co-morbidity in incarcerated PD offenders (in prisons and maximum security hospitals in the UK), particularly regarding a high prevalence of affective and neurotic disorders, and psychotic episodes in those with Borderline PD (Coid, 2003). This is an important factor to bear in mind when studying an offender population (who might be suitable for DSPD), which historically has a high prevalence of Borderline PD. Such comorbid disorders may relate to both the clinical presentation of particular individuals, as well as their cognitive and affective features (e.g. Porter et al, 2003; Bearden et al, 2006).

Gender differences

Differences between male and female prisoners have further been observed with regard to Axis I diagnoses. Specifically, it has been shown that females from offender and patient samples have a higher incidence of psychiatric disorder, including depression, anxiety, and neurosis (Maden, 1996; Moffitt et al, 2001; Timmons-Mitchell et al, 1997; Benazzi, 2003, Kennedy et al, 2005, Watzke, Ullrich, & Marneros, 2006). Moreover, associations have been observed between psychopathic traits and psychosis and substance abuse in both male and female prisoner samples (e.g. Logan & Blackburn, 2009; Coid et al, in press), thus highlighting the need to be mindful of the potential influence of co-occurring Axis I disorders in the current analysis.

Summary

Overall, it is clear that, for individuals incarcerated in establishments across England and Wales, a positive assessment of psychopathy indicates a number of possible clinical and criminogenic needs, as strong links have been widely demonstrated with criminal recidivism and dangerousness (Serin, Dev Peters, & Barbaree, 1990; Salekin et al, 1996, 1998; Blackburn & Coid, 1998; Hemphill et al, 1998; Loucks & Zamble, 2000; Eccleston & Ward, 2004; Stadtland et al, 2005). Partly for this reason, the notion of psychopathy is central to the DSPD policy initiative, involving individuals who pose high levels of risk by virtue of a personality disturbance. This study aims to enhance the knowledge-base surrounding the psychopathology of dangerous female offenders (some of which will be DSPD), and discuss how this relates (if at all) to a comparable male sample.

2. The neuropsychological functioning of prisoner populations

While studies into the prevalence and psychometrics of psychopathy and PD have significantly enhanced understanding of offender populations, research into the central psychopathologies and its developmental causes has been much less successful. Traditional conceptions have postulated dysfunction within the neural substrates of motivated behaviour and emotion, with the most recent perspectives highlighting the possible involvement of neural circuits connecting the frontal lobes and amygdala in psychopathic behaviour (Blair, 2003).

i) Cognitive theories of psychopathy

Earlier perspectives attempting to account for the functional deficits observed in psychopaths included theories that the violent and risk taking behaviour frequently observed in these individuals is due to deficits in cortical arousal relating to extraversion (Eysenck, 1994; Swickert & Gilliand, 1998), impaired control of the Behavioural Inhibition System (BIS; Gray, 1970, 1976, 1987; Fowles, 1980), and reduced capacity to feel fear (Lykken, 1957; 1995, Hare, 1965; Birbaumer et al, 2005). However, the evidence supporting these proposals is at best partial. Although these earlier perspectives provided a good foundation for more recent neurocognitive theories, they are unable to account for all of the behavioural traits of psychopathy, and under-specify the neural systems underpinning the disorder (see Blair, 2005, for a discussion). More recent perspectives, on the other hand, are more inclusive, and attribute the defective behavioural and emotional functioning displayed by psychopaths to the circuitry in frontal and limbic structures of the brain. These theories will now be discussed.

ii) Neuropsychological theories of psychopathy

Recent theories for the neurobiological underpinning of psychopathy have highlighted the involvement of circuitry surrounding the amygdala and prefrontal cortex (PFC) in the regulation of affect and impulsive behaviour.

The involvement of the limbic system originates from the long-standing view that the amygdala is the gateway for the processing of emotional information (see Heller, 1997, and Blair, 2006 for reviews). Evidence for this comes from studies involving emotion recognition tasks, which have highlighted amygdala activation during the processing of

facial expressions of distress in normal controls (Breiter et al, 1996; Morris et al, 1996; Blair et al, 1999; Phillips et al, 2001; Fischer et al, 2007). Conversely, studies of patients with damage to this area have reported impaired emotional processing (Adolphs et al, 1994, 1995, 1999; Calder et al, 1996, 2001; Hamann et al, 1996; Young et al, 1996; Broks et al, 1998). In addition to the amygdala, ventromedial prefrontal (also known as the orbitofrontal cortex; OFC) regions have also been found to be associated with emotional deficiency (e.g. Anderson et al, 2006), and the processing of emotional expressions of anger (Harmer et al, 2001b; Blair et al, 1999; Blair & Cipolotti, 2000; Lew et al, 2005). Therefore, from this perspective, it is hypothesized that the affective deficit observed in psychopathic individuals is underpinned by dysfunction in these areas.

The PFC is also known to be involved in the regulation of impulsive behaviour (including tasks of reward/punishment learning and action selection), and has strong links with subcortical/ limbic structures (see Rogers, 2006 for a review). Studies using the Iowa Gambling Task (IGT) have been particularly helpful in assessing the role of cortical areas of activation during decision-making processes. The IGT requires participants to choose a card from four decks (each of which yields different rates of monetary reward and punishment) over a series of trials; with the aim of learning to discriminate the risky decks from the safe ones (see Bechara et al, 1994). In studies involving the IGT, risky decision-making has been found to be impaired by focal lesions of the medial prefrontal cortex (Bechara et al, 1994, 1997, 1999; Fukui et al, 2005; Fellows & Farah, 2005; Northoff et al, 2006; Tanabe et al, 2007), as well as the amygdala (Bechara et al, 1999). More recent reports have further suggested a specific role of the ventromedial prefrontal cortex in coding the emotional value of the stimuli used to make decisions during the task (Clark et al, 2008).

Thus, these studies taken together support the notion that the flattened affect and behavioural disinhibition portrayed by psychopaths may be a consequence of deficient cortico-limbic circuitry, and endorse the use of the emotion recognition task and the IGT in the current study as indirect measures of such function. The functions of emotional processing and decision making shall now be discussed in more detail.

a) Emotional processing

Evidence of impairments in forensic samples

Psychopathic individuals have been found to display deficits on tests of emotional processing comparable with patients with amygdala lesions (see Pridmore et al, 2005; and Blair, 2005b for a review). For example, psychopathy has been found to be associated with a greater impairment in recognising emotional expressions of sadness in both male (Hastings et al, 2008) and female forensic samples (Eisenbarth et al, 2008). Similar results have also been found in children with psychopathic tendencies (Blair et al, 2001; Stevens et al, 2001). In addition to sadness, psychopaths/ prisoners have been found to be deficient in their ability to recognise facial expressions of fear (Blair et al, 2004; Iria & Barbosa, 2009), anger (Lee et al, 2004), and disgust (Kosson et al, 2002), and discriminate between emotional expressions (Munro et al, 2007), though findings have not been conclusive (Glass & Newman, 2007).

However, recent studies have implied that the emotional impairment observed in psychopaths may not be limited to negative/ threat emotions. Specifically, Hastings and colleagues (2008) reported that, in addition to impaired recognition of sadness, psychopathy was also negatively correlated with overall affect recognition (including happiness, and less intense displays of emotion) in their sample of 45 male prisoners. Thus, the authors proposed that psychopathy may be linked to a more *general* affective deficit.

Further support for this position comes from studies of startle reflex where, unlike normal controls and non-psychopathic offenders whose startle response is potentiated during the presentation of aversive stimuli and inhibited during pleasant stimuli, psychopathic participants show no differentiation in blink response for startles presented during pleasant or unpleasant stimuli (which together were significantly smaller than startles presented during neutral slides; Patrick et al, 1993). Likewise, studies measuring event related potential (ERP) have provided further support for the notion of a general emotional deficit. ERP is a measured brain response that occurs as a result of activity involved in a cognitive task (see Corrigan et al, 2009). In studies of this nature, psychopaths exhibit less ERP differentiation between affective and neutral words than non-psychopaths (e.g. Williamson et al, 1991, Kiehl et al, 1999; Campanella

et al, 2005). However, more recent research has indicated that this difference is present under conditions of focussed attention only (Howard & McCullagh, 2007).

In addition to a generalised affective deficit, it has been suggested that the emotional recognition impairment observed in psychopaths may be specific to particular features of the disorder. For example, Del Gaizo & Falkenbach (2008) studied the perception and experience of emotion in college students (119 females and 56 males) with psychopathic traits (using the Psychopathy Personality Inventory (PPI), Lilienfeld & Andrews, 1996), and found that psychopathic traits associated with the PCL-R Factor 1 (reflecting interpersonal style and affective deficiency) were positively associated with accurate recognition of emotional expressions of fear. Likewise, Habel et al (2002) reported that their original findings of a deficit in identifying sadness and happiness in a group of male psychopathic offenders changed when they divided their sample into those with high scores on Factor 1 versus Factor 2. Here, they discovered that psychopaths with high scores on Factor 1 were better than lower scorers on tasks of emotional discrimination. They interpreted this finding as evidence of the skills psychopaths possess in their ability to con and manipulate others. Therefore, it may be that emotional processing deficit frequently observed in psychopaths is in fact specific to those scoring higher on traditional Factor 2 items, and that in contrast, individuals with higher rates of interpersonal style are better at processing emotional cues.

These studies not only highlight the specificity of emotional processing regarding particular facets psychopathy, but also that individuals with a high degree of superficial charm may actually be better at interpreting threat signals in others. In turn, these findings emphasize the importance of considering individual facets of psychopathy in relation to emotional processing in the current study.

In addition to psychopaths, it has been proposed that individuals with certain PD's also display impairments in emotional processing and behavioural inhibition, and that these behaviours in turn are related to deficits in cortico-limbic function (e.g. Posner et al, 2002). This is unsurprising if one considers some of the similarities in diagnostic criteria between particular traits of PD and psychopathy (e.g. lifestyle features of psychopathy and Borderline and Antisocial PD, affective features of psychopathy and Schizoid PD,

e.g. Kosson et al, 2008), and the fact that Borderline and Antisocial PD are highly prevalent in forensic populations (Singleton et al, 1998).

However, in comparison with the wealth of psychopathy literature, research into the neuropsychology of PD, particularly Borderline PD is much less developed (Rogers & Kirkpatrick, 2005). Nevertheless, neuropsychological investigations of both patient and prisoner samples have provided some support for the notion of a fronto-limbic deficit comparable to that observed in psychopaths.

Firstly, impaired amygdala function has also been observed in Borderline PD individuals (Driessen et al, 2000), and hypothesized to be partly responsible for the extreme affective/ emotional dysregulation regularly observed (e.g. Posner et al, 2002). However, studies of performance on emotional processing measures in Borderline PD individuals have produced mixed results. For example, in a study conducted by Levine and colleagues (1997) where male and female Borderline PD patients were compared with a group of healthy controls on measures of emotional processing, it was found that the Borderline PD participants reported lower levels of emotional awareness, and exhibited poorer accuracy when attempting to recognise facial expressions of fear, anger, and disgust. However, in contrast to this, other research has shown that female Borderline PD patients are actually more accurate than controls in perceiving emotional facial expressions (particularly fear; Wagner & Linehan, 1999).

Indeed, the latter perspective is one endorsed by Linehan (1993) who argued that, because individuals with Borderline PD have a high sensitivity to emotional cues in the environment, they are more accurate than controls in perceiving emotional states in others. This position is partly supported by certain fMRI studies, which have shown that individuals with Borderline PD show greater activation in the left amygdala when exposed to facial expressions of emotion (Herpertz et al, 2001a; Donegan et al, 2003), which in turn was thought to reflect the intense and slowly subsiding emotions commonly observed in Borderline PD individuals. On the other hand, there is evidence to the contrary, with one startle reflex study conducted by Hertpertz and colleagues (1999, 2001b), showing that female Borderline PD patients' startle responses to emotional slides was comparable to those of controls, thus suggesting that Borderline psychopathology does not involve a general sensitivity to emotional stimuli.

Therefore, there appears to be mixed support for the notion that Borderline PD is characterised by altered affective processing as assessed with at least some laboratory methodologies. One aim of the current study is to investigate this idea by evaluating associations between emotional processing and Borderline PD in a sample of male and female prisoners, and to compare the results between gender and with offenders with other personality disturbances.

Neurobiological evidence

In addition to studies of performance on measures known to be sensitive to amygdala function, there is also more direct evidence of how such neural substrates are linked to emotional processing deficits in psychopaths. Müller et al (2003) conducted an fMRI study to investigate functional abnormalities in emotion processing within cortical and subcortical regions in a group of criminal psychopaths and a group of controls. The task consisted of participants viewing various positive and negative pictures (e.g. puppies and ice cream versus threatening faces and skull and bones) whilst blood-oxygenation was measured. Results revealed that psychopaths exhibited a different pattern of activation/ signal than control subjects on tasks measuring emotional processing. Specifically, negative images evoked increased activation in right-sided prefrontal regions and the amygdala, and positive images induced left-sided orbitofrontal regions, relative to controls. In addition to the amygdala, abnormal activation of the OFC has been reported in individuals with a history of impulsive and antisocial behaviour (Reyes & Amador, 2009; and De Pascalis et al, 2009), during the processing of angry faces (Coccaro et al, 2007) and negatively valenced words (De Pascalis et al, 2009).

Similarly, Intrator et al (1997) reported differing patterns of relative cerebral blood flow during the processing of emotional words in psychopathic participants. Participants were presented with blocks of stimuli over sessions (one per session), where one block contained neutral words and the other emotionally negative words. Each participant was then required to pay attention to a set of various letter strings, and to press a button whenever the stimulus shown was a real word. Results from the study indicated that psychopathic individuals exhibited increased activation to emotional stimuli in both right and left frontal temporal regions (including the amygdala and caudate nucleus), when compared with controls. Therefore, it appears that input from frontal and limbic

regions may be deficient in psychopathic individuals during the processing of emotional material; meaning they have to work at a higher level of activation to complete the task effectively. However, there are very few studies in this area (with low numbers of participants), so caution must be exercised when attempting to make any firm conclusions from this data.

On tests of affective memory psychopathic inmates have been shown to exhibit less activation in limbic structures than non-psychopathic inmates and controls. Kiehl et al (2001), for example, used fMRI techniques during an affective memory task to try and elucidate the neurobiological substrates of affective processing difficulties in psychopaths. They found that criminal psychopaths show impaired activation in the amygdala/ hippocampal formation, the parahippocampal gyrus, ventral striatum, and the cingulate gyri (compared with non-psychopathic criminals and controls). These results were interpreted as evidence that psychopaths' flaw in affective processing (evident in their lack of empathy, shallow affect, etc), may be due to deficient input from limbic structures. This, in turn fits with studies of emotional processing described above.

Therefore, there appears to be some agreement regarding the structural locality of emotion dysregulation in the brain of psychopathic individuals (i.e. frontal regions and the amygdala). However, research in this area is scarce. It is also difficult to draw comparisons between studies, due to their differing sample populations (e.g. forensic vs controls), sample sizes (some of which are very small), and presenting co-morbid disorders, which are not always controlled for. For these reasons, only tentative conclusions can be drawn.

However, as with the performance studies highlighting specificity of emotional processing impairment in relation to specific facets of psychopathy, studies investigating neural substrates of emotionality in psychopaths have provided comparable results. For example, studies of affective startle reflex have found that both male and female prisoners with high scores on Factor 1 fail to show the same pattern of larger startle magnitude to aversive pictures and smaller startle magnitude to pleasant or neutral pictures as those with low Factor 1 scores (Patrick et al, 1993; Sutton, Vitale, & Newman, 2002).

Additionally, in an ERP study of affective processing in Singaporean prisoners, Howard & McCullagh (2007) initially found an inverse relationship between both PCL-R factors and affective processing. However, when analysing the data using Hare's more recent four factor model (Hare, 2003), it was found that activity relating to affective processing was specifically and positively correlated to affective (Facet 2) and lifestyle features of psychopathy (Facet 3). Such findings indicate that the observed emotional processing impairment in psychopathic individuals may in fact be a result of offenders having a specific deficit in the affective and lifestyle features of psychopathy, rather than psychopathy as a whole. Additionally, it has been suggested that individuals scoring higher on personality traits relating to Factor 1 versus Factor 2 recruit different neural structures during tasks of emotional processing (the PFC and amygdala respectively; Gordon, Baird, & End, 2004). Therefore, these studies both support the importance of considering individual facets of psychopathy in relation to emotional processing in the current study.

Gender differences

In addition to the various gender differences observed regarding the prevalence of psychopathy and PD, numerous differences between men and women have been observed with regard to neuropsychological function.

At a task performance level, there is some evidence that women have been found to perform better than men on tasks involving facial emotion recognition (Thayer & Johnsen, 2000), particularly negative emotions (Miura, 1993). This has also been reported in PD samples, where female Borderline PD patients have been found to be better at recognising fearful expressions than male counterparts (Levine et al, 1997). Women have also been found to report higher ratings of intensity for aversive pictures (Sharp, van Goozen, & Goodyer, 2006) and dynamic expressions of anger and happiness, compared with increased intensity for anger only in males (Biele & Grabowska, 2006).

At a pathophysiological level, amygdala function in response to emotional stimuli has been found to differ between men and women (Furmark et al, 1997; Phillips et al, 1997; Morris et al, 1998; Cahill, 2005). Gender differences involving hemispheric organisation have also been reported in brain activity associated with processing verbal emotional

stimuli (Gasbarri et al, 2006), as well as differing activation of other structures in men and in women during tasks of emotional memory (Bremner et al, 2001; Piefke et al, 2005), anticipatory fear (Butler et al, 2005), moral sensitivity to emotive pictures (Harenski et al, 2008), and emotional perspective taking (Schulte-Rüther et al, 2008). Additionally, the link between emotional processing of fear and anger and amygdala activation has been found to be strengthened by levels of testosterone (Derntl et al, in press).

Therefore there is some evidence to suggest that men and women may differ in their performance on measures of emotional processing. However, research in this area is very limited, with studies using various sample populations, sample sizes, and measures, thus making it difficult to draw firm conclusions. The aim of the current study is to investigate gender differences in emotional processing in an equivalent sample of high risk male and female prisoners.

b) Decision making

Evidence of impairments in forensic samples

In addition to problems with emotional processing, prisoners and individuals with PD have also been found to display deficits on tests of on tasks of decision-making, comparable to individuals with damage to areas of the PFC and amygdala (e.g. Mitchell et al, 2002; Broomhall, 2005; Kirkpatrick et al, 2007b; Yechiam et al, 2008). These deficits have been observed via tests known to tap cortico-limbic function, and also from more direct exploration of the neural substrates involved in action selection processes. The published literature of neuropsychological test performance in prisoner/ psychopathic and PD samples will first be reviewed.

LaPierre, Braun, & Hodgins (1995) compared the performance of 30 psychopathic and 30 non-psychopathic prisoners on a battery of neuropsychological tests known to tap PFC function. These included a Go/No Go task (in which participants are required to learn to respond to some stimuli but not others, under reward-punishment and punishment-only conditions), the error score of the Porteus Maze task, and an olfactory identification task (all related to OFC function). The authors also measured the number

of perseverative errors on the Wisconsin Card Sorting Test (WCST) of executive control (a measure of dorosolateral PFC function). Results from this study showed that psychopaths were impaired on measures relating to OFC specifically, compared with non-psychopaths. In contrast, on measures relating to wider PFC function (WCST), psychopaths and non-psychopaths were not significantly different. These findings therefore suggest that the proposed impairment of frontal regions in psychopaths is not generalised (e.g. Hart et al, 1990), but instead more specific to the orbital PFC.

In addition to Go/No Go measures, studies using the IGT have proven to be very helpful in investigating the specificity of neurophysiological processes involved in risky decision-making in psychopathic individuals (and have offered additional support to studies proposing a specific orbitofrontal deficit in psychopathic populations). In particular, one study conducted by Mitchell and colleagues (2002) involved presenting psychopathic and non-psychopathic individuals with two tasks believed to be sensitive to orbitofrontal and dorsolateral function: the IGT, and the intradimensional/ extradimensional (ID/ED) shift task, respectively. The ID/ED task requires participants to learn to select one of two stimuli on the basis of various features, according to the 'correct' or 'incorrect' feedback presented on the screen. Participants progress through nine stages, each requiring them to learn to discriminate between the two test stimuli on the basis of various features, such as shapes and lines (and again when contingencies were reversed). Results from the above experiment revealed that psychopaths were impaired in their performance of both the IGT, and on the response reversal component of the ID/ED task (both of which are associated with the OFC). However, their performance on the ED shift component of the ID/ED task (which is associated with the dorsolateral PFC) was intact.

Comparable to psychopathic samples, individuals with Borderline PD have also been found to display similar deficits to patients with PFC lesions (Bazanis et al, 2002; Berlin, Rolls, & Iverson, 2005; Minzenberg, Poole, & Vinogradov, 2006; 2008), and to psychopathic individuals on tests of impulsivity and decision-making (Hochhausen, Lorenz, & Newman, 2002). For example, Bazanis et al (2002) found that, on a decision-making task involving choices between uncertain rewards and punishments, Borderline PD patients made more risky choices than their non- Borderline

counterparts. Similarly, a recent study by Nigg et al (2005) reported poor response inhibition on a Go/No Go task in Borderline PD patients.

Impaired decision-making has also been reported in male and female *prisoners* with Borderline PD, where they have been found to make significantly more risky choices (Kirkpatrick et al, 2007b) and passive avoidance errors (Hochhausen, Lorenz, & Newman, 2002) than their non-Borderline PD counterparts. Results with individuals with Antisocial PD, on the other hand, have been less consistent, with no reported differences between PD groups and controls on Go/No Go measures, but impaired performance on other measures of prefrontal functioning in Antisocial PD individuals (Dinn & Harris, 2000).

Overall, these studies support the argument that the cognitive deficits frequently observed in psychopathic individuals are underpinned by impairments in the circuitry of the OFC. This position has been strengthened further by studies investigating the neural circuits involved in such cognitive processes more directly.

Neurobiological evidence

Dikman & Allen (2000) conducted an ERP study which investigated the error-related negativity (ERN; a brain potential produced within the PFC when individuals make errors in performance) of low-socialised individuals during a reward-punishment task. They found that low-socialised individuals displayed significantly smaller ERNs during a punishment task than a reward task. High-socialised participants, on the other hand, produced similar ERNs in both conditions. This study therefore suggests that low-socialised individuals do not process the feedback information in the same way as the high-socialised subjects, and that this may be due to impaired circuitry within the PFC.

Further evidence for this position comes from a study conducted by Kiehl, Liddle, & Hopfinger (2000) who recorded behavioral responses and ERPs during a Go/No Go task in a sample of schizophrenic patients, psychopathic offenders, and non-psychopathic offenders. They found that the non-psychopathic offenders showed greater frontal ERP negativity to the No Go stimuli than to the Go stimuli. This effect was significantly smaller in the schizophrenic patients and absent in the psychopaths, thus suggesting that the neural processes engaged within the PFC during tasks of

response inhibition are impaired in psychopathic samples (and to a lesser extent in schizophrenia).

In addition to psychopathy, one study investigating the neural circuits thought to underpin personality disorder traits has provided more tangible evidence for a prefrontal deficit in individuals with Borderline and Antisocial PD. Specifically, Völlm and colleagues (2004) conducted an fMRI study, assessing frontal lobe function in a group of Cluster B personality-disordered individuals during a Go/No Go task. They reported that while control participants showed activation in the prefrontal cortex (specifically in right dorsolateral and left orbitofrontal regions), Borderline and Antisocial PD patients did not. This indicates that individuals with Cluster B personality disorders share many of the same deficiencies as psychopaths on measures of decision-making, and that this may be linked to prefrontal dysfunction (as previously suggested, e.g. Lezenweger et al, 2004; Fertuck et al, 2005a), which in turn may be responsible for many of the behavioural traits observed in these individuals.

Therefore, taken together, the findings from the reviewed literature provide supportive evidence for the notion that the flattened affect and behavioural disinhibition observed in psychopaths is a consequence of impaired neural circuitry in frontal and limbic structures. They also provide encouragement for the use of the emotion recognition task and IGT in exploring these impairments (and how they relate to specific facets of psychopathy) in the current study.

Gender differences

Gender differences have been observed in the type of gambling behaviour men and women engage in (Coventry & Hudson, 2001; LaPlante et al, 2006), and also the performance of male and female participants on decision-making measures. This has been demonstrated in both forensic and non-forensic samples. For example, studies from non-forensic samples have indicated riskier behaviour in males than in females (Gershon, 2002; Hunt et al, 2005). Likewise, on gambling tasks assessing response perseveration, females with a high number of Antisocial PD and psychopathic traits have been found to show a less risky response pattern than their male equivalents (Vitale & Newman, 2001; Vitale et al, 2005). In addition to performance measures,

certain gender differences in the neural mechanisms recruited during tasks of gambling/ risky behaviour have also been noted (e.g. Bolla et al, 2004; Tranel et al, 2005; Kamarajan et al, 2008).

Thus, from the studies reviewed, there is some limited evidence to suggest that men and women may differ in their performance on decision making measures, and also in the neural mechanisms recruited during the administration of these tasks. However, research into gender differences in neuropsychology is very limited, particularly with forensic and PD populations, therefore making the generation of firm predictions very difficult. As such, gender differences in risky decision making (as measured by the IGT) will be explored in the current study, in a comparable sample of male and female prisoners from England and Wales.

c) Memory function

Besides tests assessing decision-making and emotional processing, Borderline PD patients also appear to exhibit marked problems with memory functioning (e.g. O'Leary, 1991; Burgess, 1992; Stevens et al, 2004). Specifically, when compared to groups of healthy controls, Borderline PD patients have been found to be impaired on tasks assessing complex auditory (O'Leary, 1991) and working memory (Dinn et al, 2004; Judd & Ruff, 1993; Stevens et al, 2004).

In addition to these measures, the Rey-Osterrieth Complex Figure (ROCF; see Lezak, 1995) is often used as a measure of complex visual memory in neuropsychological investigations of this nature. This task requires participants to copy the figure, and then to reproduce it immediately and after a 30 minute delay. Research with Borderline PD individuals has found that they are impaired in both the copy and recall conditions (Dinn et al, 2004; Monarch, Saykin, & Flashman, 2004; Harris, Dinn, & Marcinkiewicz, 2005). In particular, a study by Kirkpatrick et al (2007a), investigated memory function in 18 prisoners with Borderline PD and 18 prisoners with other personality disorders (using the ROCF). They reported significant memory deficits on all aspects of performance among the sample of Borderline PD prisoners specifically. Therefore, although findings in this field have not been consistent (e.g. Sprock et al, 2000), the literature to date

implies that individuals with Borderline PD may have difficulty in retrieving complex visual information. This has been interpreted by O'Leary et al (1991) as part of the reason behind characteristics such as identity disturbance, often found in Borderline PD individuals. Nevertheless, studies in this field are scarce, and some have been inconclusive. One of the aims of the current study is to evaluate memory functioning in a large sample of male and female prisoners, and how this relates to Borderline pathology.

Summary

Female prisoners appear to differ greatly from their male counterparts in terms of their psychopathology. They have a lower prevalence of psychopathy and Antisocial PD but more frequently exhibit Borderline PD traits and symptoms of depression. They also exhibit differing relationships between psychopathy, offending behaviour, and personality disorder, compared to men.

When considering neuropsychological functioning, prisoners presenting with specific psychopathic and PD traits have been found to exhibit deficits on measures of response inhibition, decision-making, emotional processing, and memory functioning. These have, in turn, been linked to impaired circuitry in frontal and limbic structures. Moreover, on tasks of decision-making and emotional recognition, female participants have been found to be less risk-taking, and more accurate in identifying facial emotion than their male counterparts (and, correspondingly, have shown differential activation in amygdala and prefrontal areas).

However, research in this area is very scarce and much is unreliable. No study has yet assessed emotion recognition, decision-making, impulsivity, and complex visual memory in a large sample of equivalent male and female prisoners, presenting with a range of psychopathology, including psychopathy and Borderline PD. For this reason, and because the small number of studies in this area of research share a range of inconsistencies, firm conclusions cannot be drawn. The current study therefore aims to address the lack of research in this area by evaluating the clinical and neuropsychological characteristics of male and female prisoners with a history of serious offences and antisocial behaviour, who may fall within the remit of DSPD services. The aim of this research is to generate psychopathological and

neuropsychological data to test some preliminary conjectures and force theoretical development in this area, thus providing further direction for a more focussed, gender-specific approach to working with offenders.

Chapter 2: Methods

The Prisoner Cohort Study

The data in the current study was collected as part of a wider research project; the Prisoner Cohort Study, which was commissioned by the Home Office as part of the dangerous severe personality disorder (DSPD) service development programme in England and Wales (Department of Health, Home Office, 1999). The main aim of the Prisoner Cohort Study was to test the predictive accuracy of various risk assessment instruments, and additional measures, including those of personality disorder, which were being piloted for use in the DSPD centres in predicting serious re-offending. The study involved interviews with prisoners in penal establishments across England and Wales between November 2002 and February 2006 by a team of trained researchers (one of which was the author).

Current Study

Participants

High-risk offenders in custody in 139 penal establishments in England and Wales were selected from the IIS (Prison Service Inmate Information System) or Central System Database if they met the following criteria:

(i) serving a prison sentence of two years or more for a sexual or violent principal offence (excluding life sentence prisoners);

(ii) aged 18 and over; and

(iii) had one year or less left to serve (so they could be followed up more easily).

From this procedure, four samples of offenders were identified (see Table 1). It is important to note that, for the purpose of the Prisoner Cohort Study, the Offender Group Reconviction Score (OGRS; Copas & Marshall, 1998) was used to try and target interviews to the highest risk offenders in the top 10% of the sample (i.e. those probably most suitable for DSPD services). The OGRS is calculated from the prisoners' age, and on static factors of offending history, and has been found to be an accurate predictor of recidivism risk (Gray et al, 2004; Coid et al, 2009a). Additionally, sex offenders were over-sampled (due to their historical low attrition rate; Coid, personal communication, 2008). However, this selective procedure was only possible with male prisoners (as the larger population sample allowed for such selectivity). Interviews with

female prisoners were arranged simply on whether they were available and willing (i.e. regardless of their OGRS score). As such, male and female prisoners differed in level of recidivism risk (see below).

a) Interviewed sample

Interviewed samples of male and female prisoners were compared to the population sample on the OGRS, to provide an estimate of how representative they were in terms of their level of risk. This was done with a one way ANOVA (to compare average scores between groups), or a Mann Whitney U test, if the variances between groups of comparison were not homogeneous.

Unsurprisingly, due to the sampling frame, male prisoners from the interviewed sample[1] (17.4% of the population sample) had significantly higher OGRS scores than the remaining population sample of male prisoners[2] ($F (1, 3082) = 80.25$, $p < 0.001$). There was, however, no significant difference between the interviewed[3] and population sample[4] of female prisoners on the OGRS ($F (1, 664) = 3.61$, $p > 0.05$). A significant gender differences was also apparent, with male interviewed prisoners scoring higher on the OGRS than female interviewed prisoners ($z = -4.98$, $p < 0.001$). This is an important point to consider when discussing the generalizability of the findings from the current study to specific forensic populations. Further differences between male and female prisoners, on measures of psychopathy, index offence, Axis I and Axis II disorders are discussed in Chapter 3.

In addition to the 1346 male and 310 female prisoners who agreed to take part in the study, 244 male (3%) and 19 female prisoners (2%) refused to participate. OGRS scores between these two sets of prisoners did not differ significantly for men[5] ($F (1, 1579) = 9.85$, $p > 0.05$) or women[6] ($F (1, 312) = 0.04$, $p > 0.05$).

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[1] Number of interviewed male prisoners with OGRS scores = 1337 (Mean = 56.22 ± S.D = 28.36)

[2] Number of population male prisoners with OGRS scores = 1747 (Mean = 47.10 ± S.D = 27.75)

[3] Number of interviewed female prisoners with OGRS scores = 296 (Mean = 47.99 ± S.D = 24.16)

[4] Number of population female prisoners with OGRS scores = 370 (Mean = 51.56 ± S.D = 23.97)

[5] Number of refusing male prisoners with OGRS scores = 244 (Mean = 50.07 ± S.D = 27.16)

[6] Number of refusing female prisoners with OGRS scores = 18 (Mean = 46.83 ± S.D = 23.19)

Table 1. Breakdown of different samples of prisoners and analysis undertaken

Type of sample	Male (n)	Female (n)	**Analysis**
Population **(Total number of prisoners meeting set criteria**)	7724	1159	None
Interviewed **(Total number of prisoners interviewed)**	1346	310	Prevalence of psychopathy, index offence, Axis I and Axis II disorders in male and female prisoners. (132 (10%) of men and 180 (86%) of women were interviewed by the author)
Matched **(Male prisoners from interviewed sample, matched with female prisoners on psychopathy, age, and IQ)**	310	310	Associations between psychopathy, PD, and offending history among male and female prisoners.
Neuropsychological **(Matched sample of prisoners, screened for possible neurological difficulties)**	268	268	a) Gender differences on neurocognitive measures. b) Associations between neurocognitive measures, psychopathy, and PD among male and female prisoners.

b) Matched sample

In order to minimise possible bias when examining gender differences in associations between psychopathy, PD, and offending behaviour, 310 men were selected from the total sample of 1338 male offenders with PCL-R data, and matched with the sample of 310 female offenders on PCL-R scores. Men and women were also matched on age and IQ (see Table 2), which have been found to relate to psychopathy and criminality (Coid et al, 2006; Black et al, 2007; Kennealy et al, 2007). Due to the nature of the study (e.g. time constraints and other appointments of the prison regime), not all participants had data for all three measures. However, in all cases, prisoners were matched on at least two measures. Despite being matched on PCL-R scores, male prisoners had higher OGRS scores than female prisoners ($F(1, 601) = 22.83$, $p < 0.001$).

Table 2. Scores on matched measures for matched sample of male and female prisoners

Category		Male prisoners N (M ± SD)	Female prisoners N (M ± SD)	F[7]
PCL-R:	**Total**	310 (16.23 ± 7.41)	309 (16.39 ± 7.52)	0.07
	Facet 1	309 (2.15 ± 1.93)	309 (2.11 ± 1.80)	0.07
	Facet 2	310 (2.99 ± 2.22)	304 (2.93 ± 2.27)	0.09
	Facet 3	308 (4.50 ± 2.40)	307 (4.78 ± 2.33)	2.16
	Facet 4	307 (5.34 ± 2.96)	309 (5.07 ± 2.96)	1.25
Age		310 (28.60 ± 9.00)	310 (28.30 ± 8.80)	0.17
IQ		268 (88.85 ± 14.48)	255 (89.00 ± 13.89)	0.02
OGRS		307 (57.89 ± 27.20)	296 (47.99 ± 24.14)	22.28***

A comparison of mean scores (± standard deviations) for male and female prisoners. *** $p < 0.001$.

c) Sample for Neuropsychological analysis

Included in the matched sample of 310 male and 310 female offenders were 42 men and 42 women defined as having a neurological deficit (either a possible learning disability (as indicated by a WASI score of less than 70), a history of epilepsy, or previous comatose illness associated with a head injury). These offenders were excluded from the neuropsychological analyses, as a series of one-way ANOVAs (or non-parametric equivalent) showed that they performed worse than the non-neurological group on psychometric measures of state mood and affect, and several others measures of cognitive function. The remaining 268 male and 268 female offenders remained matched on psychopathy, age, and IQ (see Table 3), but like the matched sample as a whole, male prisoners scored more highly than female prisoners on the OGRS ($F(1, 522) = 17.01$, $p < 0.001$).

[7] One way ANOVA, using gender as the between group variable.

Table 3. Scores on matched measures for neuropsychological sample of male and female prisoners

Category		Male prisoners N (M ± SD)	Female prisoners N (M ± SD)	F[8]
PCL-R:	**Total**	268 (16.22 ± 7.34)	268 (16.45 ± 7.38)	0.13
	Facet 1	268 (2.12 ± 1.93)	268 (2.11 ± 1.78)	0.01
	Facet 2	268 (2.99 ± 2.24)	263 (2.88 ± 2.19)	0.34
	Facet 3	267 (4.52 ± 2.38)	266 (4.83 ± 2.33)	2.42
	Facet 4	265 (5.34 ± 2.93)	268 (5.13 ± 2.95)	0.62
Age		268 (28.33 ± 8.64)	268 (28.09 ± 8.71)	0.10
IQ		277 (91.29 ± 12.18)	219 (91.11 ± 12.01)	0.03
OGRS		265 (57.44 ± 26.99)	259 (48.24 ± 23.91)	17.01***

A comparison of mean scores (± standard deviations) for male and female prisoners. *** $p < 0.001$.

Procedure

Participants were interviewed in penal establishments across England and Wales. Their files were reviewed, and informed consent obtained, prior to interview. Each assessment lasted approximately 4-5 hours, and consisted of a semi-structured interview and a neuropsychological test battery (see below). The semi-structured interview was designed to collect the information necessary to score a battery of personality assessments and various diagnostic criteria (e.g. Axis I disorders). Additional information such as offending history, childhood trauma, and demographic data were also recorded from both interview and file information.

Measures

a) Personality disorder:

All interviewers were trained in the following assessments and scored for inter-rater reliability. The standard measure of inter-rater reliability is the Intraclass Correlation (ICC; Shrout & Fleiss, 1979), which compares the variability in the data due to true differences in the scores with the variability in the data due to differences in the raters. If the reliability of the raters is high then the variability in the raters should be small compared to the variability of the scores. This will result in a high ICC. It is generally accepted that an ICC reliability of 0.9 is excellent, 0.8 is good, and 0.7 is acceptable. An ICC of below 0.7 is not considered acceptable.

[8] One way ANOVA, using gender as the between group variable

1. Psychopathy Checklist Revised (PCL-R; Hare 1991, 2003).

The PCL-R is a reliable and valid method for assessing psychopathy in the prison population. It relies upon information from a semi-structured interview and a prisoner's file to score 20 items that measure the interpersonal, affective, lifestyle, and social deviance/ antisocial components of psychopathy (see below). Each item is scored as 0, 1, or 2, regarding whether the trait is absent; present to some degree; or present (respectively). Item scores are summed to create a total score as well as 4 individual facet scores (from the four facet model of psychopathy, Hare, 2003). The total score, ranging from 0-40, provides an estimate of the extent to which the individual matches the prototypical psychopath.

The cut-off for caseness has been argued to vary between cultures (e.g. Morana, Arboleda-Flórez & Camara, 2005) and across gender (e.g. Warren et al, 2003). Specifically, a cut-off of 30, is widely used in male forensic populations across North America, whereas lower scores of 25 or over have been recommended in UK populations (e.g. Cooke et al, 2005) and with female offenders (Warren et al, 2003). Conversely, it has been suggested that psychopathy is not a distinct clinical entity and is best assessed as a dimensional construct (Marcus, John, & Edens, 2004; Edens et al, 2006; Lynam & Derefinko, 2006). Associations in the current analysis were assessed dimensionally.

In addition to the clinical cut-off, there has also been disagreement in recent literature regarding the structure of psychopathy, as reflected in the psychometrics of the PCL-R. The original model specified two factors encompassing 17 of the 20 PCL-R items (Harpur, Hakstian & Hare, 1988), and received considerable support from studies of both male (Harpur, Hare, & Hakstian, 1989; Templeman & Wong, 1994; Brandt et al, 1997; Hobson & Shine, 1998; Rogers et al, 2000; Reiss et al, 2001) and female samples (Elizabeth, 1993; Strachan, 1995). The two factors were defined as:

Factor 1 – Selfish, Callous & Remorseless Use of Others

Comprising the PCL-R items: Grandiosity/ superficial charm, pathological lying, conning/ manipulative behaviour, lack of guilt/remorse, shallow affect, callous/ lack of empathy, and failure to accept responsibility.

Factor 2 – Social Deviance

Comprising the PCL-R items: Need for stimulation/ impulsivity, parasitic lifestyle, poor behavioural controls, early behaviour problems/ juvenile delinquency, lack of realistic long-term goals, irresponsibility, and revocation of conditional release.

Since then, Hare and colleagues (2003, 2005) have proposed that psychopathy is better represented as four correlated factors/ facets, underpinned by the two original factors (see below). Thus far, this model has been validated in studies involving offender populations (Bolt et al, 2004), forensic and civil psychiatric patients (Bolt et al, 2004; Hill, Neumann, & Rogers, 2004; & Vitacco et al; 2005) and various ethnic groups (Hill, Neumann & Rogers, 2004).

Factor 1 – Arrogant & Deceitful Interpersonal Style

Including the PCL-R items: Grandiosity, superficial charm, pathological lying, and conning/ manipulative behaviour.

Factor 2 – Deficient Affective Experience

Including the PCL-R items: Lack of remorse, failure to accept responsibility, shallow affect, and callous/ lack of empathy.

Factor 3 – Impulsive & Irresponsible Behavioural Style

Including the PCL-R items: Need for stimulation, impulsivity, irresponsibility, parasitic lifestyle, and lack of realistic long-term goals.

Factor 4 – Antisocial Behaviour

Including the PCL-R items: Poor behavioural controls, early behavioural problems, juvenile delinquency, revocation of conditional release, and criminal versatility.

However, there is an ongoing debate in the field as to whether or not antisocial behaviour is a key characteristic of psychopathy (e.g. Neumann, Hare, & Newman, 2007 versus Cooke, Michie, & Skeem, 2007 respectively). Indeed, Cooke & Michie (2001) have posited that a three facet model of *Interpersonal Style, Affective Deficiency, and Lifestyle Impulsiveness,* (mirroring Hare's first three factors) is a better representation of the construct of psychopathy. The authors believed that removing the emphasis from antisocial behaviour and shifting it towards personality traits was a more accurate way of specifying the underlying construct of psychopathy. This model has received support from researchers who also believe it to be a more accurate portrayal of psychopathy than the original two factor structure (e.g. Jackson et al, 2002; Johansson et al, 2002; Williams, Nathanson, & Paulhus, 2002; Skeem, Mulvey & Grisso, 2003), particularly in male sex offenders (Weaver et al, 2006), but not those who maintain that antisocial behaviour is a vital component of psychopathy (e.g. Vitacco, Neumann & Jackson, 2005; Kennealy et al, 2007).

The four facet model was adopted in the current study to explore associations between the individual facets of psychopathy and PD, offending history, and neuropsychological function. This model was selected on the basis of recent evidence which found that the antisocial factor (i.e. facet 4) made a significant contribution to associations with total PCL-R scores, as well as strong inter-correlations with lifestyle features (i.e. facet 3), thus suggesting that it is an integral component of the psychopathy construct among prisoners in England and Wales (Roberts & Coid, 2007).

For the purposes of the current study, all interviewers attended a 3-day PCL-R training course run by HM Prison Service, and were later assessed for inter-rater reliability, which involved the scoring of six reliability cases. ICC's for the 11 researchers were acceptable (0.70), and for the author specifically were excellent (0.90). PCL-R ratings were scored from the semi-structured interview and file information. 1338 men from the interviewed sample, 310 men from the matched sample, and 309 women had full PCL-R data.

2. Structured Clinical Interview for DSM-IV, Axis II disorders (SCID-II; First et al 1997)

The SCID-II is a standardised and accurate assessment of current Axis II psychopathology (i.e. the 10 DSM-IV Axis II personality disorders), found to be valid and reliable in a range of contexts and cultures (Maffei et al, 1997, Dreessen & Arntz, 1998, Zanari et al, 2000; Osone & Takahahi, 2003). Each section contains a number of questions related specifically to each PD, scored as 1, 2, or 3, for whether the trait is absent; present to some degree; or present (respectively). There are different cut-off scores for different PD's. Each PD was scored both categorically (i.e. present or not present, depending on whether the cut off for caseness was reached), and dimensionally (how many traits of the PD, scored as 3, were present).

Interviewers were assessed for inter-rater reliability by rating 3 SCID-II interview schedules. The overall ICC was found to be good (0.75). In total, 308 women had completed SCID-II data, in addition to 1303 men from the total sample and 301 men from the matched sample (plus 2 with partial scores).

For the purpose of the analysis, both categorical and dimensional scores were used. Additionally, due to high co-morbidity of Axis II disorders in forensic samples (e.g. Singleton et al, 1998; Decuyper, De Fruyt , & Buschman, 2008), categorical variables of 'any other PD diagnosis' were calculated and added as predictors to the regression model to ensure that any reported associations between psychopathy and PD were not confounded by any other PD traits. For example, if an association was present between Facet 3 and Borderline PD, the categorical variable 'PD other than BPD' was added to the regression model in attempt to eliminate any bias from other PD diagnoses.

3. Personality Assessment Schedule (PAS; Tyrer & Johnson, 1996; Tyrer, 2004)

The PAS is a measure of PD severity which has been used in both prisoner and patient studies (Ranger et al, 2004; Tyrer et al, 2009; Newton-Howes et al, 2009). Scores from the SCID-II were used to categorise each prisoner's personality difficulty on the following severity scale (see Tyrer & Johnson, 1996, for a full description):

No personality abnormality (scored as 0).

Personality difficulty (scored as 1): Sub-threshold criteria for PD met.

Simple personality disorder (scored as 2): One or more PD within the same cluster.

Diffuse personality disorder (scored as 3): Two or more PDs from different clusters.

b) Axis I disorder:

From the semi-structured interview, the following Axis I disorders were rated, based on DSM-IV criteria (American Psychiatric Association, 1994).

1. Mental Disorder Due to Alcohol Misuse
2. Drug dependence
3. Depression (current)
4. Psychosis (within the last year)

These measures were included as they have been found to have a high prevalence within forensic populations (e.g. Maier et al, 1995; Cunliffe & Gacono, 2005; Stuart et al, 2006; Tye & Mullen, 2006), and are thought to influence neuropsychological performance (Ridderinkhof et al, 2002; Deckersbach et al, 2006), including measures of emotion recognition (e.g. Addington et al, 2008; Vernet et al, 2008). Therefore, to try and eliminate any potential confounding from these measures, they were added as additional predictors to the regression model.

c) Life history:

1. Offending behaviour

Information was taken from the Home Office Offenders Index regarding the number of previous convictions in each prisoner's history. For the purpose of the analysis, these were sectioned into lifetime violent, sexual, and robbery offending for male and female prisoners.

2. Childhood trauma

This was a self-report measure, taken from information collected from the semi-structured interview. Prisoners were deemed to have suffered childhood trauma if they had been the victim of either emotional, physical, or sexual abuse, or neglect during childhood. This was included as an additional predictor to the regression models as the prevalence of trauma has been reported to be high in forensic samples (e.g. Driessen et al, 2006), and has also been reported to be associated with certain aspects of psychopathy (Poythress, Skeem, & Lilienfeld, 2006).

3. Neurological disorders

Assessing the presence of neurological damage was extremely difficult given the high rates of closed head-injuries in both male and female prisoner samples (Morrell et al, 1998; Slaughter et al, 2003; Schofield et al, 2006). However, potential neurological disorders (defined as epilepsy, learning disability, or previous comatose illness associated with a head injury) were recorded from the interview schedule, on the basis that they may have had a confounding effect on the neuropsychological measures (e.g. Meletti et al, 2003; Bechara & Van Der Linden, 2005). Learning disability was defined as a WASI score of 70 or below, and epilepsy and previous comatose illness were determined from either file information (if such medical reports were available) or self report. Any prisoner meeting the ad hoc criteria for neurological disorders were excluded from the neuropsychological analyses (see 'participants' section above).

d) Psychometric measures:

1. Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983)

The HADS is a self report measure designed to detect the presence and severity of mild degrees of mood disorder. It consists of 14 items, 7 for anxiety and 7 for depression. Each item is rated on a 4 point scale (from 0 to 3), and has cut off scores for mild, moderate, and severe caseness. The HADS has been found to be a reliable and valid measure of depression and anxiety in a range of contexts and cultures (e.g. Herrmann, 1997; Nygren et al, 1997; Liu, Shono, & Kitamura, 2009), including forensic populations (Chambers et al, 2000).

2. The State Trait Anger Expression Inventory (STAXI; Spielberger, 1996).

The STAXI is a self report measure of the experience and expression of anger. It consists of 44 items, each rated on a 4 point scale (from 1 to 4). The current study focussed specifically on the experience of anger. Therefore, the 20 items related to state (short lived; 10 items) and trait anger (relatively stable; 10 items) were administered. The latter measure assessed trait anger with respect to both temperament and reactivity. The STAXI has been used in a range of contexts (Tritt et al, 2005; Nickel et al, 2006), including forensic samples (e.g. Mela et al, 2008).

3. Buss-Perry Aggression Questionnaire (Buss & Perry, 1992).

The Buss-Perry is a self report measure of aggression. It measures dimensions of physical and verbal aggression, anger and hostility. Participants are required to answer 29 statements related to each of these four domains, each on a 7 point scale of how characteristic the trait is of themselves. The Buss-Perry has been validated and used in a variety of contexts and cultures (Buss & Perry, 1992, Gerevich et al, 2007; Shah et al, 2009), including forensic populations (Smith, Waterman, & Ward, 2006).

4. The Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999)

General cognitive ability was assessed using the Wechsler Abbreviated Scale of Intelligence (WASI, Wechsler, 1999). The WASI is a brief, reliable measure of intellectual ability, separated into verbal and performance IQ. It has been used extensively in clinical, educational and research settings, on individuals aged 6 to 89, and has been validated extensively (e.g. Saklofske et al, 2000; Ryan et al, 2003).

The full WASI assessment consists of the four sub-tests; Matrix Reasoning and Block Design (measuring nonverbal and visuo-motor ability), and Vocabulary and Similarities (measuring verbal ability). A two-subtest format can also be administered (using the Vocabulary and Matrix Reasoning tests), providing a measure of full-scale IQ only. Due to the time constraints of the current study, the two-subtest format was administered. WASI scaled scores were then derived from the raw scores, adjusted for age according to published norms (The Psychological Corporation, 1999).

e) Neuropsychological measures:

1. Emotion Recognition

The emotional deficit observed in psychopathic individuals is often hypothesized to be associated with dysfunction in circuitry encompassing the amygdala (including the hippocampus, hypothalamus, and anterior cingulate cortex; see Pridmore et al, 2005; and Blair, 2005b for a review).

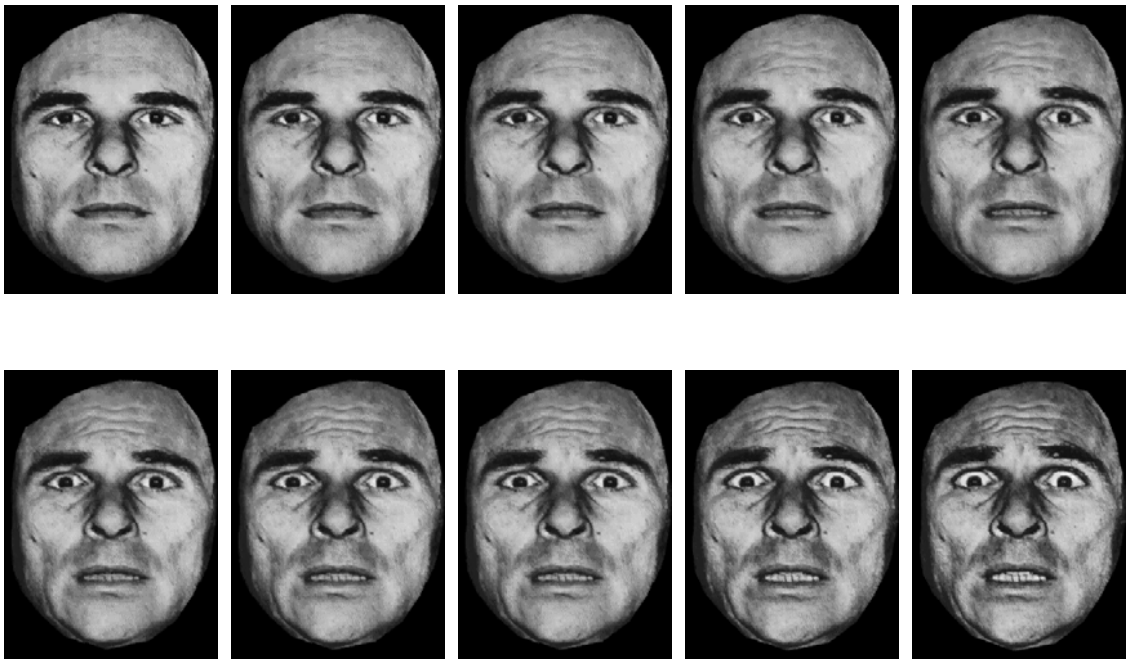
Evidence from numerous studies supports the notion of recruitment of the amygdala in the processing of facial expressions of emotion in others. This has been shown in healthy volunteers (e.g. Breiter et al, 1996; Morris et al, 1996; Blair et al, 1999; Phillips

et al, 2001; Fischer et al, 2007), and patients with damage to limbic areas (e.g. Adolphs et al, 1994, 1995, 1999; Young et al, 1996; Calder et al, 1996; Hamann et al, 1996**;** Broks et al, 1998). Psychopathic/ prisoner samples have, in turn, been found to be deficient in their ability to recognise emotional expressions in others (e.g. Kosson et al, 2002; Blair et al, 2004; Lee et al, 2004; Munro et al, 2007; Eisenbarth et al, 2008), thus supporting the theory of an amygdala deficit.

In addition to limbic structures, it has been hypothesized that the orbital frontal cortex also plays a role in the recognition of certain emotional expressions (e.g. Blair et al, 1999; Blair & Cipolotti, 2000; Lew et al, 2005), and that antisocial individuals are also impaired in the activation of this frontal area (e.g. Coccaro et al, 2007; Reyes & Amador, 2009; and De Pascalis et al, 2009). Therefore, the emotion recognition task employed in the current study was included as an overt measure of emotional processing, and also as an indirect measure of frontal-limbic function.

The current emotion recognition task involved prisoners' viewing a series of faces on a laptop computer. The task, approximately 20 minutes in duration, involved faces being randomly presented on the computer screen one at a time at brief intervals. Each face depicted a varying intensity of the following emotions: happiness, sadness, anger, disgust, fear, and surprise. Each emotion was morphed to increasing intensities of 10% (ranging from 10% to 100%; see Fig. 1), with each emotion being presented 4 times at each intensity throughout the course of the task. After each face presentation, participants were asked to identify the emotion (using a prompt card of the choice of emotions). Participants' responses were recorded one at a time on the laptop computer by the researcher. Following the completion of the task, the data was retrieved as accuracy scores for each emotion at each intensity level, as well as how sensitive the participant was to emotional signals (defined as 'Pr'), and how able they were to accurately label emotional expressions (defined as 'Br'). This neuropsychological instrument has been shown to be sensitive to interruption of neural activity using transcranial magnetic stimulation (Harmer, Thilo, Rothwell, & Goodwin, 2001), mood disturbances (Harmer, Grayson, & Goodwin, 2002) and a number of pharmacological challenges (Harmer, Bhagwagar, Cowen, & Goodwin, 2002; Harmer, Grayson et al., 2002; Harmer, Hill, Taylor, Cowen, & Goodwin, 2003).

Figure 1. An example of the ten increments of a fearful facial expression



2. Iowa Gambling Task (IGT; Bechara et al, 1994)

Prisoners (and individuals with Borderline PD) have been shown to display deficits on tasks involving behavioural inhibition, and goal-directed behaviour, thought to be linked to impairment in the pre frontal cortex (PFC; see Rogers, 2006 for a review).

In particular, the most anterior and ventral section of the frontal lobe - the orbitofrontal cortex (OFC), as well as the amygdala, has been implicated in the regulation of social behaviour (e.g. Barrash et al, 2000; Blair, 2004; Damasio, 1994; Seguin, 2004; Martinez-Selva et al, 2006, Rolls, 2004). Thus, behavioural traits such as impulsivity, aggression, and deficient behavioural regulation observed in psychopathic individuals are often attributed to dysfunction in these areas (Raine et al, 1997b; Brower & Price, 2001; Blair, 2004; Rolls, 2004; Seguin, 2004).

The IGT is a computerised decision-making task which requires participants to choose a card from four decks (each of which comprises different rates of monetary reward and punishment) over a series of trials; with the aim of learning to discriminate the risky decks from the safe ones (see Bechara et al, 1994). In studies involving this task, healthy volunteers have been shown to display activity in the medial PFC, which in turn was found to be correlated with risky choice (Fukui et al, 2005; Northoff et al, 2006).

Furthermore, studies of patient samples have shown that individuals with damage to the PFC are impaired in their performance (by continuing to choose risky decks), compared with healthy controls (who, over time, learn to choose the more advantageous decks, e.g. Bechara et al, 1994, 1997, 1999; Fellows & Farah, 2005). Comparable deficits in decision-making have been observed in prisoner samples (Mitchell et al, 2002; Broomhall, 2005), particularly those incarcerated for violent offences (Yechiam et al, 2008), and with a diagnosis of Borderline PD (Kirkpatrick et al, 2007). As such, studies using the IGT have been particularly helpful in assessing cortical areas of activation during decision-making processes. Thus, in the current study, the IGT was used as an overt measure of decision-making, as well as a more indirect measure of OFC function.

Participants were asked to select one card at a time from the deck of their choice (they were not told which the risky and safe decks were). They were told that the aim of the task was to win as much money as possible. Decks of cards in the IGT were split into those which yield high immediate gain but larger future loss (Decks A and B), and those which yield lower immediate gain but a smaller future loss (Decks C and D). Decks were further divided into those that that issue small punishments more frequently (Decks A and C), and those that issue one large punishment infrequently (Decks B and D). The task took approximately 10 minutes in duration, and the participant's scores were recorded automatically onto the computer.

3. <u>The Matching Familiar Figures Test (MFFT; Kagan, Rosman, Day, Albert, & Phillips, 1964)</u>

The MFFT is a measure of reflective-impulsivity, which combines an individuals' decision making time with their problem-solving ability. This differentiates individuals who tend to make quick inaccurate decisions from those who adopt a more reflective and accurate approach. It was included as a measure in the current study as many prisoners' offending history follows a pattern of impulsive, inaccurate choices. Also, measures of this nature have been more directly linked to personality traits of impulsivity (Chapman et al, 2008; Bagby et al, 2008; Molto et al, 2007). Indeed, the MFFT has been used in a variety of populations, including children with impulsive tendencies (Finch et al, 1984) and incarcerated offenders (Heckel et al, 1989).

The task requires participants to choose one figure out of 5 possible others that is the same as one they are shown. The images are of everyday objects (e.g. scissors, cat, leaf). Responses are timed, and if the guess is incorrect, the participant is asked to choose again. In the current study, reflective-impulsivity scores were calculated from the error rates/reaction time. Thus, a higher, more positive score indicated a more impulsive and less reflective respondent.

4. The Camden Short Recognition Memory Tests for Words and Faces (Warrington, 1996)

Like decision-making, recognition memory has been linked to the pre-frontal cortex (Wagner et al, 1998; Simons et al, 2005), which has in turn been linked to impulsive features of psychopathy and PD (Brower & Price, 2001; Blair, 2004). Additionally, recall memory has been found to be impaired in prisoners with Borderline PD (Kirkpatrick et al, 2007). Therefore, the Camden memory tests (recognition memory) and Rey-Osterrieth Complex Figure (ROCF; recall memory – see below) were included in this study to explore such findings in the current sample.

Participants were presented with 25 stimulus items for each test at a rate of approximately one every three seconds, and asked to respond “yes” or “no” as to whether each item was pleasant or not. Recognition memory was tested immediately after all stimuli are presented by showing the participant two stimuli (one from the previous set, paired with one distractor), and asking them to decide which they had seen previously. Performance scores were then transformed into percentages of stimuli correctly recognised.

5. The Rey-Osterrieth Complex Figure (ROCF; see Lezak, 2004, pg 536 – 548).

The ROCF is an abstract figure which was originally designed to test perceptual organization and visual memory in brain impaired subjects (where recall deficits were reported specifically in patients with right-sided temporal damage; Lezak, 2004). However, as impaired performance has also been reported in prisoner Borderline PD populations (Kirkpatrick et al, 2007a), it was included in the current study to test whether such a deficit was present and linked to Borderline PD in the current sample.

Participants were asked to copy the figure, and then reproduce it from memory approximately 25 minutes later. Responses were then coded by the researcher, based on the scoring system outlined by Bennett-Levy (1984).

Statistical analyses

To test how well the data from the current study fit the four facet model of psychopathy, confirmatory factor analysis was conducted (using the package EQS; Bentler, 1995). Results from this analysis showed that the four facet model (Hare, 2003) fit the data well (Confirmatory Fit Index (CFI = 0.94), Root Mean Square Error of Approximation (RMSEA = 0.11), (χ^2 = 70.13), $p < 0.001$)).

Between-group differences of categorical measures such as index offence and PD diagnosis were tested using chi square analysis (using Fischer's exact statistic when cell counts were low). Between-group differences of dimensional data such as PCL-R and PD scores, and number of lifetime offences (using gender as the between-group variable) were assessed using a one-way analysis of variance (ANOVA) when the data was normally distributed. Either a Mann-Whitney U or Kruskal Wallis test (for two or more groups respectively), was used when the data violated parametric assumptions. All between-group analyses was conducted in SPSS (v. 13), and all significance levels were set at 0.05.

Preliminary exploration of whether uncontrolled differences between groups (i.e. other potential predictors) could have accounted for any observed difference was tested by repeating the above analyses including, as covariates, those variables hypothesized to have influenced test performance (e.g. measures of affect). These associations were then tested more accurately via multivariate regression analysis (using MLwiN, v 2.02).

Within the multivariate regression model, dependent measures known to have a high degree of co linearity (e.g. psychopathy facets and dimensions of PD) were plotted as repeated measures on the y axis. This method ensured that any existing co-variance between dependent measures could be controlled for, and the magnitudes of association between facets and other measures were comparable within the framework of regression analysis. The performance measure of interest (independent variable) was then added to the model, and the degree of association calculated. Regression

coefficients were expressed as z-scores for a direct comparison of effect sizes between independent variables, and their significance was assessed by dividing by the standard error. Where an association was found to be significant, several other predictors (thought to be potential confounders) were added to the model to ensure that the association of interest could not be explained by the effect of other confounding variables.

Differences between male and female prisoners were investigated by adding 'gender' as an additional predictor to the model, as well as an interaction term of measure of interest x gender. If the gender interaction term was found to be significant (i.e. male and female prisoners differed significantly from each other in that particular association), independent regressions were conducted to determine the level of significance in the association for male and female prisoners separately.

For a full description of the statistical analyses used for each area of interest, please refer to the methods section of each experimental chapter.

Chapter 3: Male and female prisoners in England and Wales: demography, criminality, and psychopathology

Chapter aims:

1. To provide a descriptive analysis of demographic, criminological, and psychopathological characteristics of a representative sample of male and female prisoners in England and Wales;
2. To explore gender differences in the prevalence of psychopathy, personality disorder, and criminal history in this sample;
3. To explore differences in the severity of psychopathy in relation to offending history and personality disorder (PD).

Historically, female prisoners have been found to differ from male prisoners in terms of their offending history, Axis II presentation, and psychopathy prevalence (Rogers, Jordan, & Harrison, 2007; Warren & South, 2006).

When considering offending behaviour, women not only commit less crime than men (NOMS, 2005), but also present with a different offending profile. For example, figures have shown that the most common offences committed by women tend to be theft, child abuse, drug offences, and property crime (Cale & Lilienfeld, 2002; d'Orbán, 1993; Hollin & Palmer, 2005; NOMS, 2005, 2008; Messer et al, 2004; Warren & South, 2006; Gunter et al, 2008). Men, on the other hand, are most often incarcerated for acts of violence, burglary, robbery, and sexual offences (Farrington & Painter, 2004; NOMS, 2005; Watzke et al, 2006; Suter et al, 2002; Gunter et al, 2008). However, findings have not been consistent (e.g. Warren & South, 2006) and there is evidence that, although women commit fewer violent offences in general, they commit significantly more serious acts of violence (i.e. homicide) when compared to male samples (Watzke et al, 2006). This chapter aims to explore the offending behaviour of male and female prisoners in a UK sentenced population.

As well as differences in their criminal histories, female prisoners have also been found to have a lower prevalence of psychopathy than their male counterparts (Salekin et al,1997, Logan, 2002; Warren & South, 2006; Rogers et al, 2007), but with deceitfulness rated more often then their more overtly antisocial male equivalents

(Strand & Belfrage, 2005). Regarding Axis II presentation, women have been found to have a higher prevalence of Borderline PD and Histrionic PD, and men a higher prevalence of Paranoid PD and Antisocial PD, in forensic samples (Hamburger, Lilienfeld, & Hogben, 1996; Paris, 1997; Singleton et al, 1998; Cale & Lilienfeld, 2002; Coid, 2002; Watzke et al, 2006). As a result of their differing psychopathology, and the fact that female prisoners often require different strategies for management, treatment, and relapse prevention when compared with their male equivalents, numerous recent reports have highlighted the need for gender-specific services in prison populations; more specifically, that services should be more responsive to such differences (NOMS, 2008; The Corston Report, 2007; Freudenberg et al, 2007).

This chapter will examine the prevalence of psychopathy and Axis II personality disorders in the current sample, in order to provide a clearer picture of the similarities and differences in the psychopathology of male and female prisoners currently in England and Wales.

As an introduction to the following chapter (which investigates the associations between psychopathy, Axis II disorders, and criminal history), an initial exploratory analysis of PD presentation and severity of criminality between three groups rated low, medium, and high on psychopathy will also be conducted. Differences between male and female prisoners at each level will also be compared.

Predictions

Regarding offending behaviour, it is predicted that significantly more women will be incarcerated for current offences of homicide, drugs, and theft, and more men for violence, sex, robbery, and burglary. Male prisoners are also expected to score more highly on the PCL-R, and to have a higher prevalence of Paranoid PD and Antisocial PD. In contrast, female prisoners are expected to have a higher prevalence of Borderline PD.

It is also predicted that the higher the PCL-R score, the higher the prevalence of PD and the more complex the PD presentation. It is also expected that prisoners from the high scoring psychopathy group will have a more severe criminal history than those in the medium and low PCL-R groups.

Participants

The total sample of offenders consisted of 310 women and 1346 men. From this, 309 women and 1338 men had PCL-R data, and 308 women and 1303 men had a full set of SCID-II scores (see Chapter 2 for a full account of the sample population). The total sample of prisoners was analysed in order to provide an estimated prevalence of psychopathy, PD, and offending behaviour in sentenced prisoners in England and Wales.

Measures

Psychopathy was measured using the Psychopathy Checklist-Revised (PCL-R; Hare, 2003), and personality disorders using the Structured Clinical Interview for Axis II Disorders (SCID-II; First et al, 1997) (see Chapter 2 for a full description of measures). Complexity of PD presentation was also assessed using the Personality Assessment Schedule (PAS; Tyrer & Johnson, 1996; Tyrer, 2004) and current DSPD criteria (see Coid et al, 2007). Information on demography and current index offence was recorded from a semi-structured interview schedule. Lifetime offending was recorded from the prisoners' file (list of previous convictions).

Statistical analyses

The data was analysed using SPSS (v13). Male and female prisoners were compared on both categorical and dimensional measures. For categorical measures, such as index offence, PD diagnosis, and certain demographic variables (e.g. ethnicity), gender differences were tested using chi square analysis (using Fischer's exact statistic when cell counts were low). Between group differences of dimensional data such as PCL-R and PD cluster scores, and number of lifetime offences were assessed using a one-way analysis of variance (ANOVA; using gender as the grouping variable) when the data was normally distributed. Either a Mann-Whitney U or Kruskal Wallis test, for two or more groups respectively, was used when the data violated parametric assumptions.

Due to the diverse nature of the index offence categories (and the fact that low numbers impact upon the statistical validity), lifetime offending was broken down into three broader categories: sex, robbery, and violence, in order to increase the robustness of the test. All significance levels were set at 0.05.

PCL-R categories (i.e. low, medium, and high) were calculated by firstly transforming raw scores into z-scores, and then grouping each category on ± 1 standard deviation from the mean (medium group). A comparison of PD prevalence and offending history between these groups was conducted with a one way ANOVA (or Kruskal Wallis test if variances were unequal). A priori comparisons were conducted where necessary, using Bonferroni t test (suitable for multiple a priori comparisons), or Tamhane's T2 (when the variances were unequal).

Results

i) Demography

Male prisoners were significantly older (M = 31.0 ± SD = 11.5) than female prisoners (M = 28.3 ± SD = 8.8), z = -3.01, p < 0.01). The majority of both female (83.5%) and male offenders (78.6%) were white and unemployed (76.1% and 49.1% respectively). There was an overall difference in the division of male and female offenders according to ethnicity (χ^2 = 16.32, p ≤ 0.001) and categories of socio-economic class (χ^2 = 76.76, P < 0.001) (see Table 4).

ii) Psychopathy

Commensurate with previous studies, male offenders had higher PCL-R total scores (17.88 ± 7.62) than female offenders (16.39 ± 7.52, (F (1, 1645) = 9.12, p < 0.01), as well as higher scores on interpersonal style (F1: z = -3.514, p < 0.001), affective deficiency (F2: F (1, 1638) = 12.13, p ≤ 0.001), and antisocial behaviour (F4: F (1, 1633) = 8.86, p < 0.01), (see Fig. 2). Both groups were, however, equivalent on lifestyle features of psychopathy (F3).

Although there was a trend for more men than women to be classified as psychopaths using a cut-off score of 25 (21.0% vs 16.2% respectively), this difference was not significant (p = 0.06). Similarly, gender differences in the prevalence of men and women meeting the criteria for DSPD were not significant (see Table 4).

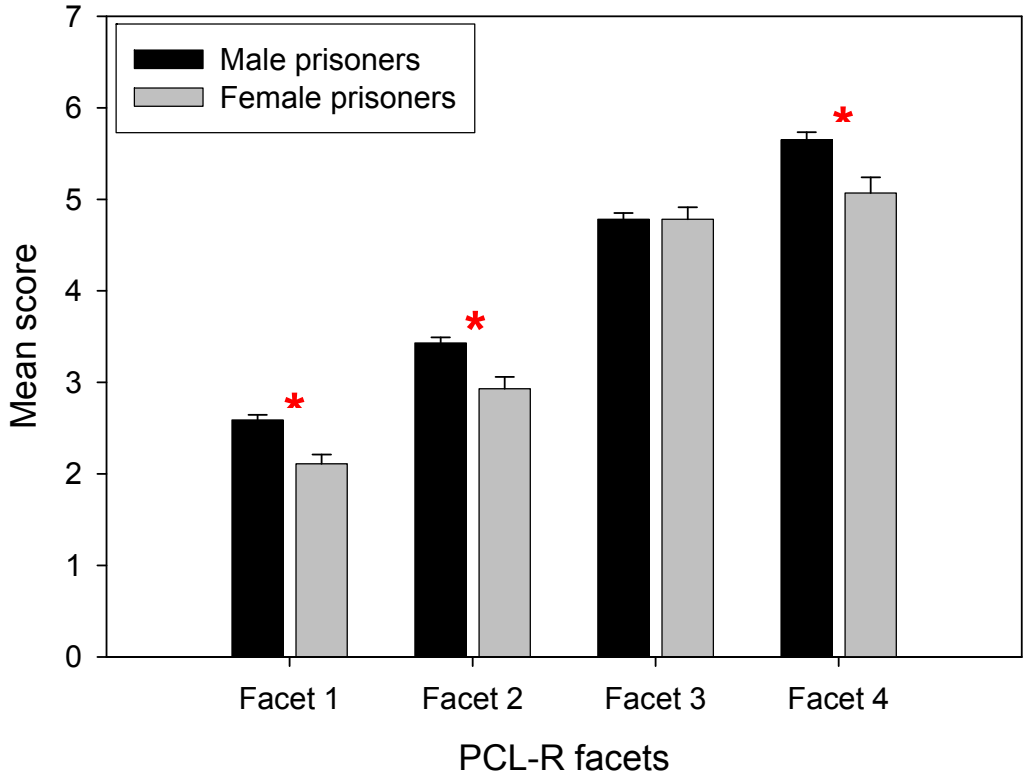
The former finding was, however, altered slightly, when applying a PCL-R cut-off of 30. This generated an increased prevalence of psychopathy among men (χ^2 = 3.76, p ≤ 0.05). Thus, the PCL-R cut-off score is an important factor to consider when discussing the prevalence of psychopathy.

Table 4. Categorical analysis of demographic and psychopathological data for male and female prisoners

Category		Male offenders N (%)	Female offenders N (%)	χ^2
Ethnicity	White	1058 (78.6)	259 (83.5)	16.32***
	Black	200 (14.9)	32 (10.3)	
	Asian	43 (3.2)	1 (0.3)	
	Other	45 (3.3)	18 (5.8)	
Socio-economic class	Professional	59 (4.4)	3 (1.0)	76.76***
	Skilled	269 (20.0)	24 (7.7)	
	Unskilled	329 (24.5)	42 (13.5)	
	Student	26 (1.9)	5 (1.6)	
	Unemployed	660 (49.1)	236 (76.1)	
Axis I Disorder	Depression	87 (6.5)	35 (11.3)	8.56**
	Psychosis	86 (6.4)	58 (18.7)	48.17***
	Alcohol dep	274 (20.4)	86 (27.7)	8.04**
	Drug dep	523 (39.1)	184 (59.5)	42.75***
Personality Disorder	Avoidant	120 (9.2)	36 (11.7)	1.81
	Dependent	10 (0.8)	7 (2.3)	5.45*
	Ob-comp	87 (6.7)	12 (3.9)	3.29
	Paranoid	277 (21.2)	40 (13.0)	10.71***
	Schizotypal	52 (4.0)	7 (2.3)	2.07
	Schizoid	85 (6.5)	13 (4.2)	2.30
	Histrionic	14 (1.1)	3 (1.0)	0.02
	Narcissistic	131 (10.0)	8 (2.6)	17.54***
	Borderline	243 (18.6)	78 (25.3)	6.96**
	Antisocial	836 (64.1)	156 (50.6)	19.07***
	Any PD	947 (72.7)	201 (65.3)	5.59*
Psychopathy	25+	281 (21)	50 (16.2)	3.63
	30+	75 (5.6)	9 (2.9)	3.76*
DSPD		194 (14.9)	34 (11.1)	3.02

* $p \leq 0.05$; ** $p \leq 0.01$, *** $p \leq 0.001$

Figure 2. Differences between male and female prisoners on PCL-R facet scores



* Indicates significant difference between groups.

iii) Personality disorder

The majority of male (72.7%) and female prisoners (65.3%) were diagnosed with at least one DSM-IV PD, and the difference between these two groups was significant (χ^2 = 6.70, p ≤ 0.01). Male prisoners had a higher number of Cluster A (z = -3.00, p < 0.01) and Cluster B (F (1, 1609) = 7.21, p < 0.01) PDs, although there were no significant gender differences according to individual PD's in Cluster C (p = 0.66).

When examining personality disorders categorically, Antisocial PD was the most common Axis II disorder in both men (64.1%) and women (50.6%), and this difference was found to be statistically significant (χ^2 = 18.18, p < 0.001). When assessing other differences between gender, male prisoners were also found to have an increased prevalence of Paranoid PD (χ^2 = 10.71, p < 0.01) and Narcissistic PD (χ^2 = 17.54, p <

0.001), whereas women had a significantly higher prevalence of Dependent (χ^2 = 5.45, p < 0.05) and Borderline PD (χ^2 = 6.96, p < 0.01), compared to their male counterparts.

However, when assessing personality disorders dimensionally (i.e. number of PD criteria met), male prisoners were found to have a much more complex psychopathological presentation than female prisoners. Specifically, male prisoners were found to score significantly higher on criteria relating to Dependent (z = -2.16, p < 0.05), Obsessive-compulsive (z = -3.27, p < 0.001), Schizotypal (F (1, 1610) = 4.98, p < 0.05), Schizoid (F (1, 1609) = 11.65, p < 0.001), Paranoid (z = -4.13, p < 0.001), Histrionic (z = -6.51, p < 0.001), Narcissistic (z = -10.50, p < 0.001), and Antisocial PD (z = -6.29, p < 0.001). In contrast, Borderline PD was the only dimensional scale significantly higher in women (F (1, 1608) = 9.43, p < 0.01).

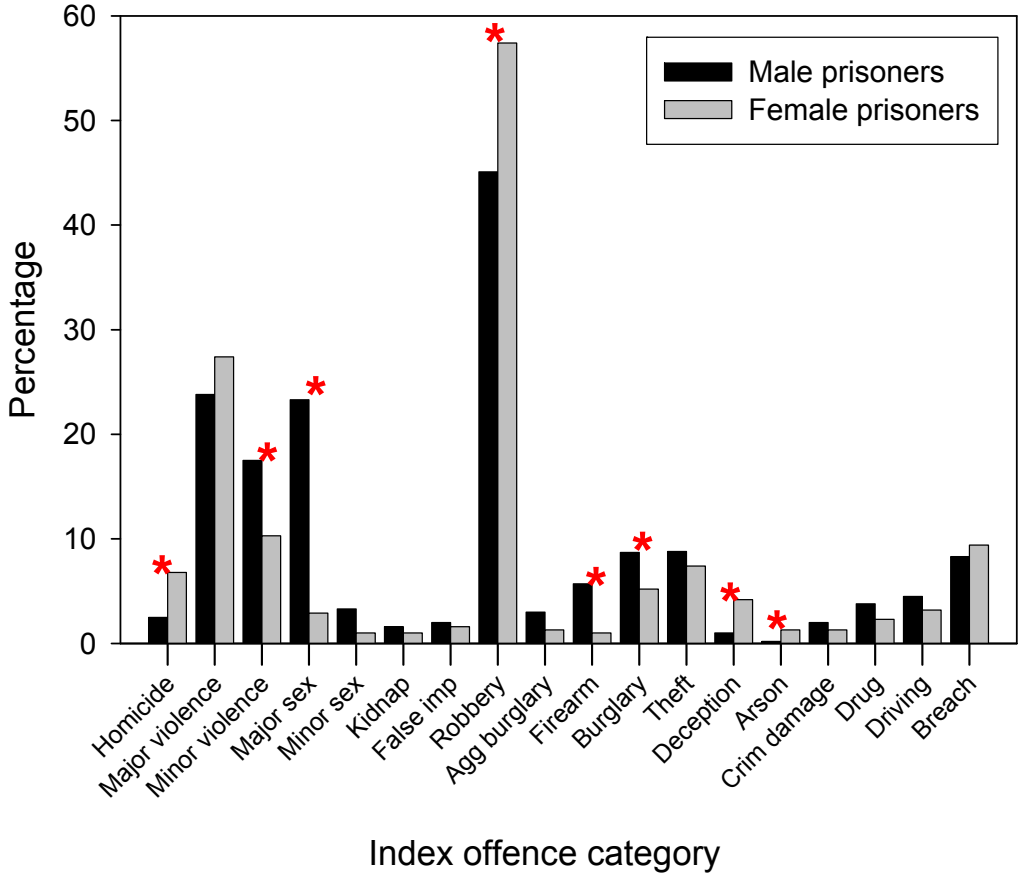
The highest rate of comorbidity of Axis II disorders among men was Antisocial PD and Paranoid PD (where 29.2% of the 836 men with ASPD also had PPD). This was significantly higher than among women, where 19.2% of the 156 women with Antisocial PD also had Paranoid PD (χ^2 = 6.52, p ≤ 0.01). Comorbidity among female prisoners was highest between Antisocial and Borderline PD (where 36.5% of the 156 women with ASPD also had a diagnosis of BPD). This was significantly higher than among men, where 26.0% of the 836 men with Antisocial PD also had Borderline PD (χ^2 = 7.36, p ≤ 0.01).

iv) Offending behaviour

Robbery was the most common index offence among both male (45.1%) and female offenders (57.4%). Gender comparisons across categories revealed that more men than women were serving sentences for minor violence (χ^2 = 9.52, p < 0.01), burglary (χ^2 = 4.27, p < 0.05), crimes involving firearms (χ^2 = 12.15, p < 0.001), and sexual offences (Major sex: χ^2 = 66.70, p < 0.001; other sex: χ^2 = 5.06, p <0.05). In comparison, crimes of homicide (χ^2 = 14.90, p < 0.001), robbery (χ^2 = 15.26, p < 0.001), deception (χ^2 = 15.60, p < 0.001), and arson (χ^2 = 6.81, p < 0.01) were more commonly committed by women (see Figure 3.). Over the lifespan, female offenders were found to have committed significantly more robbery offences than their male

counterparts (z = -2.30, p < 0.05). No other significant gender differences in lifetime offending were found.

Figure 3. Index offence categories for male and female prisoners



* Indicates significant difference between groups.

v) Differences between PCL-R groups in PD prevalence and offending history

As an introduction to the analyses which explores associations between psychopathy, PD, and offending behaviour (Chapter 4), the prisoners were grouped according to their PCL-R score (low, medium, or high). Differences between these sub-groups were examined.

In this analysis, significant differences between PCL-R sub-groups emerged in the number of Cluster A (χ^2 = 88.20, p < 0.001), Cluster B PDs (χ^2 = 407.48, p < 0.001),

and PAS scores (χ^2 = 292.94 p < 0.001). Planned comparisons revealed that the direction of these differences was as expected. Prisoners with higher psychopathy scores had more PD diagnoses and more complex PD presentation (p < 0.001 for all comparisons).

Although no overall group differences were observed for Cluster C PDs, planned comparisons revealed that prisoners in the high PCL-R sub-group had significantly more PD diagnoses in Cluster C than prisoners in the low PCL-R sub-group (p < 0.05).

Differences between PCL-R groups were also found for lifetime violent (χ^2 = 101.32, p < 0.001), robbery (χ^2 = 109.88, p < 0.001), and sexual offending (χ^2 = 33.24, p < 0.001). Planned comparisons revealed that violent offending became more prevalent according to increasing scores of psychopathy (p < 0.001 between low, medium, and high psychopathy sub-groups). Offences of robbery, on the other hand, were found to be significantly higher in both the medium (p < 0.001) and high (p < 0.001) PCL-R sub-groups when compared with the low PCL-R group only. In contrast, sexual offending was found to be more prevalent among the low PCL-R group, compared with the medium category (p < 0.05).

Gender differences in PCL-R groups

As an exploratory introduction to Chapter 4, which considers the impact of gender on associations between psychopathy, PD, and criminality, gender differences in the prevalence of PD according to different levels of psychopathy were analysed next (see Table 5). Significant differences between male and female prisoners were observed in the 'medium' sub-group only. Within this category, male offenders had significantly more PD diagnoses within Cluster A (z = -2.02, p < 0.05) and Cluster B (F (1, 1072) = 4.83, p < 0.05), and had a more complex PD presentation, as measured using PAS scores (z = -2.99, p < 0.01).

Gender differences in lifetime offending demonstrated that, in the low psychopathy sub-groups, male prisoners had committed significantly more sexual offences than female prisoners (z = -5.08, p < 0.001; see Table 6). On the other hand, in the medium psychopathy sub-group, female offenders had committed more sexual offences (z = -

3.31, $p \leq 0.01$) and offences of robbery than their male counterparts ($z = 4.17$, $p < 0.05$). No significant differences between male and female prisoners were observed in the high psychopathy sub-group.

Table 5. Differences in frequency of PD per cluster across low, medium, and high psychopathy groups

	LOW		F	MEDIUM		F	HIGH		F
	Male	*Female*		*Male*	*Female*		*Male*	*Female*	
	N = 203 (16%)	N = 62 (21%)		N = 867 (67%)	N = 207 (67%)		N = 231 (18%)	N = 38 (12%)	
	M ± SD	**M ± SD**		**M ± SD**	**M ± SD**		**M ± SD**	**M ± SD**	
Cluster A	0.08 ± 0.34	0.03 ± 0.18	1.30$_a$	0.31 ± 0.57	0.16 ± 0.43	**4.93$_a$ ***	0.56 ± 0.78	0.39 ± 0.78	1.52$_a$
Cluster B	0.19 ± 0.47	0.16 ± 0.37	0.16	0.96 ± 0.76	0.18 ± 0.51	**4.83***	1.54 ± 0.83	1.71 ± 0.57	1.42$_a$
Cluster C	0.12 ± 0.37	0.11 ± 0.32	0.04	0.16 ± 0.43	0.17 ± 0.45	0.35	0.22 ± 0.52	0.26 ± 0.64	0.25
PAS	0.84 ± 0.95	0.82 ± 0.88	0.01	1.89 ± 0.95	1.67 ± 0.98	**8.81$_a$ ****	2.27 ± 0.78	2.29 ± 0.75	0.86

Although both parametric and non-parametric tests were used, F values (parametric statistic) are presented for consistency. $_a$ Indicates analysis that did not meet the criteria for a parametric test (Mann-Whitney U test used). * $p \leq 0.05$; ** $p \leq 0.01$, *** $p \leq 0.001$

Table 6. Differences in lifetime offending across low, medium, and high psychopathy groups

	LOW		F	MEDIUM		F	HIGH		F
	Male	*Female*		*Male*	*Female*		*Male*	*Female*	
	N = 203 (16%)	N = 62 (21%)		N = 867 (67%)	N = 207 (67%)		N = 231 (18%)	N = 38 (12%)	
	M ± SD	**M ± SD**		**M ± SD**	**M ± SD**		**M ± SD**	**M ± SD**	
Violence	1.09 ± 1.55	1.47 ± 1.43	2.95	2.66 ± 3.43	2.34 ± 2.75	1.55$_a$	3.82 ± 4.01	3.05 ± 3.45	1.25
Robbery	0.67 ± 1.47	0.92 ± 1.55	1.38	1.78 ± 2.35	1.89 ± 1.83	**0.38$_a$ ***	2.03 ± 2.20	2.50 ± 1.86	1.53
Sex	2.78 ± 5.45	1.00 ± 6.49	**4.65$_a$ ****	1.40 ± 4.16	1.57 ± 6.34	**0.24$_a$ ****	1.29 ± 6.84	1.61 ± 7.98	0.07

Although both parametric and non-parametric tests were used, F values (parametric statistic) are presented for consistency. $_a$ Indicates analysis that did not meet the criteria for a parametric test (Mann-Whitney U test used). * $p \leq 0.05$; ** $p \leq 0.01$, *** $p \leq 0.001$

Discussion

Overall, findings from the current chapter support the historical position that there are significant gender differences in the psychopathology of male and female prisoners. These differences are present regarding the prevalence of psychopathy, certain PD's, offending history, and Axis I disorders.

Nevertheless, there are several limitations to this analysis that need to be acknowledged. The first is that, based on the sampling frame for the Prisoner Cohort Study (see Chapter 2 for further details), male prisoners were classed as higher risk (according to the OGRS; Copas & Marshall, 1998) than female prisoners. This, in turn, may have had an effect on reported gender differences in psychopathy prevalence and severity of offending. Additionally, as male sex offenders were oversampled, the reported gender difference in the prevalence of sexual index offences should be interpreted with caution when attempting to make generalisations to the prisoner sample across England and Wales. It is also important to interpret with caution the finding of an equivalent prevalence of lifetime sexual offending among men and women. This is because the PNC document outlining each prisoners' previous convictions (from which this data was recorded), classifies offences of prostitution under the same 'sexual offence' heading as offences of rape, etc. It is unknown whether or not the researchers in the current study classified these offences in this way. Unfortunately, this caveat was only noticed once the data had been collected, and so could not be checked or amended as necessary to ensure that only true sexual offences were recorded. Consequently, this statistic may not be a true measure of sexual offending in women.

In addition to the above limitations, it is also important to recognise the widely differing sample size and significant difference in age between the two groups. This is important to consider, since sample size is linked to statistical validity (Clark-Carter, 2003), and age has been found to be confounded with Axis I and II disorders as well as criminal behaviour (Harpur & Hare, 1994; Farrington, 2003; Johnson et al, 2000). Secondly, when considering associations between psychopathy, PD, and offending behaviour, due to the high rate of Axis I/ Axis II comorbidity shown in this sample, it is unwise to interpret the results purely at face value and assume that they are not a consequence of another facet of the complex psychopathology in this sample. Moreover, numerous recent studies (Guay et al, 2007; Walters, Duncan, & Mitchell-Perez, 2007; Walters et

al, 2007) have argued the case that psychopathy is better conceptualised along a continuum rather than a taxonomic construct (and thus indicating that those below the clinical cut-off are qualitatively different from those falling within the boundaries of clinical caseness).

Notwithstanding these limitations, results from the current study provide an important insight into the psychopathological presentation of high risk male and female prisoners with complex psychopathology in England and Wales. This unique set of data could not have been gathered from any other sampling frame. Regarding offending behaviour, the percentage of index offences of robbery among male (45.1%) and female (57.4%) prisoners was much higher than previously reported (e.g. NOMS, 2005, 2008; Watzke, Ullrich, & Marneros, 2006). Additionally, the finding that significantly more female than male prisoners were serving a sentence for robbery is contrary to previous studies (e.g. Watzke, Ullrich, & Marneros, 2006). However, these differences may be due to the sampling frame used in the Prisoner Cohort Study, where prisoners were only selected if they had been serving a sentence of two years or more. Predictions regarding gender differences for other offences, however, were largely supported. Specifically, male prisoners were found to be incarcerated for sexual offences, burglary, firearm offences, and minor violence, more often than women.

However, in line with research by Watzke and colleagues (2006), significantly more women were incarcerated for the most serious crimes of violence (i.e. homicide). At the same time, these homicide offences referred to offences of manslaughter and not murder as the latter were excluded from the sampling frame. Nevertheless, this finding, together with the observation that male and female prisoners did not differ significantly for other crimes of major violence and for violent offending over the lifetime, indicates that female prisoners in England and Wales may not be as different to their male equivalents in terms of violent behaviour, as previous research has suggested. Female prisoners were also found to have committed more crimes involving deception and arson than male prisoners. These findings as a whole highlight the importance of tailoring management and intervention plans for male and female prisoners in order to be more responsive to their specific treatment needs and risk reduction.
Mean PCL-R scores for male prisoners (17.9) fell within the range of scores noted for male prisoner samples in North America and Canada (i.e. 15.4 – 25.0; Cooke, Kosson,

& Michie, 2001; Hare et al, 1990; Rogers, Jordan, & Harrison, 2007), and just above the rate observed in UK populations (i.e. 13.8 – 17.8; Cooke, 1995; Cooke et al, 2005; Hare, 2003; Hare et al, 2000). When the traditional cut off score of 30+ was applied to the male sample, the prevalence rate of 5.6% was well below that of previous North American studies (15.0 – 21.0%; Hare, 2001), but slightly above that of similar UK samples (i.e. 3.0 – 4.5%; Cooke, 1995; Hare et al, 2000).

In women, the mean PCL-R score of 16.4 was lower than those obtained in a recent UK study of female offenders (i.e. 19.3; Logan & Blackburn, 2009; although this sample was specific to women in a high secure prison and forensic psychiatric care). The current scores do, however, fall into the mid-range obtained in other non-UK female samples (i.e. 11.1 - 22.5; Weizmann-Henelius et al, 2002; Salekin et al, 1997, 1998; Hemphill, Hare, & Wong 1998; Jackson et al, 2002; Loucks & Zamble, 2000; Rogers, Jordan, & Harrison, 2007; Kennealy, Hicks, & Patrick, 2007). Similar to the male sample, the prevalence rate of psychopathy among women based on a 30+ cut off (2.9%), was well below those previously reported in previous studies (9-11%; Loucks & Zamble, 2000; Salekin et al, 1997; Vitale et al, 2002). However, when a lower cut-off of 25+ was applied, the prevalence rate of 16.2% was in line with current UK samples (i.e. 15%; Logan & Blackburn, 2009).

Predictions regarding gender differences in the prevalence of psychopathy were commensurate with previous studies reporting lower PCL-R scores among female offenders (e.g. Salekin et al, 1997, Grann, 2000; Logan, 2002; Warren & South, 2006). However, this was not the case for facet 3 lifestyle traits (similar to the findings of Rogers, Jordan, & Harrison, 2007), or the prevalence of psychopathy when using the more liberal cut-off score of 25, which is commonly used in UK populations. Nevertheless, when this was raised to the more stringent cut-off of 30 (common in North American populations), the gender difference between male and female offenders on psychopathy caseness became significant. At the same time, it is important to note that, despite the latter finding supporting previous research (e.g. Salekin et al, 1997), the overall prevalence of psychopathy among both male and female prisoners in England and Wales, as defined by the 30+ criteria, was substantially lower than the range of 15-30% previously reported in North American male prisoner samples (e.g. Hare, 2003; Sullivan & Kosson, 2006).

However, it has been argued that this reflects the selected nature of North American samples used for experimental purposes. Such samples are often from high security correctional facilities, which may not be representative of the overall correctional population (Coid et al, 2009a). Nevertheless, these findings not only highlight the importance of being attentive to diagnostic criteria when attempting to draw conclusions from literature on gender differences, but may also support the argument for a differing level of PCL-R cut-off for men and women (see Forouzan & Cooke, 2005 for a discussion).

Nearly three quarters (73%) of men and two thirds (65%) of women met the diagnostic threshold for at least one Axis II PD. This exceeds the reported prevalence in other studies of male (64%, Singleton et al, 1998) and female prisoners (50%, Singleton et al, 1998; O'Brien et al, 2003). However, UK studies from high risk populations (e.g. Logan & Blackburn, 2009) and those using self report measures (e.g. Dolan & Mitchell, 1994) have reported higher prevalence rates of up to 82% in women.

Predictions that male prisoners would have a higher prevalence of Paranoid and Antisocial PD were supported. Similarly, the expectation that more female prisoners would have a diagnosis of Borderline PD was also confirmed (although the difference in prevalence between men and women was not as large as has been previously observed; e.g. Black et al, 2007). Additionally, male prisoners were also found to have a higher prevalence of Narcissistic PD, and female prisoners Dependent PD, which complements findings from previous studies (e.g. Singleton et al, 1998; Rogers, Jordan, & Harrison, 2007; Lynam & Widger, 2007). Comorbidity between Axis II disorders was also found to differ significantly according to gender, with more male prisoners having an Antisocial PD/ Paranoid PD presentation, and more female prisoners presenting with Antisocial PD/ Borderline PD pathology.

When considering offending history and Axis II presentation at differing levels of psychopathy, it was expected that those scoring higher on the PCL-R would have a more complex PD presentation and more severe offending history. This prediction was supported with crimes of violence and robbery, but was not the case among in prisoners with a history of sexual offending (where those in the low PCL-R sub-group

had a more severe sexual offending history). It was also supported in terms of Cluster A and B PDs, together with PAS scores, but not for PDs from the anxious/ fearful cluster.

Gender differences were also noted in the severity of PD presentation and offending history in relation to psychopathy. Overall, these differences existed predominantly in the mid-range psychopathy group, where male prisoners had more complex PD presentations, but interestingly, committed fewer robbery and sexual offences than their female counterparts. No significant differences between male and female prisoners were noted in the high PCL-R sub-group, implying that there are few differences according to gender among prisoners with psychopathy.

In summary, the results from this chapter provide a snapshot of the psychopathology of male and female sentenced prisoners, serving a sentence of two years or more in England and Wales. They further highlight the diverse presentation of these two clinical groups, and in line with recent recommendations (e.g. the Corston Report, 2007), the need for interventions and management strategies to be responsive to such differences, to ensure maximum efficacy.

Nevertheless, it is important to acknowledge the high rate of Axis I/ Axis II comorbidity in this sample (and gender differences in these prevalence rates), and the fact that this may have influenced any observed differences. As such, in order to investigate associations between psychopathy, PD, and offending behaviour in the next chapter, an equal sized sample of male offenders will be matched to the sample of 310 female offenders on measures of psychopathy, age, and IQ (the latter also found to be linked to criminality; Satterfield et al, 2007). From this, both psychopathy and personality disorder will be assessed dimensionally in relation to each other and to offending history. Additionally, multivariate regression analysis will be adopted in order to account for any potential influence of other predictors in the model. The influence of gender on any of the observed associations will also be tested.

Chapter 4: Associations between psychopathy, personality disorder and offending behaviour among male and female prisoners in England and Wales

Chapter aims:

1. To compare the prevalence of PD and offending history among male and female prisoners with equivalent PCL-R scores;
2. To explore associations between psychopathy, personality disorder, and offending behaviour, in a sample of male and female offenders matched for psychopathy; and
3. To report any gender differences in these associations.

The psychopathological presentation of offenders incarcerated in prisons in England and Wales is an important issue to appraise when considering the planning and efficacy of day to day management, treatment outcome, and risk reduction. In order for treatment outcomes to be successful and cost-effective, interventions need to be tailored to address the specific needs of the client group.

Prisoners are a well known group of individuals whose psychopathology is wide ranging: they have been shown to present with an array of Axis I and Axis II disorders, and criminal history (Singleton et al, 1998; Fazel & Danesh, 2002; Brugha et al, 2005; Widiger, 2006; Gunter et al, 2008). These differences have been shown to be wider still between male and female prisoners (Hamburger et al, 1996; Salekin et al, 1998; Warren et al, 2003; Bennett et al, 2005; Strand & Belfrage, 2005; Watzke et al, 2006). Nevertheless, diagnostic criteria for services like that of the DSPD units employ similar selection procedure for men and women (Susan Cooper, personal communication, 2009).

In the previous chapter, gender differences in PD prevalence and offending history (supporting some the above findings) were observed in the total sample of male and female prisoners. However, due to the large difference in sample size and age between male and female prisoners in the total sample, drawing firm conclusions from the data is difficult. In addition, this initial analysis did not provide a picture of how facets of psychopathology found in a prisoner population interact. The aim of this chapter therefore is to close the gap on some of this expansive psychopathology, and

provide a clearer picture of how features of psychopathy, personality disorder (PD), and criminal history are associated. In addition, it aims to elucidate how certain presentations may differ in an equivalent sample of male and female prisoners; thus providing a more detailed and specific needs analysis for treatment providers. Similar associations will be also be explored further, from a neuropsychological perspective, in the Chapter 6. To conduct these analyses, an equal sized sample of male offenders will be matched to the sample of 310 female offenders on measures of psychopathy, age, and IQ.

Previous studies of the clinical presentation of offenders with respect to psychopathy, PD, and offending have reported similar results. Psychopathy has been linked to violence (Stafford & Cornell, 2003; Roberts & Coid, 2007), and violence to Antisocial PD (Tikkanen et al, 2007). Similarly, psychopathy has been linked with Antisocial PD, and also with Histrionic PD (Hamburger et al, 1996; Coid et al, 2006).

Studies looking more specifically at the factorial breakdown of psychopathy have reported strong associations between interpersonal features and Narcissistic PD (Huchzermeier et al, 2007; Coid et al, 2006), affective features and Narcissistic and Schizoid PD (Coid et al, 2006); and lifestyle and antisocial features with Histrionic (Coid et al, 2006), Borderline (Huchzermeier et al, 2007) and Antisocial PD (Huchzermeier et al, 2007; Coid et al, 2006). Such studies highlight the importance of considering the individual facets of psychopathy when assessing risk and need, as individuals with different loadings on the various facets may have a very different clinical presentation. However, these studies have not examined gender differences in any such associations.

The small numbers of studies examining PD presentation among male and female offenders separately have implied a differing manifestation of psychopathy across gender. Specifically, psychopathy in women is reported to exhibit in a more Histrionic (Hamburger et al, 1996; Cale & Liliefeld; 2002a; 2002b), Schizotypal and Borderline presentation (Warren et al, 2003), whereas men have been found to present with a more Antisocial pathology (Hamburger et al, 1996; Cale & Liliefeld; 2002a; 2002b). However, findings have not been consistent, with a recent study highlighting strong associations between psychopathy and Antisocial PD in a sample of incarcerated

women in Florida (Kennealy et al, 2007). Psychopathy among men has been further been linked to Paranoid, Narcissistic, and Histrionic PD traits, particularly with interpersonal and affective features of psychopathy (i.e. Hildebrand & de Ruiter, 2004; Logan & Blackburn, 2009).

With regard to offending behaviour, violence has been linked to Cluster B PDs and total psychopathy scores among women (Westen et al, 2003; Burnette, South, & Reppucci, 2007; Kennealy et al, 2007), and more specifically, to affective features of psychopathy (F2) among prisoners overall (Coid et al, 2006). Offences of robbery have been found to be strongly associated with antisocial features of psychopathy (F4) among male and female prisoners (Coid et al, 2006).

There therefore appears to be strong links in the literature between psychopathy, Cluster B PDs, and offences of violence and robbery. However, as highlighted above, it can be difficult to draw firm conclusions from the data when considering specific associations (and therefore treatment needs) for male and female offenders independently. Further confusion is added when the reported lower prevalence of psychopathy among women is considered (e.g. Logan, 2002; Warren & South, 2006), and the view that psychopathy among women is a different entity, not adequately measured by the PCL-R (e.g. Salekin et al, 1997; Warren et al, 2005). However, for services such as those for individuals with 'Dangerous and Severe Personality Disorder' (DSPD), the selection criteria for women is comparable to that for men. Therefore, when considering individuals who fall within the remit of this service, it is crucial to examine both the similarities and differences in their presenting psychopathology. For this to be equivalent, both sets of prisoners need to be matched on the PCL-R.

The present chapter aims to answer some the above questions, by detailing a more specific picture of the psychopathology of male and female sentenced prisoners currently in England and Wales.

<u>Predictions</u>

a) Psychopathy and PD

Psychopathy was expected to be associated with Cluster B PD's. In particular, due to the similarities in their criteria (DSM-IV, American Psychiatric Association, 1994), strong

associations were anticipated for interpersonal features of psychopathy (Facet 1) and Narcissistic PD; affective features of psychopathy (Facet 2) and Schizoid PD; and lifestyle and antisocial features of psychopathy (Facets 3 and 4) and Borderline and Antisocial PD.

Associations between psychopathy and Borderline PD were expected to be stronger among female prisoners, and between psychopathy and Paranoid and Narcissistic PD among male prisoners.

b) Offending history and psychopathy and PD

Interpersonal and affective psychopathy traits (facets 1 and 2), and Schizoid PD were predicted to be associated with lifetime sexual offending. In contrast, lifestyle and antisocial features of psychopathy (facets 3 and 4), and Borderline and Antisocial PD (also similar by nature of their defining criteria) were expected to be associated with a history of violent and robbery offending.

Participants

In order to eliminate bias when examining the associations between psychopathy and PD and offending according to gender, 310 men were selected from the total sample of 1338 male offenders with PCL-R data, and matched with the sample of 310 female offenders on PCL-R scores (see Table 7). They were also matched on age and IQ, which have been found to relate to psychopathy and criminality (Coid et al, 2006; Black et al, 2007; Kennealy et al, 2007). For a full description of the matched sample, see Chapter 2.

Table 7. Matched scores on psychopathy, age, and IQ in male and female prisoners

Category	Male prisoners M ± SD)	Female prisoners M ± SD	F
PCL-R: **Total**	(16.23 ± 7.41)	(16.39 ± 7.52)	0.07
Facet 1	(2.15 ± 1.93)	(2.11 ± 1.80)	0.07
Facet 2	(2.99 ± 2.22)	(2.93 ± 2.27)	0.09
Facet 3	(4.50 ± 2.40)	(4.78 ± 2.33)	2.16
Facet 4	(5.34 ± 2.96)	(5.07 ± 2.96)	1.25
Age	(28.60 ± 9.00)	(28.30 ± 8.80)	0.17
IQ	(88.85 ± 14.48)	(89.00 ± 13.89)	0.02

Statistical analysis

Firstly, the prevalence of PD and offending history was explored in the matched sample of male and female prisoners, using a one-way analysis of variance (ANOVA, or non-parametric equivalent) when the data was dimensional, and chi square analysis when the data was categorical.

Following this, associations between psychopathy, PD, and offending history were explored. In order to moderate the possible limitations from the previous analysis (Chapter 3), these associations were tested using multivariate regression analysis (MLwiN; v 2.02). In this way, dimensional scores[9], previously highlighted as a more valid of way of assessing psychopathology (Guay et al, 2007; Walters, Duncan, & Mitchell-Perez, 2007; Walters et al, 2007), were plotted as repeated measures on the y axis (dependent measure), thus ensuring that any existing co-variance between facets of psychopathy could be controlled for, and the magnitudes of association between facets and other measures were comparable within the framework of regression analysis.

The data were analysed in the following way:

a) Facets of Psychopathy (dependent measures) and personality disorders;
b) Facets of Psychopathy (dependent measures) and offending; and
c) Personality Disorder (dependent measure) and offending.

Dimensional PD scores (i.e. number of DSM-IV criteria met) were used in analysis a) and c). The statistical thresholds for significance were: $z \geq 1.96$, $p \leq 0.05$; $z \geq 2.58$, $p \leq 0.01$; and $z \geq 3.30$, $p \leq 0.001$.

Where an association was found to be significant, several other predictors, also thought to be related, were added to the model to ensure that the association of interest could not be explained by the effect of other variables. Specifically, the measures of age, IQ, ethnicity, Axis I disorders, and childhood trauma were included, as these have been previously shown to be significantly associated with psychopathy, personality disorder, and criminality (Coid, 1992, 1993, 1998, 2003; Brugha et al, 2005; Shea et al, 2004; Craig et al, 2006; Poythress, Skeem, & Lilienfeld, 2006; Black et al, 2007; Tikkanen et

[9] Raw scores were standardised before being entered into the analysis.

al, 2007; McCormick et al, 2007). In addition, when analysing associations between psychopathy and criminal history, a categorical diagnosis of any personality disorder was also added as potential co-variate.

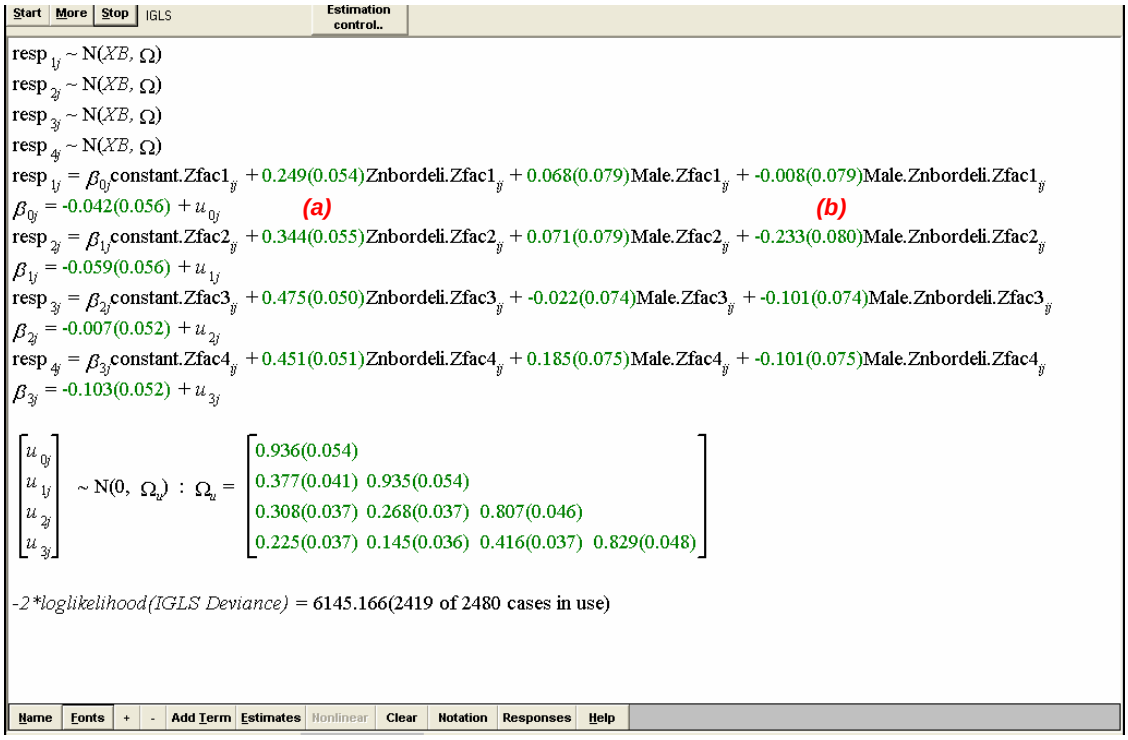
Gender interactions were explored by firstly adding gender to the model (as female prisoners were coded as 0, they were used as the reference group), and then by creating an interaction term of gender x co-variate (see Fig. 4). For example, when exploring associations between psychopathy facets and PD (analysis a), the interaction term of gender x PD was added to the model to explore gender specificity in the association.

If this interaction term was found to be significant (i.e. male and female prisoners differed significantly from eachother in that particular association), independent associations were explored to determine whether the association was significant in male and female prisoners separately. As female prisoners were coded as the baseline, the dependent measure of interest already present in the model represented the association between itself and the PD/ psychopathy measure of interest for female prisoners (once gender had been added to the model). Using the example provided in Fig. 4, female prisoners showed a significant association between affective features of psychopathy (F2) and number of Borderline PD criteria[(a)] (β (SE) = 0.34 (0.06), $p < 0.001$). From this equation, the association for the male prisoners was calculated as follows:

- β for male prisoners = β for female prisoners [(a)][10] plus β for gender interaction [(b)]
  = (0.334 – 0.233 = 0.111)
- SE for male prisoners = $\sqrt{(\text{SE of } a)^2 + (\text{SE of } b)^2}$
  = $\sqrt{}$ 0.009
  = 0.097
- Therefore, for male prisoners, the association between affective features of psychopathy and Borderline PD = β (SE) = 0.11 (0.10), $p > 0.05$.

[10] Please see Fig. 4 on next page.

Figure 4. An example of the analysis of associations between psychopathy facets and Borderline PD: investigating gender interactions.



Results

1. Prevalence of PD and offending history in matched sample of prisoners

From the sample of male and female prisoners matched on PCL-R scores, age, and IQ, male prisoners were found to have a higher prevalence of Narcissistic PD, both categorically (χ^2 = 7.22, p < 0.01; see Table 8), and dimensionally (z = -6.72, p < 0.001; see Table 9). Male prisoners also had a significantly more traits relating to Histrionic (z = -4.42, p < 0.001) and Antisocial PD (z = -2.80, p < 0.05) than female prisoners. In contrast, and as expected, female prisoners had a significantly higher prevalence of Borderline PD, both categorically (χ^2 = 7.55, p < 0.01) and dimensionally (F (1, 607) = 9.82, p < 0.01), than male prisoners with equivalent PCL-R scores. Similar to the findings from the total sample of prisoners (see Chapter 3), gender differences in the prevalence of prisoners meeting the criteria for DSPD were not significant.

Comparisons of index offence categories between male and female prisoners were comparable to those found with the total, unmatched sample. Specifically, significantly more female prisoners were incarcerated for crimes of homicide (χ^2 = 5.04, p < 0.05), robbery (χ^2 = 7.91, p < 0.01), deception (χ^2 = 6.42, p ≤ 0.01), and arson (χ^2 = 4.03, p < 0.05). In comparison, significantly more male prisoners were serving sentences for crimes of minor violence (χ^2 = 13.31, p < 0.01), burglary (χ^2 = 4.05, p < 0.05), crimes involving firearms (χ^2 = 9.18, p < 0.01), and sexual offences (Major sex: χ^2 = 44.68, p < 0.001; other sex: χ^2 = 3.85, p ≤ 0.05). When exploring offending history over the lifetime, no significant differences between male and female prisoners with equal PCL-R scores were observed.

Table 8. A comparison of PD prevalence and index offence among male and female prisoners with matched PCL-R scores

Category		Male offenders N (%)	Female offenders N (%)	χ^2
Personality	Avoidant	27 (8.9)	36 (11.7)	1.27
Disorder	Dependent	3 (1.0)	7 (2.3)	1.56
	OCPD	20 (6.6)	12 (3.9)	2.25
	Paranoid	54 (17.9)	40 (13.0)	2.80
	Schizotypal	10 (3.3)	7 (2.3)	0.61
	Schizoid	6 (2.0)	13 (4.2)	2.50
	HPD	1 (0.3)	3 (1.0)	0.96
	NPD	22 (7.3)	8 (2.6)	7.22**
	BPD	49 (16.3)	78 (25.3)	7.55**
	ASPD	172 (57.1)	156 (50.6)	2.58
	DSPD	32 (10.6)	34 (11.1)	0.03
Index offence	Homicide	9 (2.9%)	21 (6.8%)	5.04*
	Maj. Violence	85 (27.4%)	85 (27.4%)	0.00
	Min. violence	65 (21.0%)	32 (10.3%)	13.31***
	Major sex	62 (20.0%)	9 (2.3%)	44.68***
	Other sex	10 (3.2%)	3 (1.0%)	3.85*
	Kidnap	5 (1.6%)	3 (1.0%)	0.51
	False imp.	6 (1.9%)	5 (1.6%)	0.09
	Robbery	143 (46.1%)	178 (57.4%)	7.91**
	Agg. Burglary	10 (3.2%)	4 (1.3%)	2.63
	Firearm	16 (5.2%)	3 (1.0%)	9.18**
	Burglary	29 (9.4%)	16 (5.2%)	4.05*
	Theft	30 (9.7%)	23 (7.4%)	1.01
	Deception	3 (1.0%)	13 (4.2%)	6.42**
	Arson	0	4 (1.3%)	4.03*
	Crim. Dam	8 (2.6%)	4 (1.3%)	1.36
	Drug	12 (3.9%)	7 (2.3%)	1.36
	Driving	14 (4.5%)	10 (3.2%)	0.69

* $p \leq 0.05$; ** $p \leq 0.01$, *** $p \leq 0.001$

Table 9. A comparison of dimensional scores of PD and offending history among male and female prisoners with matched PCL-R scores

Category		Male offenders M ± SD	Female offenders M ± SD	F
Personality Disorder	Avoidant	1.01 ± 1.50	1.16 ± 1.72	1.31
	Dependent	0.61 ± 1.01	0.64 ± 1.28	0.12
	OCPD	1.26 ± 1.28	1.09 ± 1.16	2.97
	Paranoid	1.71 ± 1.82	1.49 ± 1.66	2.32
	Schizotypal	1.22 ± 1.39	1.11 ± 1.40	1.03
	Schizoid	0.89 ± 1.08	0.77 ± 1.21	1.60
	HPD	0.66 ± 0.96	0.39 ± 0.83	14.22***[a]
	NPD	1.44 ± 1.76	0.65 ± 1.25	40.85***[a]
	BPD	2.45 ± 2.10	2.99 ± 2.22	9.82**
	ASPD	8.21 ± 5.19	6.95 ± 4.50	10.25*[a]
Lifetime offending	Violence	2.66 ± 3.80	2.25 ± 2.67	2.34[a]
	Robbery	1.78 ± 2.50	1.77 ± 1.83	0.05[a]
	Sex	1.48 ± 6.95	1.45 ± 6.56	0.00

* $p \leq 0.05$; ** $p \leq 0.01$, *** $p \leq 0.001$

[a] indicates non-parametric test (Mann Whitney U) used to test significance.

2. Associations between psychopathy, PD, and offending history

a) Psychopathy and PD

Initial analysis of associations between PCL-R total and dimensional PD scores found that each of the 10 DSM-IV PDs were significantly associated with psychopathy overall. However, when explored according to cluster (using scores of the number of PDs in each of the three clusters as three repeated measures), it was found that only Cluster A (β (SE) = 0.28 (0.04), $p < 0.001$) and Cluster B PDs were significantly associated with PCL-R total scores (β (SE) = 0.56 (0.03), $p < 0.001$).

In line with predictions, numerous associations were observed between PCL-R *facet scores* and Cluster B PDs (see Fig.5). Firstly, *interpersonal features* of psychopathy (F1) were found to be positively associated with Narcissistic PD as expected (β (SE) = 0.37 (0.04), $p < 0.001$), as well as Histrionic (β (SE) = 0.21 (0.04), $p < 0.001$), Borderline (β (SE) = 0.24 (0.04), $p < 0.001$), and Antisocial PD (β (SE) = 0.37 (0.04), $p < 0.001$).

Affective features (F2) were found to be significantly and positively associated with Narcissistic (β (SE) = 0.34 (0.04), $p < 0.001$), Borderline (β (SE) = 0.23 (0.04), $p < 0.001$), and Antisocial PD (β (SE) = 0.31 (0.04), $p < 0.001$). Initial associations with Histrionic PD were explained by confounding with other Axis II disorders.

Lifestyle features (F3), as predicted, were strongly associated with Borderline (β (SE) = 0.43 (0.04), $p < 0.001$) and Antisocial PD (β (SE) = 0.61 (0.03), $p < 0.001$), but were also significantly associated (to a lesser degree) with Histrionic and Narcissistic traits ((β (SE) = 0.18 (0.04), $p < 0.001$) and (β (SE) = 0.31 (0.04), $p < 0.001$) respectively).

Significant associations between *antisocial features* (F4) and Cluster B PD's, on the other hand, were noted for Borderline and Antisocial PD only ((F4: (β (SE) = 0.40 (0.04), $p < 0.001$) and (β (SE) = 0.71 (0.03), $p < 0.001$) respectively).

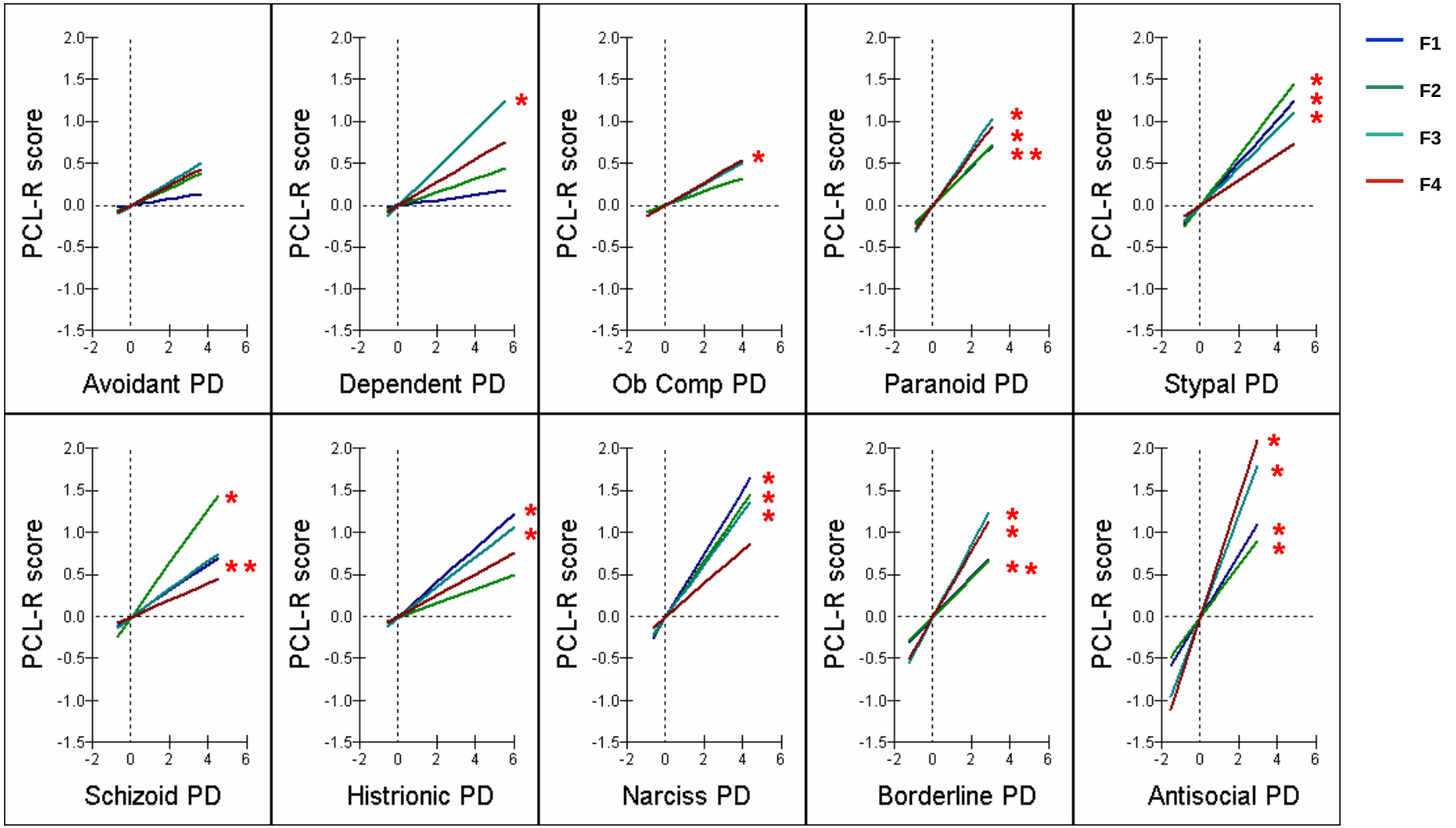
Importantly, however, personality disorders from Cluster B were not the only Axis II disorders that demonstrated strong associations with psychopathy in this sample of prisoners. Specifically, Paranoid PD was also found to be significantly associated with all four facets of psychopathy, even after controlling for potential confounding from other

variables (F1: (β (SE) = 0.23 (0.04), p < 0.001); F2: (β (SE) = 0.24 (0.04), p < 0.001); F3: (β (SE) = 0.34 (0.04), p < 0.001); and F4: (β (SE) = 0.31 (0.04), p < 0.001)).

Additionally, Schizotypal and Schizoid PD were also found to be positively associated with interpersonal ((β (SE) = 0.26 (0.04), p < 0.001) and (β (SE) = 0.16 (0.04), p < 0.001) respectively), affective ((β (SE) = 0.30 (0.04), p < 0.001) and (β (SE) = 0.23 (0.04), p < 0.001) respectively), and lifestyle psychopathic features ((β (SE) = 0.23 (0.04), p < 0.001) and (β (SE) = 0.17 (0.04), p < 0.001) respectively). However, there were no significant links to antisocial features. As predicted, Schizoid PD demonstrated the strongest links with affective features (see Fig. 5).

Two other significant associations were also noted; between interpersonal style (F1) and Obsessive compulsive PD (β (SE) = 0.13 (0.04), p < 0.001), and lifestyle features of psychopathy and Dependent PD (β (SE) = 0.23 (0.04), p < 0.001).

Figure 5. Associations between PCL-R facets and dimensional personality disorder scores



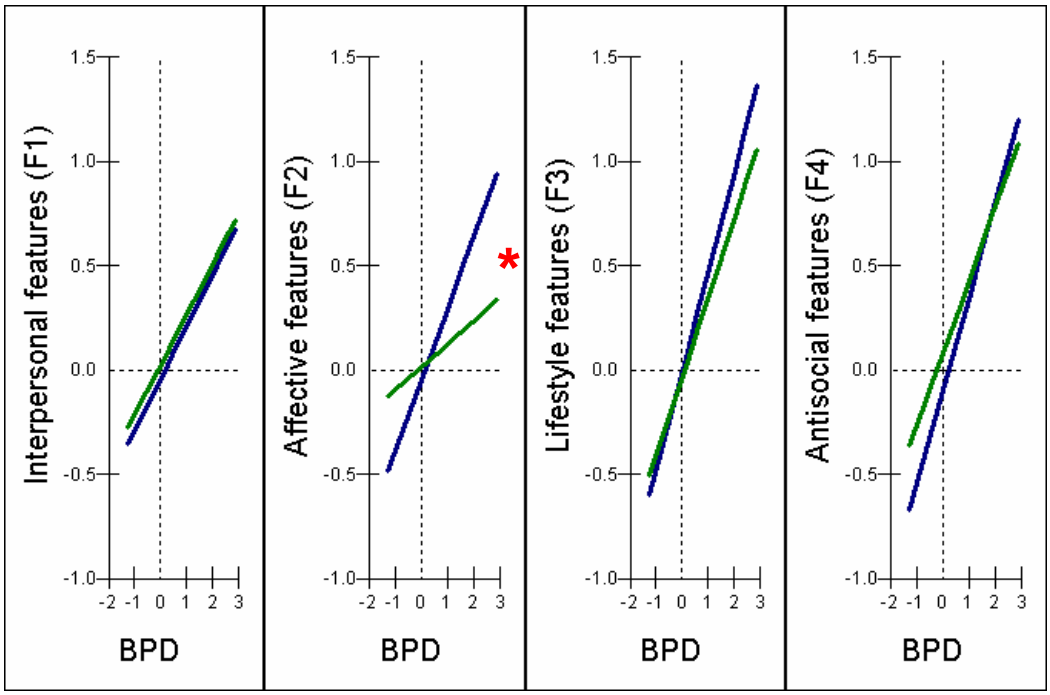
Associations between PCL-R facet and dimensional PD scores. Scores represent standardised z scores (* indicates significant association).

Gender differences

Initial analyses of associations between PCL-R total scores and PD found that male and female prisoners differed significantly in their associations between Narcissistic PD and psychopathy (β (SE) = 0.24 (0.07), $p < 0.001$) and Borderline PD and psychopathy (β (SE) = -0.18 (0.07), $p < 0.01$). When analysed independently, higher PCL-R total scores were associated with more Narcissistic PD traits in male (β (SE) = 0.58 (0.09), $p < 0.001$) and female prisoners (β (SE) = 0.27 (0.05), $p < 0.001$). However, as can be seen from the magnitude of these associations, this was to a significantly lesser extent in women. Similarly, higher PCL-R total scores were significantly associated with more Borderline PD traits in both male (β (SE) = 0.36 (0.09), $p < 0.001$) and female prisoners (β (SE) = 0.54 (0.05), $p < 0.001$), but to a greater extent in women.

Associations between certain *facets* of psychopathy and Borderline PD were also found to be significantly different among male and female prisoners. Specifically, associations between affective deficiency and Borderline PD were found to be significantly different between genders ((β (SE) = 0.23 (0.08), $p < 0.001$), see Fig. 6). When analysed independently, female prisoners with a higher number of Borderline PD traits were found to have higher scores on affective features of psychopathy (β (SE) = 0.34 (0.06), $p < 0.001$). This association was non-significant in male prisoners (β (SE) = 0.11 (0.97), $p > 0.05$). This finding was unchanged after controlling for the influence of other potential confounders.

Figure 6. Gender differences in associations between PCL-R facet scores and Borderline PD



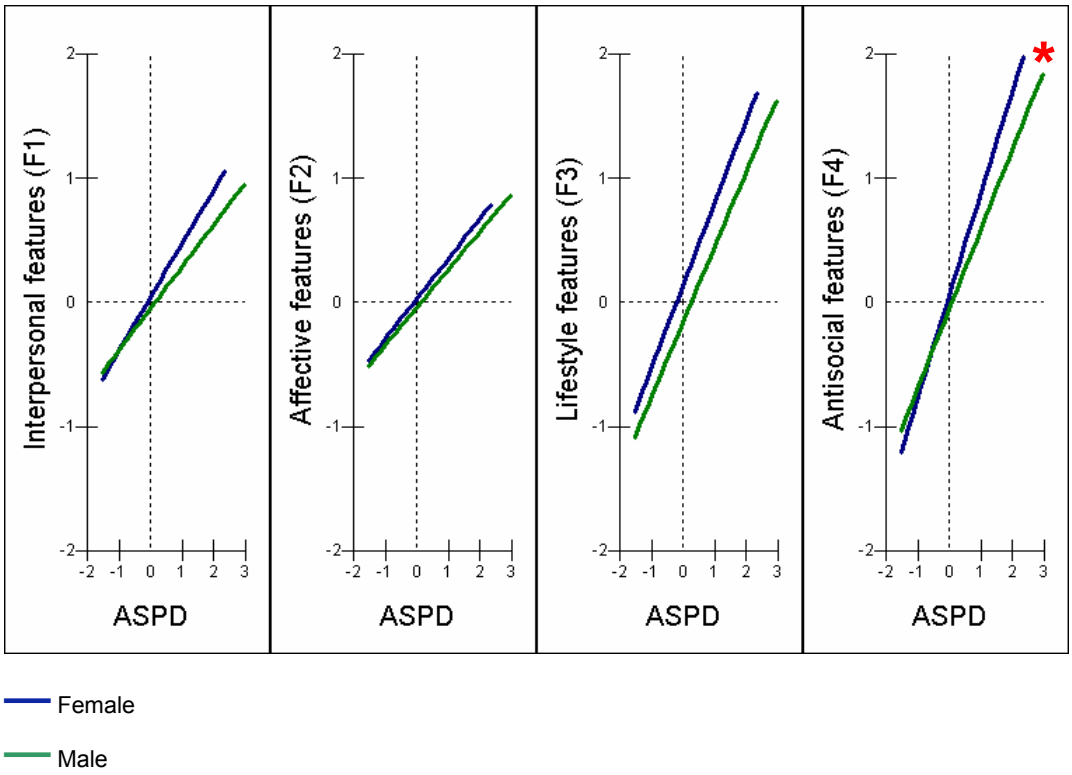
Associations between PCL-R facet and Borderline PD (BPD) scores for male and female prisoners. Scores represent standardised z scores (* indicates significant gender difference in the linear slopes).

Significant gender differences were also observed for associations between Antisocial PD and antisocial features of psychopathy (F4: β (SE) = -0.18 (0.06), $p < 0.001$, see Fig. 7). When analysed independently, it was found that these associations were significant among male (β (SE) = 0.64 (0.07), $p < 0.001$) and female (β (SE) = 0.82 (0.04), $p < 0.001$) prisoners separately. However, in contrast to previous theories of increased antisocial behaviour in male prisoners, associations among female prisoners were significantly stronger than those observed in male prisoners with equivalent levels of psychopathy. This finding was consistent when Antisocial PD was broken down and

analysed for conduct disorder and adult antisocial PD separately[11], and after controlling for the influence of other potential confounders.

Therefore, from this analysis, it appears that female prisoners with Borderline and Antisocial PD traits are more psychopathic than their male counterparts, with respect to affective and antisocial features.

Figure 7. Gender differences in associations between PCL-R facet scores and Antisocial PD



Associations between PCL-R facet and Antisocial PD (ASPD) scores for male and female prisoners. Scores represent standardised z scores (* indicates significant gender difference in the linear slopes).

b) Offending history and psychopathy and PD

As predicted, offences of *robbery* were associated with total PCL-R scores (β (SE) = 0.23 (0.04), p < 0.001), but more specifically, antisocial features of both psychopathy

[11] Association between *conduct disorder and F4*: difference between male and female prisoners = β (SE) = -0.13 (0.06), p < 0.05. Independently, female prisoners = β (SE) = 0.72 (0.05), p < 0.001; male prisoners = β (SE) = 0.59 (0.08), p < 0.001.
Association between *adult ASPD and F4:* difference between male and female prisoners = β (SE) = -0.14 (0.06), p < 0.05. Independently, female prisoners = β (SE) = 0.72 (0.05), p < 0.001; male prisoners = β (SE) = 0.59 (0.08), p < 0.001.

(F4: (β (SE) = 0.33 (0.04), $p < 0.001$) and personality disorder (ASPD: β (SE) = 0.29 (0.04), $p < 0.001$). Robbery was also significantly associated with lifestyle features of psychopathy, as predicted (F3: (β (SE) = 0.25 (0.04), $p < 0.001$)), as well as interpersonal traits (F1: β (SE) = 0.19 (0.04), $p < 0.001$)). No significant associations were noted with Borderline PD.

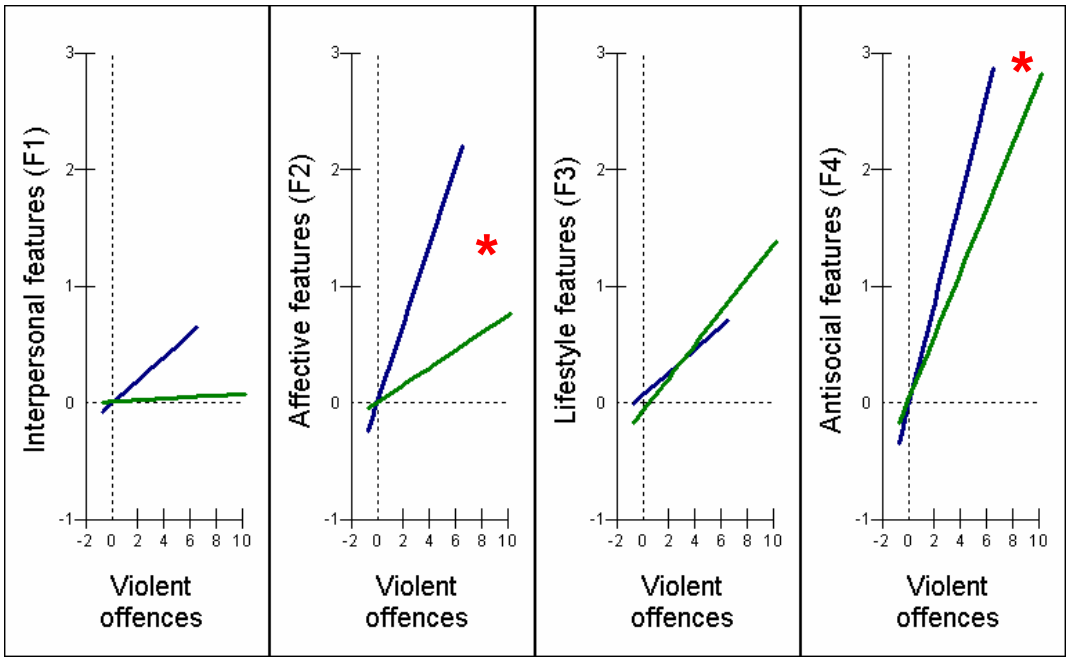
For lifetime *violent* offending, predictions of associations with total PCL-R scores (β (SE) = 0.25 (0.04), $p < 0.001$) and antisocial features of psychopathy (F4: (β (SE) = 0.33 (0.04), $p < 0.001$) were supported, but, unlike robbery, this did not extend to Antisocial PD. Instead, violent offending was significantly associated with Paranoid PD (β (SE) = 0.18 (0.09), $p < 0.05$)) and with affective features of psychopathy (F2: β (SE) = 0.16 (0.04), $p < 0.001$). As with robbery, no significant associations with Borderline PD were observed for the overall sample.

Lifetime *sexual* offending was initially found to be positively associated with interpersonal features of psychopathy (F1: (β (SE) = 0.09 (0.04), $p < 0.05$), but this association became non-significant when all the predictors were added to the model (β (SE) = 0.05 (0.04), $p > 0.05$). No other associations with sexual offending were found.

Gender differences

Male and female prisoners were found to differ markedly in the relationship of their offending history to psychopathy. Firstly, significant differences between male and female prisoners were observed for associations between *violent* offending and affective (β (SE) = -0.25 (0.08), $p < 0.01$) and antisocial psychopathy features (β (SE) = -0.17 (0.08), $p < 0.05$; see Fig. 8).

Figure 8. Gender differences in associations between PCL-R facet scores and violent offending



Associations between PCL-R facet scores and lifetime violent offending for male and female prisoners. Scores represent standardised z scores (* indicates significant gender difference in the linear slopes).

Independent analysis of the association between violence and *affective* PCL-R traits found that violent offending in women was significantly associated with greater affective deficiency (β (SE) = 0.33 (0.07), $p < 0.001$). This association was not significant in male prisoners (β (SE) = 0.07 (0.11), $p > 0.05$).

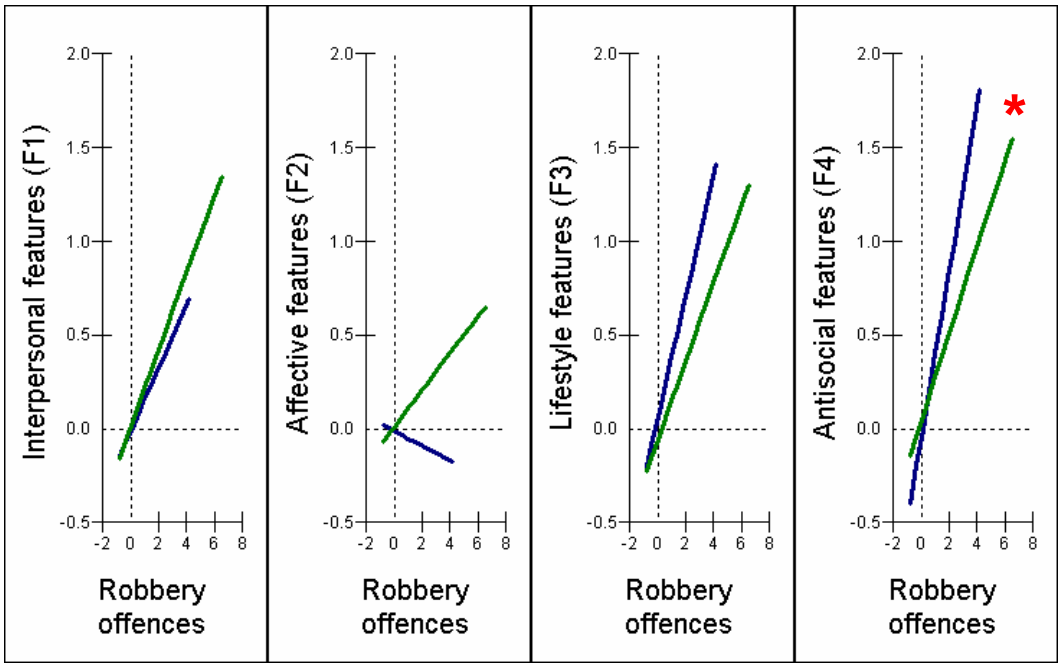
Regarding the association between violent offending and *antisocial* measures of psychopathy (F4), a significant and positive relationship was observed for *both* male (β (SE) = 0.27 (0.10), $p < 0.01$) and female prisoners (β (SE) = 0.44 (0.07), $p < 0.001$) independently. However, as can be seen from the magnitude of these associations, the gender difference reported above illustrates that the association between violent offending and antisocial psychopathy traits is significantly stronger among female prisoners. However, this gender difference was rendered non-significant after controlling for the influence of Borderline PD and Antisocial PD in the model (non-significant values = (β (SE) = -0.13 (0.08), $p > 0.05$ for BPD) and (β (SE) = -0.07 (0.06),

p > 0.05 for ASPD)). Nevertheless, independent associations for male and female prisoners remained significant[12].

In addition to violent offending, male and female prisoners differed significantly in their associations between previous offences of *robbery* and antisocial features of psychopathy (F4: β (SE) = -0.21 (0.08), p < 0.01; see Fig. 9). Similar to the above findings, a significant and positive relationship was observed for *both* male (β (SE) = 0.23 (0.10), p < 0.05) and female prisoners (β (SE) = 0.44 (0.06), p < 0.001) independently, although associations were significantly stronger among women than men. The significance of these associations remained unchanged after controlling or the influence of other potential confounders.

[12] After the addition of BPD to the model, associations between violence and F4 for female prisoners = β (SE) = 0.38 (0.07), p < 0.001; and male prisoners = β (SE) = 0.25 (0.10), p < 0.01. After the addition of ASPD to the model, associations between violence and F4 for female prisoners = β (SE) = 0.29 (0.05), p < 0.001; and male prisoners = β (SE) = 0.22 (0.08), p < 0.01.

Figure 9. Gender differences in associations between PCL-R facet scores and offences of robbery



Associations between PCL-R facet scores and lifetime offences of robbery for male and female prisoners. Scores represent standardised z scores (* indicates significant gender difference in the linear slopes).

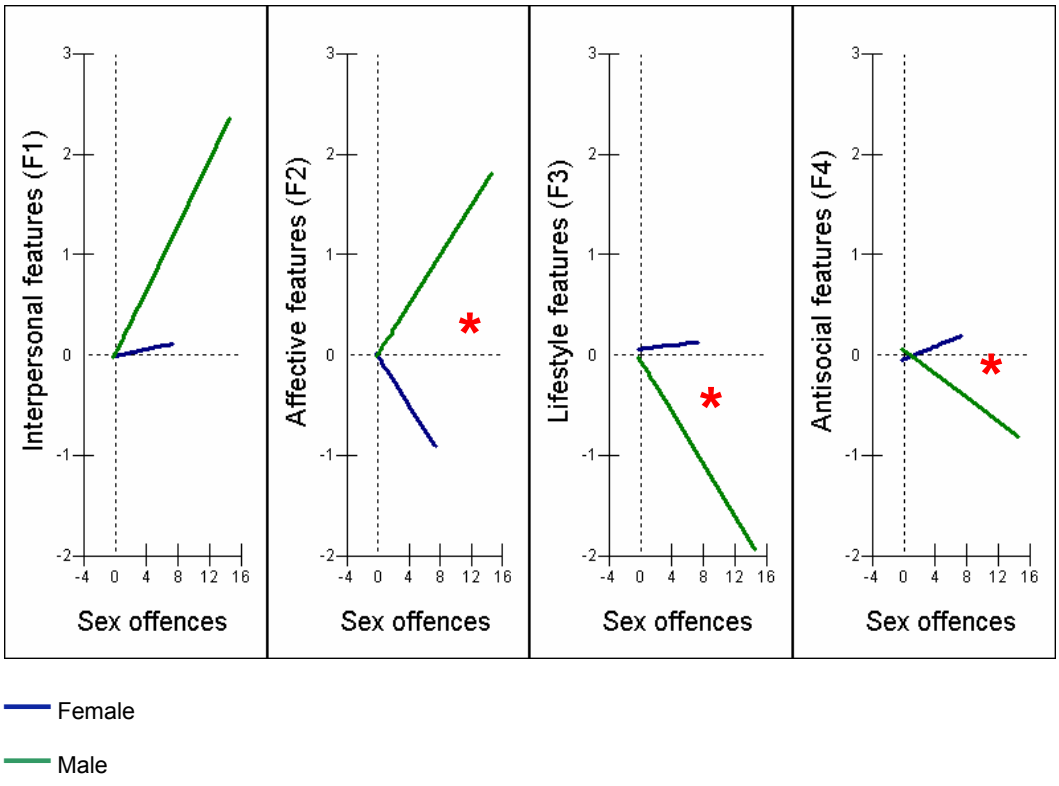
Further differences between male and female prisoners were observed for associations between a significant history of *sexual offending* and affective (F2: β (SE) = 1.35 (0.46), P < 0.01), lifestyle (F3: β (SE) = -1.14 (0.43), p < 0.01), and antisocial features of psychopathy (F4: β (SE) = -1.03 (0.43), p < 0.01); see Fig. 10). However, differences in associations with lifestyle and antisocial features were rendered non-significant after controlling for the influence of age and IQ in the model[13]. The addition of other predictors did not affect the significance of associations with affective features. Indeed, when explored independently, sexual offending in women was related to lower scores of *affective* deficiency (β (SE) = -0.93 (0.33), p < 0.01). This association was not

[13] Non-significant values = (F3: (β (SE) = -0.77 (0.42), p > 0.05) and (β (SE) = -0.94 (0.49), p > 0.05) for age and IQ respectively) and (F4: (β (SE) = -0.68 (0.42), p > 0.05) and (β (SE) = -0.79 (0.49), p > 0.05) for age and IQ respectively).

significant (β (SE) = 0.44 (0.56), p > 0.05), but in the opposite direction, for male prisoners.

Similarly, associations between a serious history of sexual offending and *lifestyle* (F3) and *antisocial* (F4) psychopathy traits were in opposite directions for male and female prisoners with equivalent PCL-R scores. Specifically, although non-significant, sexual offending was related to lower scores on lifestyle (F3: β (SE) = -0.96 (0.352), p > 0.05) and antisocial traits in men (F4: β (SE) = -0.79 (0.05), p > 0.05), but to higher scores on both these measures in women ((β (SE) = 0.18 (0.29), p > 0.05) and (β (SE) = 0.24 (0.29), p > 0.05) for lifestyle and antisocial traits respectively).

Figure 10. Gender differences in associations between PCL-R facet scores and sexual offending



Associations between PCL-R facet scores and lifetime sexual offending for male and female prisoners. Scores represent standardised z scores (* indicates significant gender difference in the linear slopes).

Discussion

Overall, the results from the current study highlight important differences in prevalence rates of PD and offending behaviour between male and female prisoners with equivalent levels of psychopathy. They also illustrate a high degree of comorbidity between psychopathy and PD (particularly with Cluster B PD's) and emphasize the specificity of some PD characteristics to individual traits of psychopathy and offending behaviour in the sample as a whole, which in some cases is further specified between genders.

Specifically, from the sample as a whole, psychopathic features demonstrated wide-ranging associations with both Cluster A and Cluster B PDs. As predicted (and in support of the findings of Hildebrand & Ruiter, 2004 and Logan & Blackburn, 2009), *interpersonal features* of psychopathy (F1) were positively associated with Narcissistic PD. However, significant associations were also observed for the other Axis II disorders in Cluster B (i.e. Histrionic, Borderline, and Antisocial PD), and Cluster A (i.e. Paranoid, Schizotypal, and Schizoid PD). Regarding offending history, interpersonal features of psychopathy were significantly associated with a serious history of robbery. Expected associations with sexual offending were not supported.

Affective features of psychopathy were significantly associated with Schizoid PD traits and violent offending, thus supporting recent work by Coid and colleagues (2006). However, significant associations were also noted for Narcissistic, Borderline, Antisocial, and Paranoid, and Schizotypal PD. Comparable associations were observed for *lifestyle features* of psychopathy, and so were not specific to Borderline and Antisocial PD. Lifestyle traits were additionally positively associated with previous offences of violence and robbery.

However, Paranoid, Borderline, and Antisocial were the only PD categories that were specifically associated with *antisocial features* of psychopathy (F4), and thus reflect the multi-faceted nature of psychopathy in its entirety. Antisocial psychopathy traits were also associated with a serious history of violent and robbery offences. Thus, these findings also support those of Coid et al (2006) who reported strong links between antisocial features of psychopathy, Borderline and Antisocial PD, and robbery.

Overall, these findings illustrate the diversity of associations between PCL-R traits, Axis II PDs, and offending behaviour, and highlight that associations in prisoners with psychopathic features are not limited to PDs from Cluster B in a UK sentenced population.

Gender differences

When exploring gender-specific differences in associations between psychopathy, PD, and criminal history, it was found that male and female prisoners exhibited numerous differences. These differences cannot be accounted for by varying levels of psychopathy among male and female prisoners (previously reported in other studies), as both groups were matched on PCL-R total and facet scores. Therefore, these findings may be important to appraise when considering treatment planning and efficacy in services where male and female prisoners have similar scores on the PCL-R (e.g. DSPD services).

Specifically, female prisoners with Borderline and Antisocial PD traits (and those with a serious history of violence) presented with more problematic affective and antisocial features of psychopathy. This offers partial support to the findings of Warren and colleagues (2003) who hypothesized that psychopathy in women was more strongly related to Borderline PD than in men, and to Kennealy et al (2007) who reported strong associations between Antisocial PD and psychopathy in women. In addition, these findings raise questions on the adequacy of the PCL-R in measuring psychopathy in women, particularly in relation to affective (F2) antisocial traits (F4). Since both male and female prisoners were matched on PCL-R scores, and were equivalent on Antisocial PD prevalence, there should be no observed difference in associations between the two. However, the presented findings illustrate that female prisoners scoring highly on antisocial traits of the PCL-R have a more serious history of robbery offences and are significantly more antisocial (as measured by the SCID-II) than male prisoners with equivalent scores. Likewise, female prisoners scoring highly on affective features of psychopathy (F2) have a significantly more violent history and present with more Borderline PD traits than their male equivalents (though the increased prevalence in Borderline PD in female prisoners needs to be taken into account).

Gender differences were also evident in relation to associations between psychopathy and sexual offending. In particular, in male prisoners, a more prolific history of sexual offending was shown to be related to more pronounced affective deficits, but lower levels of impulsivity and antisocial behaviour, in comparison to female prisoners. In contrast, these associations were in the opposite direction in women. Again, it is important to note that these differences are not reflective of, or indeed a consequence of differing psychopathy scores, as both groups were matched on this measure. Therefore, although there is little previous information on the nature of sexual offending among women, this analysis indicates that treatment plans specific to sexual offending may benefit from being tailored more towards challenging and developing interpersonal and empathy deficits among men, in contrast to more impulsive and irresponsible treatment needs among women.

Nevertheless, there are some important limitations to acknowledge. Specifically, due to the sampling frame (see Chapter 2 for more details), male prisoners with a current conviction of a sexual offence and a higher level of risk (as measured by the OGRS) were selected. This was not the case in the female prisoner sample. Therefore, although matched for psychopathy, age, and IQ, differences observed in the prevalence of sexual offending may be due to the difference in the sampling frame between genders. Additionally, the equivalent prevalence in lifetime sexual offending across gender may be due to a misrepresentation from the file information available (see limitations of Chapter 3). The potential confounding effect of differing OGRS scores on associations between psychopathy and offending behaviour is less likely, due to the fact that it was partly controlled for by the inclusion of predictors such as age (which form part of the OGRS), and that generally, stronger associations were observed in the female sample. However, this may indicate that gender differences in associations between psychopathy and offending behaviour are underestimated in the current a sample, and may be further pronounced in male and female prisoners with equivalent OGRS scores.

Clinical implications

The current findings are important to consider, both for the purpose of deciding management strategies, and when attempting to deliver effective treatment interventions for male and female sentenced prisoners in England and Wales. This

chapter has highlighted the high rate of co-morbidity between psychopathy and Axis II personality disorders among both male and female prisoners with equivalent scores on the PCL-R. It has further reinforced the need for treatment interventions, relapse prevention plans, and day-to-day management strategies to be mindful and responsive of such differences in order to maximise the efficiency of such methods. Female prisoners may benefit from extended work on empathy and perspective taking as part of a preventative strategy for violent recidivism, whereas their male counterparts may not require this intervention to the same degree. This is particularly pertinent to services for men and women with equivalent risk as measured by the PCL-R, such as that of DSPD services (though as previously mentioned, the use of the PCL-R to measure specific traits in women may need revision). In the next chapter, these findings will be extended to consider the impact of neuropsychological functioning on the psychopathological presentation of male and female prisoners who may fall within the remit of such services.

Chapter 5: Gender differences in performance of neuropsychological tests among male and female prisoners in England and Wales

Chapter aims:

1. To explore gender differences in performance on neurocognitive measures; and
2. To conduct an exploratory analysis of how neurocognitive functioning varies according to the severity and complexity of psychopathological features.

Individuals with psychopathy and severe PD have been found to exhibit deficits on neuropsychological tests of response inhibition (LaPierre, Braun, & Hodgins, 1995), decision-making (Mitchell et al, 2002), emotional processing (Patrick et al, 1993; Blair et al, 2004; Iria & Barbosa, 2009), and recall and recognition memory (Kurtz & Morey, 1999; Kirkpatrick et al, 2007), which in turn, is thought to be linked to impaired functioning in frontal and limbic structures. Gender differences have been observed in control samples on measures of facial emotion recognition, with women performing more accurately in their recognition of negative emotions (Miura, 1993), and emotions more generally (Thayer & Johnson, 2000). Women from control and psychopathic samples have also been found to exhibit less risky behaviour than males on measures of risky decision-making (e.g. Vitale & Newman, 2001; Hunt et al, 2005).

Since research with female participants within a forensic setting is scarce, making firm predictions is difficult. Nevertheless, the evidence available at the current time suggests that female prisoners would perform more accurately on tests of emotion recognition, and be less impulsive and less risky than their male counterparts on measures of reflective-impulsivity and decision-making. It was also predicted that prisoners with more complex psychopathology (as measured by the DSPD criteria) would show a greater impairment on neuropsychological measures.

Participants

Included in the total matched sample of 310 male and 310 female prisoners were 42 men and 42 women defined as having a neurological deficit (either a possible learning disability (as indicated by a WASI score of less than 70), a history of epilepsy, or previous comatose illness associated with a head injury). These prisoners were excluded from the neuropsychological analyses, as described in Chapter 2.

The remaining 268 male and 268 female prisoners were still matched on age (F (1, 534) = 0.10, p = 0.755), and on scores of psychopathy (F (1, 534) = 0.13, p = 0.717) and IQ (see Table 10; F (1, 444) = 0.03, p = 0.871). They did, however, exhibit significant variation in the prevalence of Axis I disorders between genders. Specifically, a greater number of female prisoners were diagnosed with current depression (χ^2 = 6.42, p ≤ 0.01), psychosis in the last year (χ^2 = 26.34, p < 0.001), alcohol (χ^2 = 10.63, p ≤ 0.001) and drug dependence (χ^2 = 21.13, p < 0.001).

Table 10. Matched measures for male and female prisoners in neuropsychological sample

Measure	Male prisoners (Mean ± S.E.)	Female prisoners (Mean ± S.E.)
Age	28.33 ± 0.53	28.09 ± 0.53
IQ	91.29 ± 0.81	91.11 ± 0.81
PCL-R total	16.22 ± 0.45	16.45 ± 0.45
PCL-R Facet 1	2.12 ± 0.12	2.11 ± 0.11
PCL-R Facet 2	2.99 ± 0.14	2.88 ± 0.13
PCL-R Facet 3	4.52 ± 0.15	4.83 ± 0.14
PCL-R Facet 4	5.34 ± 0.18	5.13 ± 0.18

A comparison of mean scores (± standard errors) for male and female prisoners.

Thus, 536 prisoners were entered into the analyses of gender differences (though varying numbers of men and women completed each neuropsychological measure – detailed in results tables).

Measures

The Buss-Perry, STAXI, and HADS (raw scores) were used as state and trait measures of affect and anger (see Chapter 2 for full description of psychometric and neuropsychological test instruments). The Camden Memory test was used as a measure of recognition memory (scored as the number of faces/words out of 24 correctly identified). The MFFT was employed to assess reflective-impulsivity (calculated from the number of errors divided by reaction time, standardised as z-scores), thus, the more positive the value, the more impulsive and less accurate the participant's behaviour.

The emotion recognition task examined accuracy of identifying facial expressions of emotion at 10 intensities (expressed as transformed scores of proportions). In addition to accuracy, a signal detection analysis (see Grimshaw et al, 2004) was applied to investigate prisoners' abilities to recognise an emotional signal (expressed as Pr), and correctly label each emotion (expressed as Br). Pr was calculated as: (Number of correct responses / Number of targets) / (Number of false alarm responses / Number of distractors). Br was calculated as: (Number of false alarm responses / Number of distractors) / 1-Pr). Higher values of Pr indicated sensitivity to emotional experiences while higher values of Br indicated a tendency to label an emotion in a certain way.

The IGT was used as a measure of emotional decision-making, with the score reflecting the number of times risky or safe decks were chosen over the course of quartiles of 25 plays (expressed as transformed scores of proportions).

Statistical analyses

Male and female state and trait scores, recognition memory scores, and reflective-impulsivity scores were analysed using either a one-way analysis of variance (ANOVA), using gender as the between subject factor, or a Mann-Whitney U test for two independent samples (non-parametric equivalent) where assumptions of homogeneity of variance were not met. Significance levels were set at $p \leq 0.05$ for all tests.

Proportion scores from the emotion recognition and IGT were transformed using the arcsine transformation, as is necessary wherever the variance is proportional to the mean (Howell, 1997, pg 328). Pr and Br emotion scores were analysed using a one-way analysis of variance (ANOVA). Accuracy of emotion recognition over 10 levels of intensity was analysed with a repeated measures ANOVA, using gender as the between-subjects factor.

Similarly, IGT performance was assessed in 2 ways; firstly, with a one-way ANOVA to examine gender differences in scores calculated for the number of times risky decks (C+D – A+B) and decks with infrequent punishment (B+D – A+C) were chosen; and secondly with a multi-factorial repeated measures ANOVA, using deck (A, B, C, and D) and quartile (1^{st}, 2^{nd}, 3^{rd}, and 4^{th}) as the within-subjects factor, and gender as the

between subject variable. Supplementary analyses were conducted for individual decks separately, over the 4 sets of quartiles (keeping gender as the between-subjects factor). Greenhouse–Geisser corrections were applied where assumptions of sphericity were not met.

Following this, each ANOVA was re-run with the addition of several covariates: variables found to differ between male and female samples. These included measures of mood, personality, and demography which, in themselves, may account for some of the variance in these tests. Testing the effects of a covariate likely to differ between two groups a priori can be problematic since its effects on the dependent measure(s) can be quite different between groups (Miller & Chapman, 2001). However, I confined this part of the analysis to explore a selection of additional variables, such as trait anger, which were found to differ significantly between male and female prisoners and might have made a difference to the magnitude of between-group effects.

Results

a) *Psychometric measures of state and trait affect and aggression*

Female prisoners reported increased anger ($F(1, 445) = 5.44$, $p < 0.05$) and hostility ($F(1, 443) = 7.09$; $p < 0.01$), as measured by the Buss-Perry, compared to male prisoners (see Table 10). They also scored higher than their male counterparts on trait measures of reactive anger ($z = -2.16$; $p < 0.05$); though an increase in trait anger overall was not quite significant ($z = -1.27$; $p = 0.07$; see Table 11).

Table 11. Gender differences on trait psychometric tests of trait anger (STAXI) and aggression (Buss-Perry)

Measure		Male	Female
BP: Total ¹	**M** ± SE	74.14 ± 1.42	75.99 ± 1.47
	(N)	(216)	(228)
BP: Physical ¹	**M** ± SE	25.70 ± 0.61	24.44 ± 0.55
	(N)	(218)	(228)
BP: Verbal ¹	**M** ± SE	14.60 ± 0.29	14.60 ± 0.28
	(N)	(219)	(228)
BP: Anger ¹	**M** ± SE	16.30 ± 0.41	17.68 ± 0.42**
	(N)	(219)	(228)
BP: Hostility ¹	**M** ± SE	17.48 ± 0.40	19.19 ± 0.50**
	(N)	(217)	(228)
STAXI-T ²	**M** ± SE	17.63 ± 0.36	19.02 ± 0.44
	(N)	(236)	(250)
STAXI-T/T ²	**M** ± SE	6.88 ± 0.18	7.39 ± 0.21
	(N)	(236)	(250)
STAXI-T/R ²	**M** ± SE	7.03 ± 0.16	7.64 ± 0.18*
	(N)	(236)	(250)

¹ = One-way AVOVA; ² = Mann-Whitney U./ * $p \leq 0.05$; ** $p \leq 0.01$

Female prisoners also scored higher than their male counterparts on state measures of anxiety ($z = -4.54$, $p < 0.001$) and depression ($z = -3.46$, $p < 0.001$; see Table 12).

Table 12. Gender differences on state measures of mood (HADS) and anger (STAXI)

Measure		Male	Female
STAXI: S ²	M ± SE	11.26 ± 0.22	11.63 ± 0.29
	(N)	(236)	(250)
HADS: Depression ²	M ± SE	3.82 ± 0.19	4.92 ± 0.22***
	(N)	(241)	(253)
HADS: Anxiety ²	M ± SE	5.96 ± 0.24	7.57 ± 0.26***
	(N)	(241)	(254)

² = Mann-Whitney U / *** p ≤ 0.001

b) Neuropsychological measures

i) Recognition memory and reflective-impulsivity

Female prisoners were worse than males at recognising faces in the Camden Memory Test ($z = 2.34$, $p < 0.05$; see Table 13) and were more impulsive on measures of reflective-impulsivity ($F(1, 372) = 16.09$, $p < 0.001$).

Table 13. Gender differences on measures of memory (Camden) and reflective-impulsivity (MFFT)

Measure		Male	Female
CAMDEN: Words ²	M ± SE	0.96 ± 0.01	0.96 ± 0.01
	(N)	(167)	(202)
CAMDEN: Faces ²	M ± SE	0.96 ± 0.00	0.95 ± 0.00*
	(N)	(166)	(202)
MFFT ¹	M ± SE	-0.21 ± 0.05	0.20 ± 0.09***
	(N)	(183)	(191)

¹ = One-way AVOVA; ² = Mann-Whitney U./ * p ≤ 0.05; *** p ≤ 0.001

ii) Emotion recognition

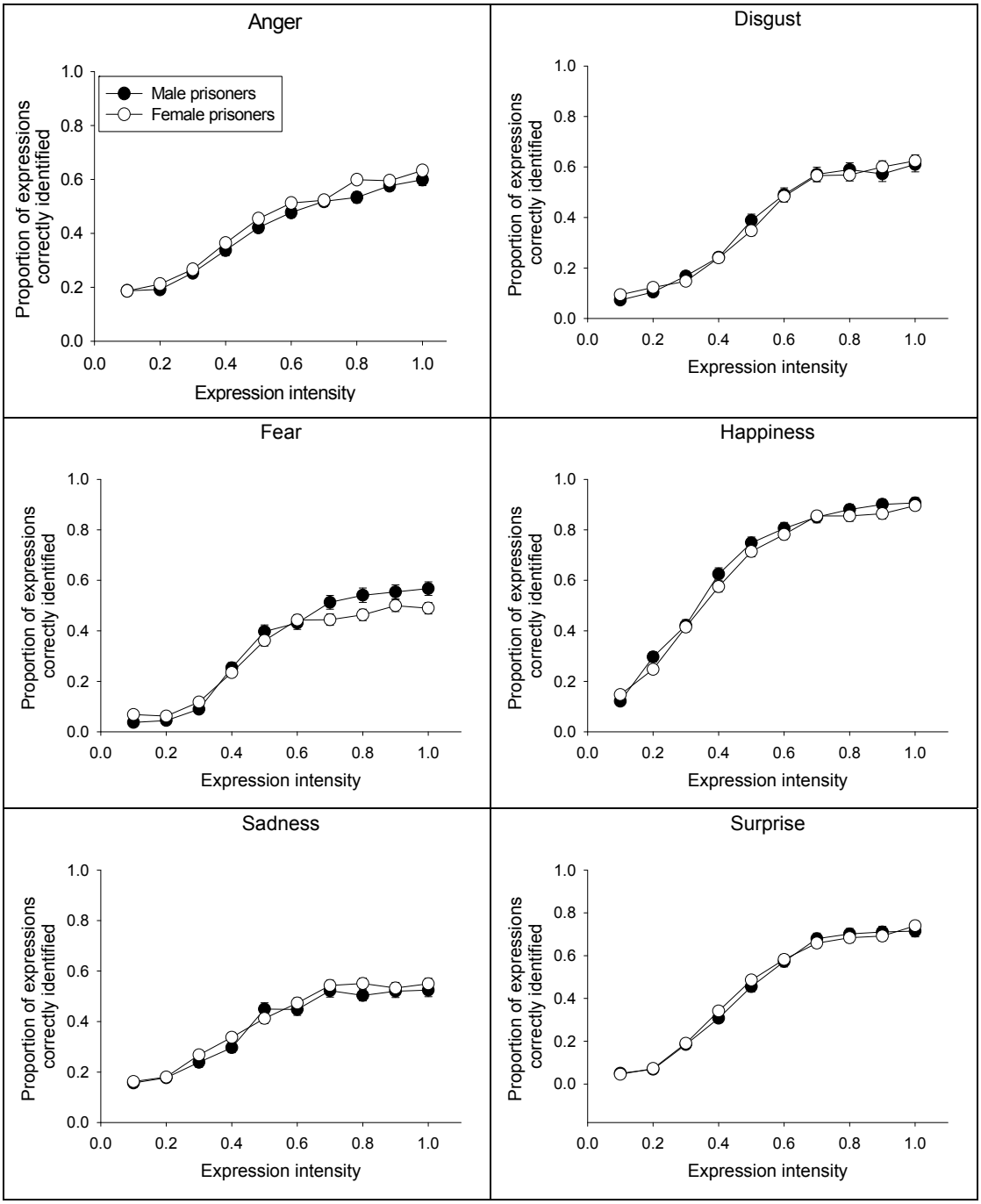
Both male and female prisoners were poor at recognising emotional expressions of others, even at high intensities (see Fig. 11). This was particularly the case for emotions of anger, disgust, fear, and sadness, where only 0.6 of emotional expressions presented at 100% intensity were correctly identified. Female prisoners in particular were less accurate than their male counterparts in the recognition of more fearful expressions, reflected in a significant two way interaction between gender and intensity of expression for fear recognition ($F(1, 5)$ [14] $= 3.07$, $p < 0.01$). Tests of the simple effects showed that the female prisoners were significantly poorer at recognising fear at the higher intensities of 70%, 80%, and100% (F values $(1, 329) > 4.39$, p values < 0.05; see Fig. 11). Conversely, female prisoners tended to be better at identifying facial expressions of anger than males ($F(1, 329) = 3.20$, $p = 0.08$).

Signal detection analysis.

Women were significantly more sensitive than men to signals (Pr) of anger ($F(1, 323) = 4.31$, $p < 0.05$) and sadness ($F(1, 323) = 4.00$, $p < 0.05$; see Fig. 12a). They also tended to be more sensitive to signals of surprise ($F(1, 323) = 3.68$, $p = 0.056$). However, female prisoners were significantly less sensitive than males to signals of fear ($F(1, 323) = 4.34$, $p < 0.05$; see Figure 2a). Females were also less likely than men to label (Br) expressions of disgust ($F(1, 323) = 4.71$, $p < 0.05$; Fig. 12b).

[14] Degrees of freedom adjusted using the Greenhouse-Geisser test, as the assumption of sphericity was not met

Figure 11. Gender differences in emotion recognition



Proportion of expressions correctly identified at each emotional intensity for male (n = 134) and female (n = 197) prisoners.

Figure 12a. Gender differences in detecting emotional signal (Pr)

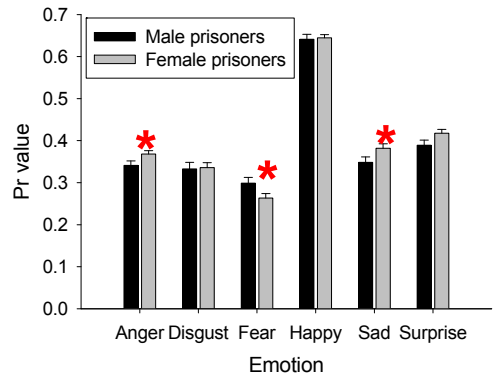
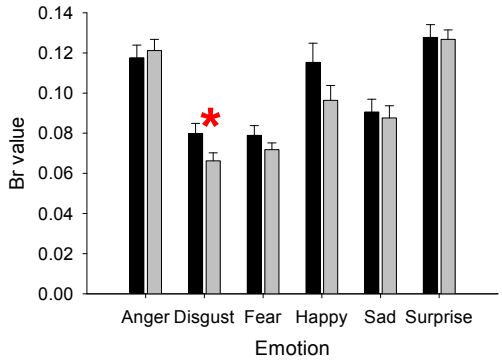


Figure 12b. Gender differences in labelling emotional expression (Br)



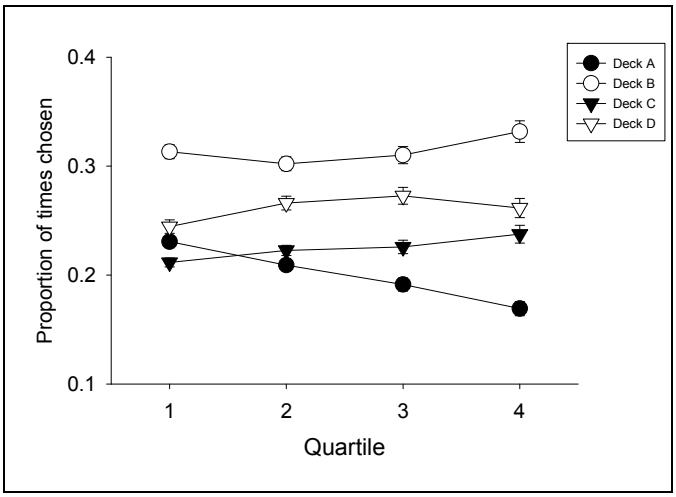
Signal detection and labelling scores for male and female prisoners. The higher the value, the more sensitive the individual to the emotion (Pr) and the more likely they are to label it correctly (Br). * indicates significant gender difference.

Decision-making

A significant two way, within-subjects interaction of deck x trial ($F(1, 7) = 8.94$, $p < 0.001$) found that, over the course of the task, prisoners made more selections from Decks B and D compared to Decks A and C (see Fig. 13). Thus, prisoners tended to choose the decks with infrequent, larger punishments rather than the decks with frequent, smaller punishments, regardless of the level of reward/ punishment.

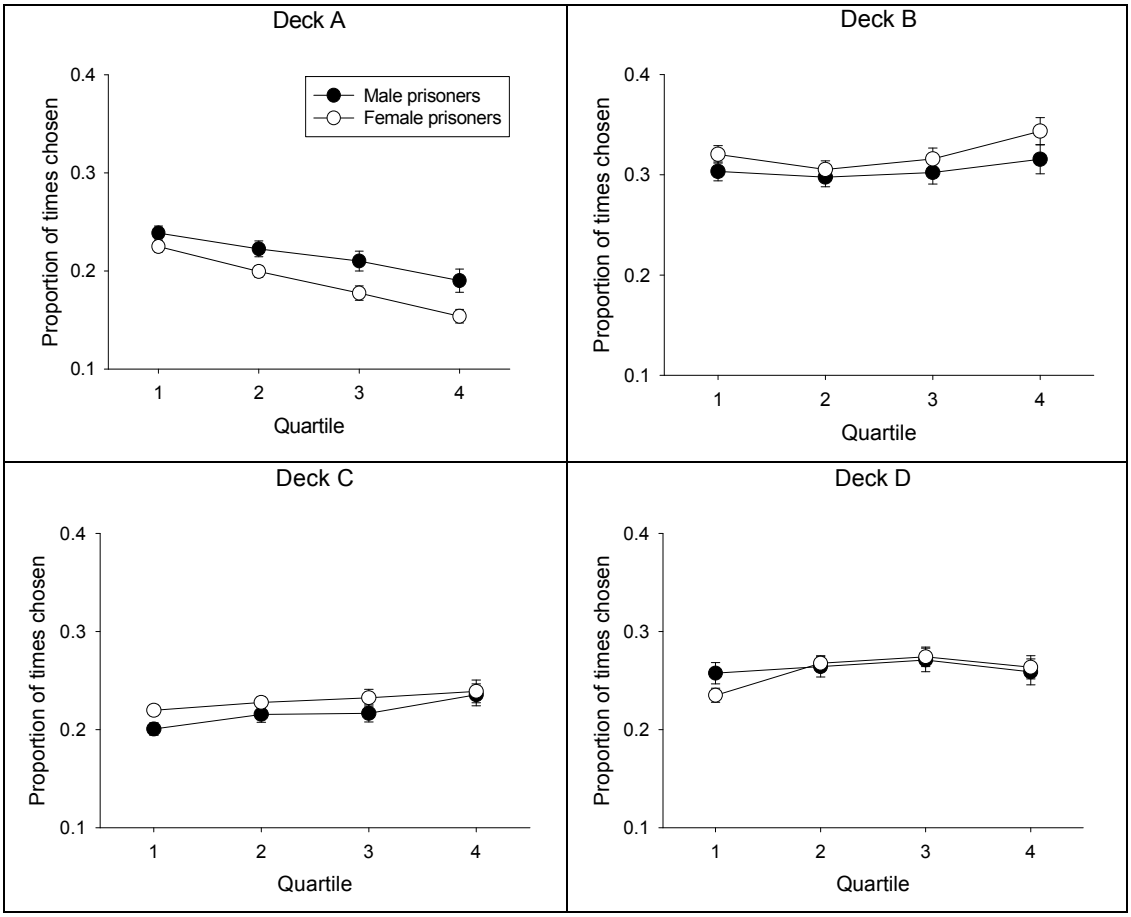
There were no gender differences in overall scores of quality of decision-making (C+D – A+B), or frequency of punishment (B+D – A+C): over the 4 quartiles. However, male and female prisoners did differ significantly in their patterns of selection from the 4 decks, as indicated by a significant two way, within subjects interaction of deck x gender ($F(1, 3) = 3.23$, $p < 0.05$). Analysis of the individual decks showed that this interaction was specific to Deck A, with male prisoners choosing this more frequently over the course of the task than female prisoners ($F(1, 333) = 7.72$, $p < 0.01$; see Fig 14).

Figure 13. Proportion scores for each deck chosen over the 4 quartiles



Proportion scores for Decks A, B, C, & D at each quartile of 25 trials, for male and female prisoners.

Figure 14. Gender comparison of proportion scores for decks A, B, C, and D



Gender comparison of proportion scores (number of times chosen) for each deck of cards individually, at each quartile, for male (n = 142) and female (n = 193) prisoners.

Influence of covariates on between-gender differences

a) Emotion recognition

Variables found to differ significantly between genders[15] had only marginal effects on the between-group statistics when entered into the analyses as covariates. Indeed, the largest difference in F value was observed when Buss-Perry scores of hostility were added to the analysis showing that female prisoners were worse at correctly labelling facial expressions of disgust (changing from: ($F(1, 323) = 4.71$, $p < 0.05$) to ($F(1, 300) = 1.98$, $p = 0.16$).

b) Decision making

None of the added covariates had any effect on the observation that female prisoners chose Deck A less often than their male counterparts.

Differences between DSPD and non-DSPD prisoners

In addition to between-group differences in gender, a preliminary analysis of the neuropsychological function in prisoners likely to satisfy criteria for DSPD compared to those not likely to satisfy criteria was also conducted. As the numbers between DSPD and non-DSPD prisoners were very unequal (e.g. DSPD = 23 Vs non-DSPD = 216 on male HADS depression scores), I compared the performance of the DSPD prisoners in terms of the 95% confidence interval (C.I.) around the performance scores of the non-DSPD prisoners for male and female prisoners (see Table 14). I also compared male and female DSPD prisoners by way of ANOVAs with gender as a single between-subject factor and, where appropriate, intensity as a within-subject factor.

[15] HADS, STAXI:T/R, Buss-Perry Anger & Hostility, Borderline and Narcissistic PD prevalence, current medication, and childhood trauma.

Table 14. A comparison of scores of psychometric and neurocognitive measures for DSPD prisoners against the 95% confidence interval of non-DSPD prisoners

Measure	MALE PRISONERS		% above C.I. of non-DSPD prisoners	FEMALE PRISONERS		% above C.I. of non-DSPD prisoners
	Mean	95% C.I.		Mean	95% C.I.	
HADS depression	4.65	3.20 – 6.10	48%	6.48*	5.32 – 7.64	55%
HADS anxiety	8.48*	7.04 – 9.91	65%	9.97*	8.71 – 11.23	74%
STAXI:T	22.18*	19.89 – 24.48	77%	25.71*	22.62 – 28.80	74%
STAXI:T/T	9.09*	7.77 – 10.41	68%	10.39*	8.83 – 11.95	65%
STAXI:T/R	8.23*	7.08 – 9.37	64%	9.68*	8.39 – 10.96	61%
BP: Physical	34.32*	31.22 – 37.41	89%	31.54*	28.79 – 34.28	79%
BP: Verbal	16.68*	14.64 – 18.73	68%	16.93*	15.29 – 18.57	68%
BP: Anger	20.84*	17.86 – 23.82	68%	23.14*	20.87 – 25.42	79%
BP: Hostility	21.06*	18.22 – 23.89	67%	24.25*	21.35 – 27.15	68%
Fear accuracy	0.33	0.26 – 0.40	50%[b]	0.21*	0.13 – 0.29	71%[b]
Sadness accuracy	0.40	0.32 – 0.48	42%[b]	0.39*	0.28 – 0.51	62%[b]

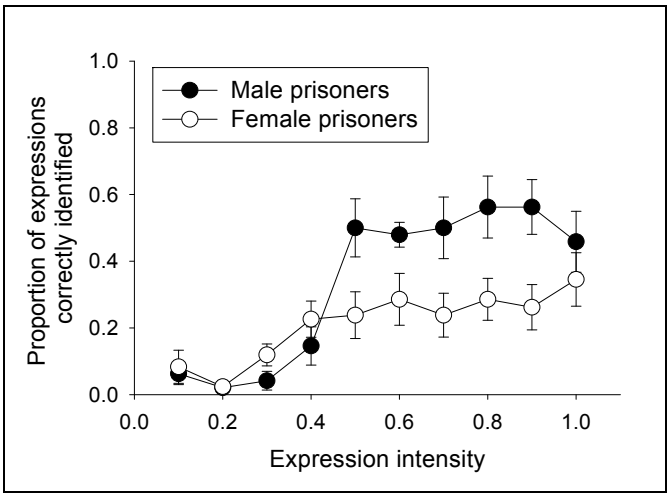
Emotion recognition scores expressed as proportions. All other scores are raw scores
* = indicated as being significantly different on ANOVA. [b] = below C.I. of non-DSPD prisoners, as lower scores on this measure indicate worse performance

Table 14 shows that male prisoners likely to meet criteria for DSPD scored more severely on trait measures of anger and aggression, and state measures of anxiety, than non-DSPD male prisoners. Female prisoners likely to satisfy DSPD criteria also had a greater degree of severity on these measures than their non-DSPD equivalents. However, female DSPD prisoners exhibited further impairment on neuropsychological measures of emotion recognition (for certain emotional expressions) and state measures of depression. No differences between DSPD and non-DSPD prisoners (male or female) were observed for measures of reflective-impulsivity, decision making, or recognition memory. However, it is important to note that these analyses are only preliminary and tentative, and that associations between neuropsychological function and severity of psychopathology will be explored more accurately and reliably in Chapter 6.

Gender differences in psychopathic and DSPD groups on neuropsychological measures

Specific differences between male and female DSPD prisoners on the measures previously discussed were examined. Female DSPD prisoners were found to be significantly more depressed than male DSPD prisoners (as measured by the HADS; $F(1, 52) = 4.21$, $p < 0.05$). Females were also worse than males in correctly identifying facial expressions of fear. This was identified in both a significant within-subjects and between-subjects interaction between gender and intensity of expression; $F(1, 5)$[16] $= 3.75$, $p \leq 0.01$; and $F(1, 31) = 4.44$, $p < 0.05$ respectively) (see Fig. 15). No other significant differences between male and female DSPD prisoners were noted.

Figure 15. Gender differences in DSPD prisoners on measures of fear recognition



Proportion of expressions correctly identified at each emotional intensity for male (n = 12) and female (n = 21) DSPD prisoners.

[16] degrees of freedom adjusted using the Greenhouse-Geisser F test, as the assumption of sphericity was not met

Discussion

Overall, female prisoners scored higher than their male counterparts on trait and state measures of anxiety, depression, and anger. This is consistent with previous research (e.g. Boothby & Durham, 1999; Suter et al, 2002; Blanchette & Brown, 2006). Female prisoners were also more impaired on recognition memory tasks involving faces, and were more impulsive than male prisoners on measures assessing reflective-impulsivity. Additionally, females exhibited a marked impairment in their ability to recognise facial expressions of fear (particularly at high intensities and in DSPD samples), and were more sensitive than males to emotional signals of threat. However, female prisoners made less risky choices on the decision making task (indicating that this deficit is not universal). Therefore, the current findings are contrary to previous studies reporting less impulsive behaviour and enhanced emotion recognition in women using non-forensic samples (Thayer & Johnsen, 2000), but are supportive of reports of enhanced risky choice in men (Hunt et al, 2005). These differences cannot be explained by varying degrees of psychopathy, age, or IQ, as male and female prisoners were matched on these measures.

It is important to acknowledge that the current sample is very specific, thus making it difficult to draw direct comparisons with other literature (particularly neuropsychological research). Nevertheless, the sample is very salient in terms of increasing knowledge and evidence base for services for prisoners with a high level of risk and complex psychopathology, such as DSPD. It is particularly useful in highlighting important differences between men and women with a comparable level of risk and need in how they perceive emotion in others.

Further limitations of the current analysis are that the two groups of male and female prisoners differed in several other ways that may have influenced cognitive function. Female prisoners had a significantly higher prevalence of Axis I disorders, depressive symptomology (as measured by the HADS), Borderline PD, and childhood trauma. These variables have been shown, in some cases, to negatively impact upon neuropsychological performance (Bazanis et al, 2002; Martínez-Arán et al, 2004; Brüne, 2005; Gohier et al (in press); Minzenberg, Poole, & Vinogradov, 2008; Haaland, Esperaas, & Landrø, 2009); particularly emotion recognition (Addington et al, 2008; Vernet, Baudouin, & Franck, 2008). Therefore, it is possible that they had a detrimental

effect on performance in the female prisoner sample. The influence of some of these variables will be explored more thoroughly in the following chapter.

Clinical and neuropsychological implications

Historically, prisoners have been found to present with pronounced levels of anxiety, depression, anger, impulsivity, and aggression (Eyestone & Howell, 1994; Fazel & Danesh, 2002; Corapcioğlu & Erdoğan, 2004; Daoust et al, 2006; Ireland, Archer, & Power, 2007; Allnutt et al, 2008; Fritz et al, 2008). The current study would appear to corroborate such findings, particularly with reference to female prisoner samples, thus highlighting the importance of dedicated mental health teams within forensic establishments, particularly those specific to women.

Both male and female prisoners displayed marked impairment in their ability to accurately identify emotional expressions (even at high intensities). This deficit was more pronounced in female prisoners (particularly those meeting the criteria for DSPD). In particular, female prisoners were severely impaired in their ability to detect fear in others, to a significantly greater extent than male prisoners. Female prisoners were also more sensitive to emotional signals of anger and sadness, and impaired in their ability to accurately label emotions of disgust, compared with their male counterparts.

These findings may have important clinical implications for improving awareness of the fearful impact of crime on victims and managing emotional reactions to threat signals in others, particularly in women. They also may be helpful in enhancing our understanding of how women perceive, and react to, the therapeutic process. Specifically, the current findings indicate that female prisoners struggle to recognise when another person is frightened, and over-accentuate emotional signals of threat. This in turn could have a negative impact upon group dynamics. Therefore, in clinical practice, it may be most beneficial to focus intervention on the development of emotional awareness prior to any offence-specific work, in order to increase the likelihood of success in interventions aimed at developing victim empathy and targeting criminogenic needs. From the current analysis, this appears to be especially pertinent to female prisoners, particularly those presenting with more severe psychopathology.

In addition to emotional processing, the current study found that both male and female prisoners exhibited risky decision-making on the IGT, by most frequently choosing risky decks with infrequent, larger punishments. This may suggest an impairment in emotional memory, where prisoners do not remember the impact of receiving one large punishment (i.e. from Deck B), and so return to play on this risky deck on a regular basis. It may also provide further insight into how prisoners perceive and process punishment cues more generally, and go some way to explaining the persistent reckless and criminal lifestyle observed in many prisoners.

Certain gender differences in decision-making processes were also noted. Specifically, male prisoners were found to choose risky decks with frequent, smaller punishments more often than female prisoners. However, on measures of reflective-impulsivity, female prisoners made more impulsive choices. The current results therefore highlight the need for, and importance of, cognitive-behavioural based programmes aimed at improving decision making and consequential thinking, which are currently run in many correctional institutions.

In addition to the proposed clinical implications, the current study provides tentative support for the notion of a fronto-limbic deficit in the current prisoner sample (e.g. Soderstrom et al, 2002). Activity in fronto-limbic areas has been frequently associated with emotional processing (Gray et al, 1997; Adolphs et al, 1999; Blair et al, 1999; Biseul et al, 2005; Clark, Neargarder, & Cronin-Golomb, 2008; Derntl et al, in press) and decision-making (Marsh et al, 2007; Rudebeck et al, 2008; Hauber & Sommer, 2009; Smith et al, 2009). Equally, these functions have been found to be compromised in individuals with damage to these areas (e.g. Adolphs et al, 1994, 1995; Calder et al, 2001; Young et al, 1996; Bechara et al, 1994; 1997; 1999; 2000). Thus, as both male and female prisoners in the current study displayed marked impairment in their ability to accurately identify emotional expressions, and exhibited risky decision-making on the IGT, it is suggested that a degree of fronto-limbic impairment may be present.

These results also highlight some useful trends in the data regarding a higher degree of complexity in the neuropsychological functioning of female compared to male prisoners with more severe psychopathology (as indicated by DSPD criteria). They suggest that the more complex neuropsychology of such individuals may be an important factor to

consider when formulating diverse and individually tailored treatment needs of prisoners accessing DSPD services.

Chapter 6: Associations between neuropsychological function and features of psychopathy and personality disorder among male and female prisoners in England and Wales

Chapter aims:

1. To explore associations between neuropsychological function and features of psychopathy and personality disorder in a sample of male and female offenders matched for psychopathy; and
2. To characterise any gender differences in these associations.

Previous research has highlighted the involvement of the prefrontal cortex (PFC) and limbic circuitry in the regulation of goal-directed behaviour, affective processing, working memory, and behavioural inhibition (e.g. Barrash et al, 2000; Blair, 1999, 2004; Damasio, 1994; Floden et al, 2008; Seguin, 2004; Martinez-Selva et al, 2006; Phillips et al, 2001; Rolls, 2004; Herberlein et al, 2008). These functions have been found to be impaired in forensic samples, particularly psychopathic individuals (Kiehl et al, 2006; Kosson, Lorenz, & Newman, 2006; Howard & McCullagh, 2007; Vitale et al, 2007), though neuropsychological investigations have yielded inconsistent results (e.g. Glass & Newman, 2006). Poor performance on specific neuropsychological measures has, in turn, been linked to specific features of psychopathy (Sutton, Vitale, & Newman, 2002; Molto et al, 2007) and PD (Kirkpatrick et al, 2007; Bagby et al, 2008). However, to date, few investigations have reported differences between male and female prisoners on these measures and subsequent associations with clinical features.

The particular aim of this chapter is to explore associations between neuropsychological function with clinical features of psychopathy and personality disorder. Specifically, performance on tests of recall and recognition memory, reflective impulsivity, decision making, and emotion recognition will be considered. Several differences in neuropsychological performance between male and female prisoners have already been observed; therefore, gender differences in these associations will be further explored.

Predictions

a) Emotional processing

The capacity to recognise emotional expressions in others, particularly distress cues, has been widely documented to be related to fronto-temporal activation (Blair, 1995; Fischer et al, 2007; LeJenne, 2008; Marsh & Blair, 2008); particularly limbic structures (Young et al, 1996; Adolphs et al, 1995, 1999; Wang et al, 2005), which themselves play a role in empathy in humans (Carr et al, 2003). In turn, emotional detachment and lack of empathy is observed in individuals with a high number of Schizoid PD traits (American Psychiatric Association, 1994; Cliftona, Turkheimerb, & Oltmannsc, 2009), and those scoring highly on affective measures of psychopathy (Hare, 2003). I hypothesised that poor recognition of the emotions of fear, anger, sadness, and disgust would be related to personality traits involving deficient empathy (i.e. affective psychopathy features (F2), and Schizoid PD). Indeed, findings of this nature have been observed in a study investigating emotional processing in children, where callous and unemotional traits were significantly associated with poor recognition of facial expressions of sadness (Woodworth & Waschbusch, 2008).

Considering individual emotions more specifically, the accurate recognition of fear (Le Jeune et al, 2008), anger (Blair & Cipolotti, 2000; Lew et al, 2005), and disgust (Blair & Cipolotti, 2000) has been implicated in the activation of the OFC (which itself has been linked to behaviours depicted by lifestyle psychopathy traits, such as poor response inhibition; Kiehl, 2000; LaPierre et al, 1995; Rolls, 2004). Therefore, I predicted that poor recognition of emotional expressions of fear, anger and disgust would be associated with psychopathy and PD features that involve comparable personality traits; namely, Borderline and Antisocial PD, and lifestyle features of the PCL-R (F3). Moreover, as reported in Chapter 5, the current sample of female prisoners are significantly more impaired than their male counterparts in their ability to recognise emotional expressions of fear at high intensities. They also have a higher prevalence of Borderline PD traits. Therefore, I predicted that the association between emotional expressions, such as fear, and Borderline PD would be stronger in female than male prisoners.

In contrast to the associations involving the affective and lifestyle features of psychopathy, it has been suggested that interpersonal PCL-R traits (F1) actually work

to improve an individuals' perception of fear in others (Del Gazio & Falkenbach, 2008). Therefore, I hypothesised that accurate recognition of emotional expressions of fear would be positively associated with interpersonal features of psychopathy.

b) Decision-making and reflective-impulsivity

Risky decision-making and poor reflective impulsivity has been linked to personality traits related to lack of consequential thinking and impulsivity (Chapman et al, 2008; Bagby et al, 2008; Molto et al, 2007). Therefore, I hypothesised that risky and impulsive behaviour (as measured by the IGT and MFFT respectively) would be related to similar personality traits; namely, lifestyle (F3) and antisocial features (F4) of psychopathy and to Borderline and Antisocial PD. Additionally, as I found that male prisoners made more risky choices on the IGT than their female counterparts (Chapter 5), I expected these associations to be stronger in male prisoners than in female prisoners.

c) Recall and recognition memory

Recognition memory has been linked to the pre-frontal cortex (Wagner et al, 1998; Simons et al, 2005), which has in turn been linked to impulsive features of psychopathy and PD (Brower & Price, 2001; Blair, 2004). Additionally, recall memory has been found to be impaired in prisoners with Borderline PD (Kirkpatrick et al, 2007). Therefore, in the current study, it was predicted that poor performance on the Camden Memory test (recognition memory) and Rey-Osterrieth Complex Figure (ROCF; recall memory) would be associated with Borderline PD traits and lifestyle features of psychopathy (F3).

In addition to the above predictions, the possible effects of other variables on associations between measures were tested. These were features that have been reported to interact significantly with neuropsychological function, such as IQ (Gagliardi et al, 2003; Green et al, 2008), Axis I disorders (Addington et al, 2008; Vernet, Baudouin, & Franck, 2008; Matthews, Coghill, & Rhodes, 2008), and childhood trauma (Parker & Nelson, 2005; Minzenberg, Poole, & Vinogradov, 2008). The interaction between these potential predictors and significant associations with neuropsychological tests was explored.

Participants

The same 268 male and 268 female offenders used in Chapter 4 were considered in this analysis. See Chapter 2 (pg. 35) for a description of the sample demographics and characteristics.

Measures

In the regression models, the following outcome measures were used:

- Emotion recognition accuracy, sensitivity, and labelling (response bias) scores for each emotion as described in Chapter 5
- Decision making, as measured by frequency of choice of risky decks (A and B), and risky choice overall (A+B)-(C+D) on the IGT;
- Scores of reflective-impulsivity.(MFFT);
- Recognition memory scores for words and faces (Camden Memory test); and
- Visual recall memory scores (ROCF). This test was added to the battery towards the end of the study, when only female data was being collected. As such, test results are available for female prisoners only.

Statistical analyses

Multi-level regression analysis was performed using the statistical package MLwiN (v 2.02). All scores were transformed into z-scores. The analysis was conducted in two stages:

- Firstly, I explored associations between neuropsychological test scores and *psychopathy*. All four facets of psychopathy (z-scores) were regressed as dependent measures against the neuropsychological measure of interest;
- Secondly, exploring associations between neurocognitive function and *PD*. Similarly, dimensional scores of the 10 PDs defined by the DSM-IV (also expressed as standardised z-scores) for were plotted as dependent measures against the neuropsychological measure of interest.

The statistical thresholds for significance were: $z \geq 1.96$, $p \leq 0.05$; $z \geq 2.58$, $p \leq 0.01$; and $z \geq 3.30$, $p \leq 0.001$.

Multi-level regression of this kind allows the calculation of regression coefficients between all facets of psychopathy/ PD simultaneously and the test scores of interest by

treating the facet scores as repeated measures within each participant. Regression coefficients were expressed as z-scores (means divided by standard errors). Where an association was found to be significant, several other predictors[17], thought to potentially affect the association, were added to the model to ensure that the association of interest could not be explained by the effect of other confounding variables.

Occasionally, where necessary, I tested interactions between regressors by calculating the product of the regressors as necessary. Group scores for some variables (e.g. IQ), low, medium, and high scoring groups were calculated as follows (low group: range = lowest score up to -1SD (-1); medium group: range = -1SD up to +1SD (-1 to +1); high group: range = +1SD (+1) up to highest score). In each case, the medium group was used as the reference. This method was sometimes used to help determine the sign of an association. Thus, in the results, significant interactions may be expressed dimensionally or in relationship to banded scores (e.g. low IQ, medium IQ and high IQ).

Differences between male and female prisoners were investigated by adding 'gender' as an additional regressor. Interactions involving gender and facet scores were tested by regressing the facet scores against interactions terms for gender and neuropsychological test scores. Female prisoners were coded as 0, and were specified as the reference group. If the gender interaction term was found to be significant (i.e. male and female prisoners differed significantly), independent regressions were conducted to determine significance in male and female prisoners separately.

[17] Additional predictors = IQ, age, Axis I disorders, childhood trauma, any PD diagnosis (for psychopathy analysis), and PCL-R total scores (for PD analysis).

Results

Emotional processing

1. Anger

a) Associations with Psychopathy

As predicted, poor recognition *accuracy* of emotional expressions of anger was associated with higher scores on lifestyle features of psychopathy (F3; (β (SE) = -0.12 (0.05), $p < 0.05$, see Fig.16). Poor *sensitivity* to signals of anger was also found to be related to total scores of psychopathy (β (SE) = -0.12 (0.06), $p < 0.05$), and lifestyle features specifically (β (SE) = -0.13 (0.05), $p < 0.05$). However, all of these associations were rendered non-significant by the inclusion of IQ to the model (all non-significant values = (β (SE) = -0.10 (0.06), $p > 0.05$)). No gender specific associations, or interactions, were observed in relation to psychopathy and anger.

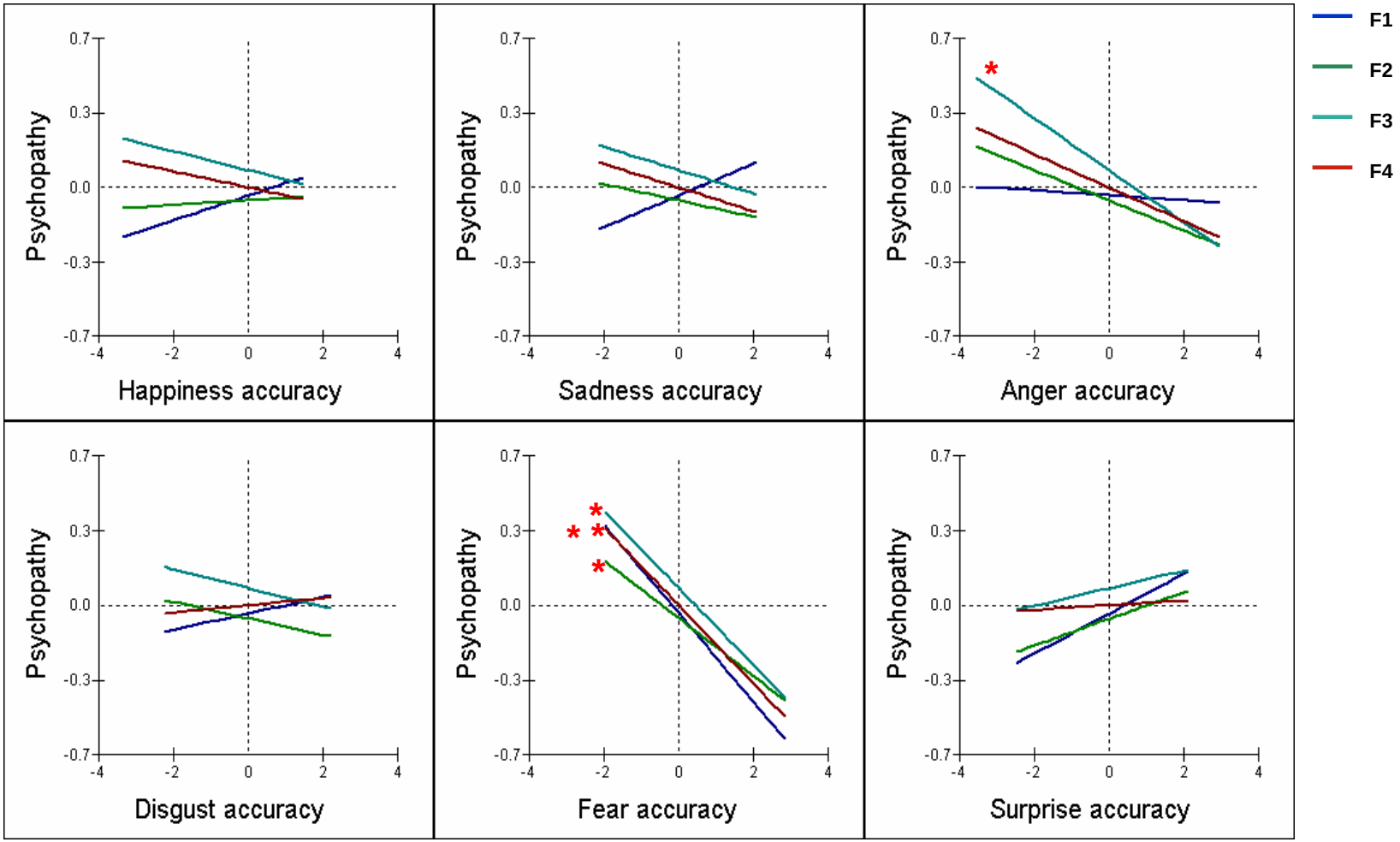
b) Associations with PD

Poor recognition *accuracy* and *sensitivity* to emotional expressions of anger was also associated with Borderline PD scores (β (SE) = -0.12 (0.05), $p < 0.05$), in line with predictions. However, as with the psychopathy associations, these associations were no longer significant after controlling for IQ (non-significant values: recognition = (0.09 (0.06), $p > 0.05$); sensitivity = (β (SE) = -0.10 (0.06), $p > 0.05$)). Associations between anger *sensitivity* and Borderline PD were also affected by the inclusion of psychopathy as a regressor (non-significant value: (β (SE) = -0.06 (0.05), $p > 0.05$)).

A significant *gender difference* was observed for associations between accurate recognition of anger and sensitivity to signals of anger and Borderline PD (Accuracy: β (SE) = 0.66 (0.32), $p < 0.05$[18]; Sensitivity: β (SE) = 0.99 (0.31), $p < 0.01$; see Fig. 17). Female prisoners with poor recognition and reduced sensitivity to emotional signals of anger had more Borderline PD traits than those with good recognition and sensitivity ((β (SE) = -0.45 (0.20), $p < 0.05$) and (β (SE) = -0.60 (0.19), $p < 0.01$), respectively). This relationship was not significant in the male prisoner sample ((β (SE) = 0.21 (0.80), $p > 0.05$) and (β (SE) = 0.39 (1.33), $p > 0.05$) for recognition and sensitivity respectively).

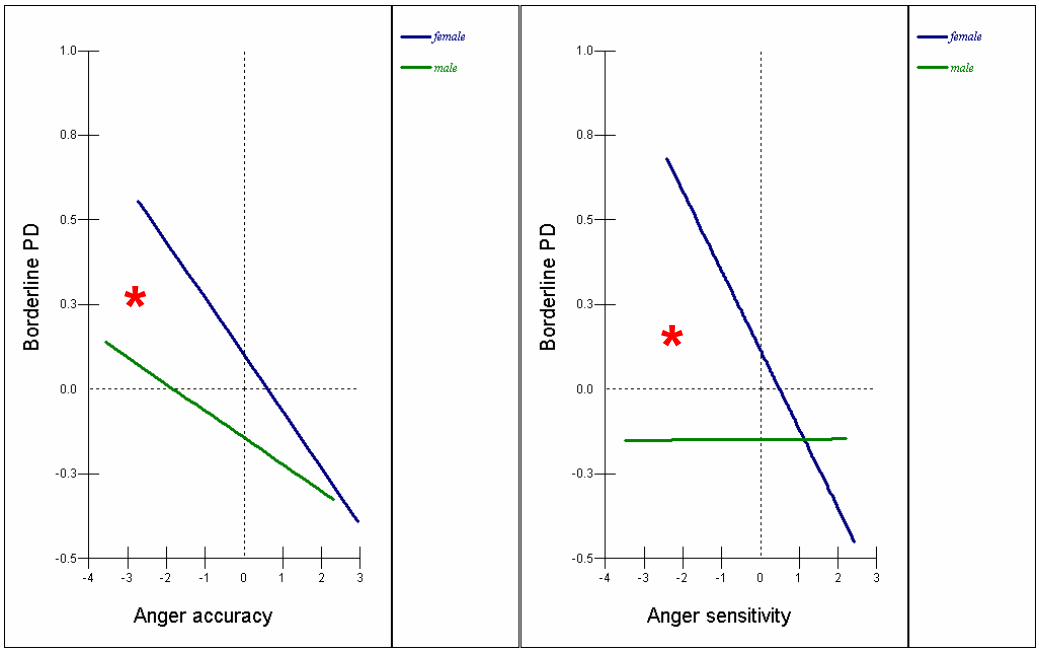
[18] This interaction was no longer significant after controlling for drug dependence (non-significant value: (β (SE) = 0.52 (0.31), $p < 0.05$).

Figure 16. Associations between emotion recognition accuracy and facets of psychopathy



Associations between accurate recognition of emotional expressions and facets of psychopathy for the total sample of offenders (n=331). Scores are standardised: higher scores indicate better accuracy and a higher number of PCL-R traits. (* indicates significant association).

Figure 17. Associations between recognition and sensitivity to emotional signals of anger and Borderline PD in male and female prisoners.



Associations between recognition accuracy and sensitivity to emotional signals of anger and Borderline PD in male and female prisoners. Scores are standardised z-scores: the higher the score, the better the accuracy/ sensitivity (on the x-axis) and the more PD traits present. * indicates significant gender difference.

2. Disgust

a) Associations with Psychopathy

No significant associations between psychopathy and disgust, and no gender interactions were observed.

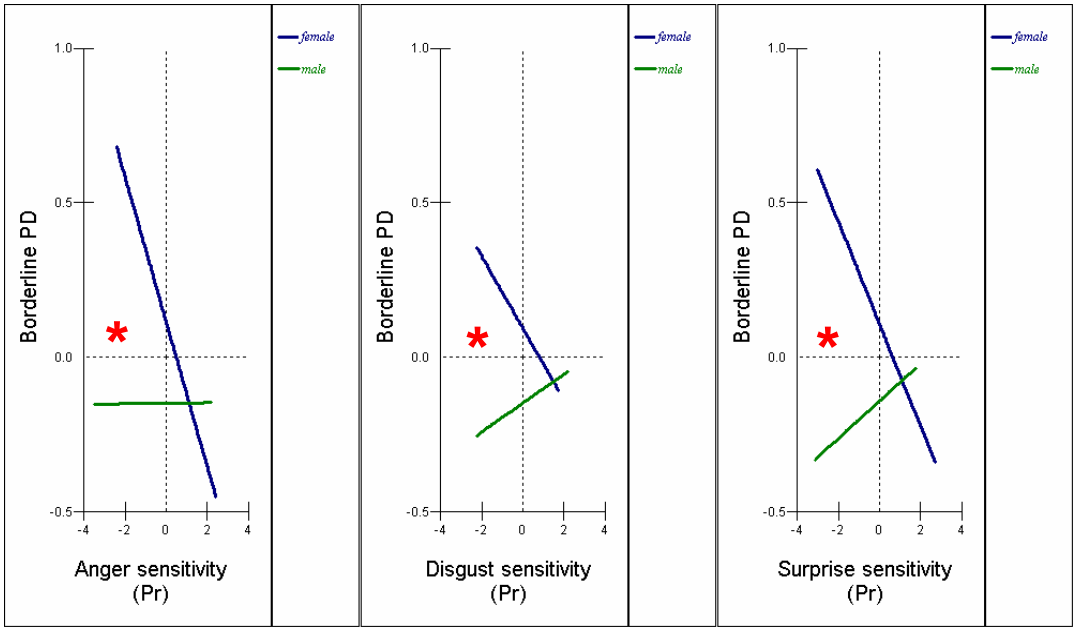
b) Associations with PD

Poor *accuracy* of disgust recognition was associated with traits of Schizoid PD (β (SE) = -0.11 (0.05), $p < 0.05$) as predicted, though the inclusion of IQ to the model reduced the significance of these effects (β (SE) = -0.09 (0.06), $p > 0.05$).

As with expressions of anger, significant gender *differences* were noted in the *sensitivity* to signals of disgust and Borderline PD (β (SE) = 0.67 (0.29), $p < 0.05$), which remained significant after the inclusion of several regressions to the model. Poor disgust sensitivity in female prisoners was significantly associated with a greater number of Borderline PD traits (β (SE) = -0.42 (0.19), $p < 0.01$). This relationship was

not significant in male prisoners (β (SE) = -0.25 (0.79), p > 0.05; see Fig. 18). A similar trend was also observed in the *accuracy* of detecting disgust expressions (β (SE) = 0.52 (0.28), p > 0.05).

Figure 18. Associations between sensitivity to emotional signals and Borderline PD for male and female prisoners



Associations between sensitivity to emotional signals and Borderline PD. Scores are standardised: the higher the score, the more sensitive the individual is to emotional signals in others and the more PD traits present. * indicates significant gender difference.

3. Fear

a) Associations with Psychopathy

Poor recognition *accuracy* of fearful expressions was associated with higher scores on the PCL-R overall (β (SE) = -0.24 (0.05), p < 0.001), and all 4 facets individually (Interpersonal: (β (SE) = -0.21 (0.05), p < 0.001); Affective: (β (SE) = -0.13 (0.05), p < 0.05); Lifestyle (β (SE) = -0.18 (0.05), p < 0.001); and Antisocial (β (SE) = -0.18 (0.05), p < 0.001), see Fig. 16).

Poor *sensitivity* to signals of fear was also associated with higher scores on the PCL-R overall (β (SE) = -0.23 (0.06), p < 0.001), and all 4 facets individually (Interpersonal: (β (SE) = -0.23 (0.05), p < 0.001); Affective: (β (SE) = -0.14 (0.05), p < 0.01); Lifestyle (β (SE) = -0.16 (0.05), p < 0.01); and Antisocial (β (SE) = -0.16 (0.05), p < 0.05).

However, after controlling for the influence of any comorbid PD (though with not any one PD in particular), only the association with Interpersonal psychopathy features remained significant. Associations with Affective, Lifestyle, and Antisocial features were rendered non-significant (non-significant values = (β (SE) = -0.10 (0.05), p > 0.05); (β (SE) = -0.09 (0.05), p > 0.05); and (β (SE) = -0.09 (0.05), p > 0.05) respectively).

There were no observed *gender differences* in associations between psychopathy and fear recognition *accuracy*, *sensitivity,* or *response bias*.

b) Associations with PD

As predicted, poor recognition *accuracy* of fearful expressions was associated with Borderline PD (β (SE) = -0.13 (0.05), p < 0.05), Antisocial PD (β (SE) = -0.16 (0.05), p < 0.05), and Schizoid PD (β (SE) = -0.11 (0.05), p < 0.05). However, all of these associations were affected with the inclusion of psychopathy (all four facets) to the model (non-significant values[19]: (β (SE) = -0.02 (0.05), p > 0.05), (β (SE) = -0.03 (0.04), p > 0.05), and (β (SE) = -0.05 (0.05), p > 0.05), for Borderline, Antisocial, and Schizoid PD respectively*).*

Similarly, significant associations between reduced *sensitivity* to emotional expressions of fear and Borderline PD (β (SE) = -0.11 (0.05), p < 0.05), Antisocial PD (β (SE) = -0.13 (0.06), p < 0.05), and Schizoid PD (β (SE) = -0.13 (0.05), p < 0.05) were also found. Likewise, these associations were rendered non-significant after the inclusion of psychopathy (all four facets) to the model (non-significant values[20]: (β (SE) = -0.01 (0.05), p > 0.05), (β (SE) = 0.03 (0.04), p > 0.05) and (β (SE) = -0.07 (0.05), p > 0.05), for Borderline, Antisocial, and Schizoid PD respectively*).*

Unlike facial emotional expressions of anger and disgust, no specific *gender differences* were noted for interactions between fear recognition/ sensitivity and Borderline PD.

[19] Using PCL-R total score
[20] Using PCL-R total score

4. Sadness

a) Associations with Psychopathy

No significant associations between psychopathy and measures of sadness recognition were observed.

b) Associations with PD

No associations were noted between recognition *accuracy* of sad emotional expressions and PD. Poor *sensitivity* to signals of sadness, on the other hand, was found to be associated with Schizoid PD (β (SE) = -0.14 (0.05), $p < 0.05$), though the significance of this association was affected by the addition of IQ to the model (non-significant value: (β (SE) = -0.10 (0.06), $p > 0.05$)). No significant differences between male and female prisoners in associations between sadness and psychopathy and PD were noted.

5. Happiness

a) Associations with Psychopathy

No significant associations were present between the ability to recognise expressions of happiness and psychopathy.

b) Associations with PD

Poor *sensitivity* to signals of happiness was associated with Schizoid PD (β (SE) = -0.14 (0.06), $p < 0.05$), 0.06), $p < 0.05$), but was affected by the addition of IQ to the model (non-significant value: (β (SE) = -0.10 (0.06)).

6. Surprise

a) Associations with Psychopathy

PCL-R total scores were found to be significantly and positively associated with the ability to *accurately label* emotional expressions of surprise (β (SE) = 0.14 (0.06), $p > 0.05$). No other significant associations were present.

b) Associations with PD

No significant associations between PD and surprise recognition were observed for the sample of prisoners as a whole. However, as with expressions of anger and disgust, a significant *gender difference* was noted in the interaction between *sensitivity* to signals of surprise and Borderline PD (β (SE) = -0.57 (0.29), $p < 0.05$). Poor surprise sensitivity in female prisoners was significantly associated with a greater number of Borderline PD traits (β (SE) = 0.39 (0.07), $p < 0.001$). This relationship was non significant (in the opposite direction) among the male prisoners (β (SE) = -0.18 (0.35), $p > 0.05$; Fig. 18). However, this gender difference was rendered non-significant after controlling for the influence of psychopathy, IQ, and alcohol dependence to the model (non-significant values = (β (SE) = -0.31 (0.26), $p < 0.05$), (β (SE) = -0.59 (0.30), $p < 0.05$), and (β (SE) = -0.49 (0.28), $p < 0.05$) respectively).

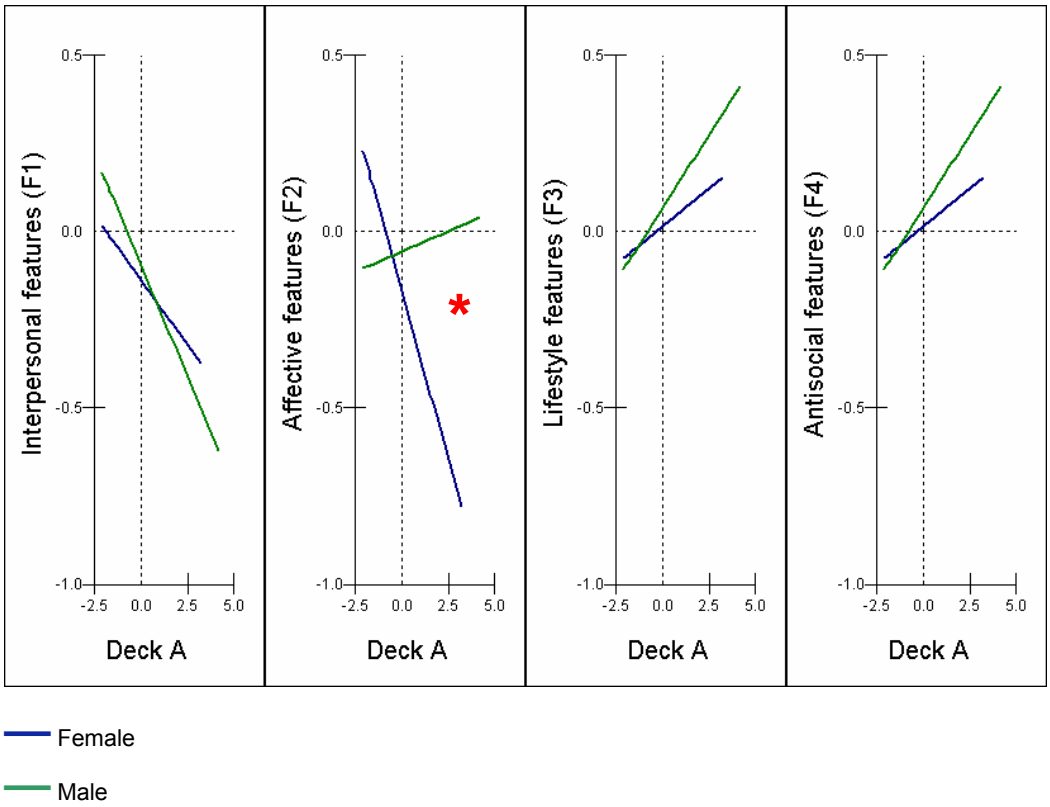
Decision making

a) Associations with Psychopathy

Risky choice, as expressed by frequent choice of Deck A (and was found to be influenced by gender in Chapter 4), was associated with less marked levels of dominant interpersonal style (F1: β (SE) = -0.10 (0.05), $p < 0.05$). However, this association was rendered non-significant by IQ (non-significant values = (β (SE) = -0.08 (0.05), $p > 0.05$)).

Significant *gender differences* were also observed regarding associations between risky choice and affective features of psychopathy (F2). Specifically, frequent choice of Deck A (risky choice with frequent punishment) was associated with fewer affective deficiency traits in women than in men (β (SE) = 0.83 (0.40), $p < 0.05$; see Fig. 19). This gender difference was unaffected by the inclusion of several predictors to the model. However, although significantly different from each other, independent analyses of these associations for men and women separately were non-significant ((β (SE) = 0.30 (0.98), $p > 0.05$) and (β (SE)) = -0.53 (0.34), $p > 0.05$) for men and women respectively).

Figure 19. Associations between psychopathy facets and risky choice for male and female prisoners

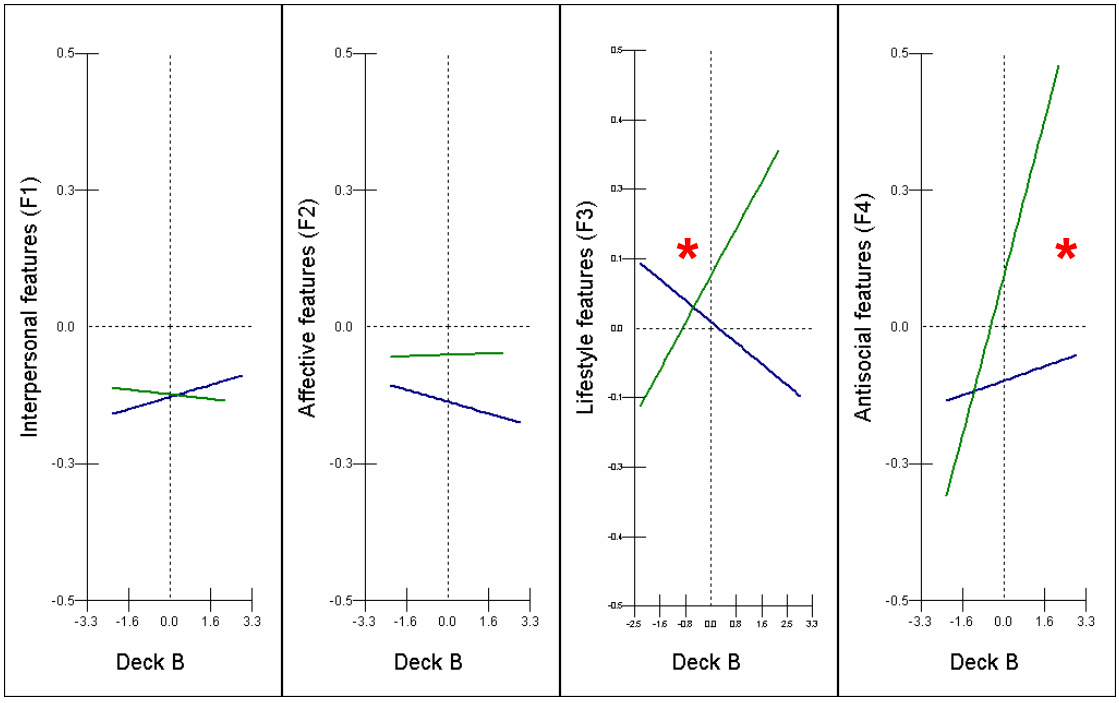


Associations between facets of psychopathy and frequency of choice of Deck A for male (n=142) and female (n=193) prisoners. Scores are standardised: higher scores represent more frequent choice and greater number of psychopathy traits. * indicates significant gender difference.

Significant *gender differences* were also noted for associations between risky choice, as measured by frequent choice of Deck B (risky choice but infrequent punishment), and lifestyle (F3; β (SE) = -0.84 (0.33), $p < 0.05$) and antisocial features (F4; β (SE) = -0.72 (0.33), $p < 0.05$) of psychopathy. Specifically, risky choice was more strongly associated with these psychopathy traits in men than in women (Fig. 20). However, these gender differences were no longer significant once the influence of any PD diagnosis was accounted for (though not with one PD in particular; non-significant values = (β (SE) = -0.32 (0.29), $p < 0.05$) and (β (SE) = -0.07 (0.29), $p < 0.05$) for F3 and F4 respectively). The gender difference with antisocial features was additionally affected by IQ (non-significant value = β (SE) = -0.57 (0.33), $p < 0.05$). Also, when explored independently, associations between frequent choice of Deck B and lifestyle and antisocial psychopathy features were non-significant in both male and female

samples ((Male: F3; β (SE) = -0.51 (0.90), p > 0.05. F4; β (SE) = -0.44 (0.77), p > 0.05) and (Female: F3; β (SE) = 0.33 (0.22), p > 0.05. F4; β (SE) = 0.28 (0.22), p > 0.05).

Figure 20. Associations between psychopathy facets and frequency of choice of Deck B for male and female prisoners



Associations between facets of psychopathy and frequent choice of Deck B for male (n=142) and female (n=193) prisoners. Scores are standardised: Higher scores indicate more frequent choice of Deck B and a greater number of psychopathy traits. * indicates significant gender difference.

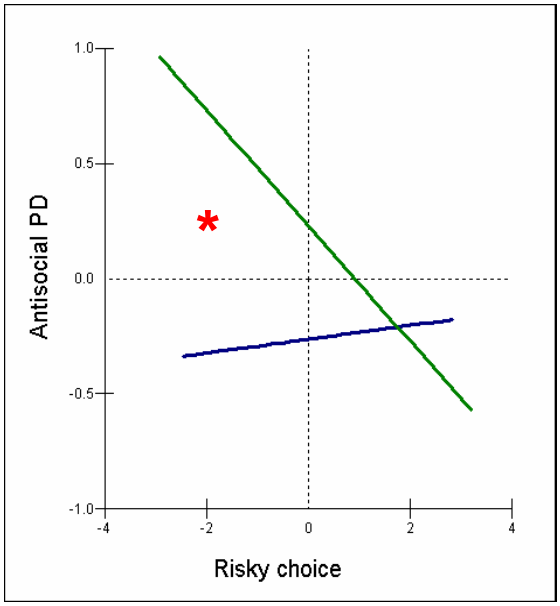
b) Associations with PD

Frequent choice of Deck A was also associated with a greater number of Narcissistic and Antisocial PD traits (β (SE) = 0.11 (0.05), and β (SE) = 0.13 (0.05) respectively). In a similar respect to psychopathy, these associations were non-significant following the addition of IQ to the model (non-significant values = (β (SE) = 0.10 (0.05), p > 0.05), and (β (SE) = 0.10 (0.06), p > 0.05) respectively).

A significant *gender difference* was observed regarding the associations between risky decision-making (as measured by overall risky choice) and Antisocial PD (β (SE) = -

0.28 (0.11), p < 0.05; see Fig. 21). This was unaffected by the inclusion of several predictors to the model. When explored independently, it was found that male prisoners who make risky choices on the IGT had more Antisocial PD traits than those who made less risky choices (β (SE) = -0.25 (0.13), p < 0.05). This association was non-significant (but in the opposite direction) in female prisoners (β (SE) = 0.30 (0.70), p > 0.05).

Figure 21. Associations between Antisocial PD and risky choice for male and female prisoners

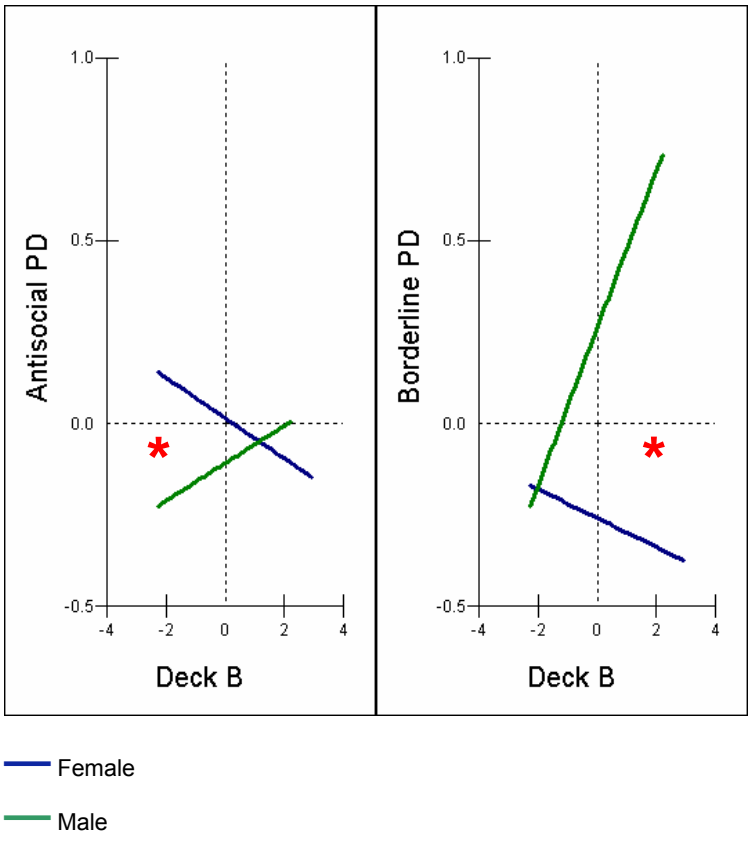


Association between traits of Antisocial PD and risky choice for male (n=142) and female (n=193) prisoners. Scores are standardised: Risky choice; lower scores represent more risky choice. PD; higher scores represent greater number of Antisocial PD traits. * indicates significant gender difference.

Similarly, risky choice as measured by frequent selection of Deck B was associated with Antisocial PD to a greater extent in men than in women (β (SE) = -0.94 (0.33), p < 0.05; see Fig. 22). Independently, this association was non-significant in women (β (SE) = 0.23 (0.21), p > 0.05), but followed a positive trend in men (β (SE) = -0.76 (0.39), p > 0.05). This finding was unaffected by the inclusion of other predictors to the model.

Frequent selection of Deck B was also found to be differentially associated with Borderline PD in men and women. Specifically, risky choice was more strongly associated with Borderline traits in men (β (SE) = -0.74 (0.33), $p < 0.05$; see Fig. 22). Analyses of male and female prisoners separately found that this association was independently significant in men (β (SE) = -0.34 (0.16), $p < 0.05$), but not in women (BPD; β (SE) = 0.40 (0.22), $p > 0.05$). However, this gender difference was rendered non-significant after controlling for the influence of psychopathy, IQ, and drug dependence (non-significant values = (β (SE) = -0.49 (0.29), $p < 0.05$), (β (SE) = -0.64 (0.34), $p < 0.05$), and (β (SE) = -0.61 (0.33), $p < 0.05$) respectively).

Figure 22. Associations between Borderline and Antisocial PD and frequency of choice of Deck B for male and female prisoners



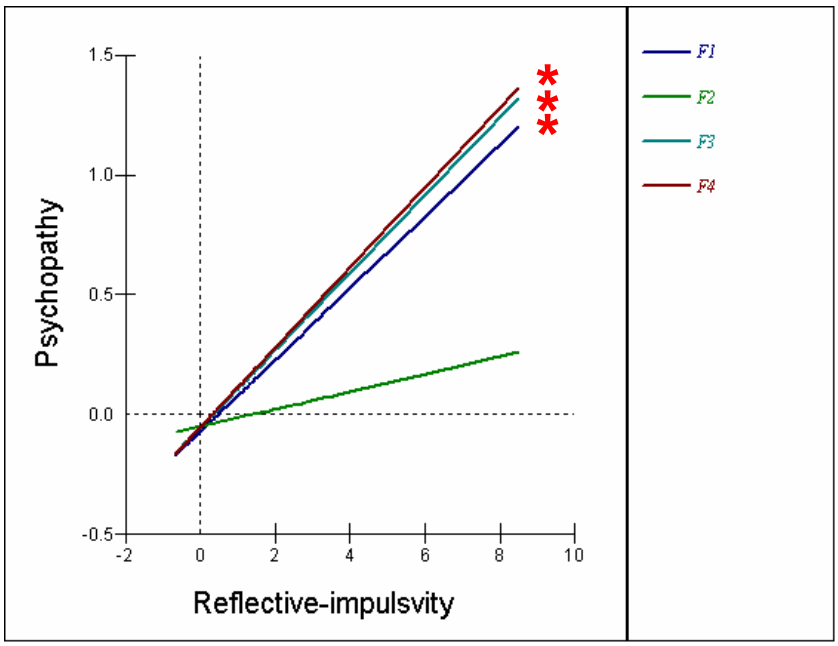
Associations between traits of Borderline and Antisocial PD and frequent choice of Deck B for male (n=142) and female (n=193) prisoners. Scores are standardised: Higher scores indicate more frequent choice of Deck B and a greater number of PD traits. * indicates significant gender difference.

Reflective impulsivity

a) Associations with psychopathy

Performance on the MFFT task was significantly associated with interpersonal (F1: β (SE) = 0.15 (0.05), p < 0.01), lifestyle (F3: β (SE) = 0.16 (0.05), p < 0.01), and antisocial features of psychopathy (F4: β (SE) = 0.17 (0.05), p < 0.001), but not with affective features (see Fig. 23). This was not affected by the inclusion of predictors to the model. No other associations with PD or gender were observed.

Figure 23. Associations between facets of psychopathy and reflective-impulsivity in male and female prisoners



Associations between interpersonal features of psychopathy and reflective-impulsivity (MFFT scores) for male and female prisoners (n = 374). Scores are standardised: higher scores on reflective-impulsivity represent more impulsive choices. The higher the PCL-R score, the more PCL-R traits present. (* indicates significant association).

Recognition memory

a) Associations with psychopathy and PD

Poor recognition of word stimuli was associated with higher scores on interpersonal features of psychopathy (F1), (β (SE) = -0.11 (0.05), p < 0.05). Similarly, poor recognition of both word and face stimuli was associated with higher scores on lifestyle features of psychopathy (F3) ((β (SE) = -0.11 (0.05), p < 0.05), and (β (SE) = -0.11 (0.05), p < 0.05) respectively). However, the association between F3 and word recognition was affected by the inclusion of IQ and Antisocial PD to the model (non-

significant values = (β (SE) = -0.10 (0.06), $p < 0.05$) and (β (SE) = -0.07 (0.05), $p < 0.05$) respectively).

Recall memory

a) Associations with psychopathy and PD

Contrary to predictions, no associations were observed between Borderline PD and the ability to accurately recall visual stimuli in female prisoners. No additional associations with psychopathy or PD were noted.

Discussion

The current analysis provides some evidence for a link between the psychopathological characteristics prevalent in prisoner samples, and neuropsychological impairment. Specifically, the ability to effectively process and interpret emotional signals of fear and anger, and to make prudent, well considered choices appears to be inversely linked to psychopathic traits (and personality disorders with similar overlapping characteristics). However, many of these associations were rendered non-significant following the inclusion of IQ as a regressor, thus suggesting that they may be an artefact of cognitive ability. In addition to the sample of prisoners as a whole, the current chapter highlights a number of gender differences in these associations, which are important to consider in the planning and delivery of intervention and management strategies, particularly in services where males and females are assessed as having comparable risk (e.g. DSPD). These will be discussed in more detail shortly.

Whilst the current analyses appear to draw some useful links between psychopathology and neurocognitive function, there are also some limitations which need to be acknowledged. Firstly, as mentioned in the previous chapter, the specificity of the current sample means that comparisons with other literature in the field may be problematic. However, the nature of the sample offers a unique opportunity to explore links between psychopathology and neurocognitive function in this particular group of prisoners, which is highly relevant to services like the DSPD programme.

In addition to the limitations of the sample, the exploratory nature of this study may have been problematic, as it led to multiple comparisons within the dataset. Statistically, this increases the chance of a Type I error being made. However, the nature of the current analyses (in plotting dependent variables as repeated measures) allowed the number of comparisons to be significantly reduced, and the co linearity between measures to be controlled for. Also, due to the nature of this study (i.e. data collection from prisoners in penal establishments across England and Wales), differing amounts of time could be spent with each individual (due to prison regime, other appointments, etc). This inevitably meant that not all prisoners completed all tests. However, the reduced numbers of observations on some neuropsychological tests were unlikely to have had an enormous impact on statistical validity.

Aside from these limitations, from the sample of male and female prisoners as a whole, the most robust finding was that prisoners with a high level of psychopathy (as evidenced across all 4 facets) were significantly worse than low PCL-R scorers at recognising emotional expressions of fear in others. These associations remained strong in the presence of other predictors. There was also evidence for a negative impact of Schizoid PD on the ability to recognise emotional signals of distress (fear, sadness, and disgust), which fits with the clinical definition of the disorder. Thus, from a clinical perspective, it may be beneficial for programmes working with highly psychopathic offenders and offenders with Schizoid PD to target interventions at developing emotional awareness and perspective taking, particularly in relation to victim impact.

In addition to fear, an impaired recognition of, and sensitivity to, expressions of anger was found to be associated with a greater number of impulsive and irresponsible behavioural traits (as depicted by F3 and Borderline PD). Thus, interventions targeted at working with individuals with Borderline PD may need to be mindful of their decreased sensitivity to signals of threat, how this relates to their behavioural characteristics, and how it may impact upon the treatment process and group dynamics.

Besides emotional processing, risky decision-making was associated with higher levels of Antisocial PD and lower levels of psychopathic interpersonal style. This fits with the profile of persistent reckless and impulsive behaviour often observed in antisocial individuals (e.g. Mitchell et al, 2002) and supports the use of cognitive-behavioural programmes aimed at improving decision making processes in these prisoners.

However, it is important to note that many of these associations were affected by the prisoners' IQ (though specific interactions between IQ and psychopathy/ PD in relation to neuropsychological measures were not observed). It may be that the neuropsychological deficits observed in prisoner samples (e.g. LaPierre, Braun, & Hodgins, 1995; Mitchell et al, 2002; Kirkpatrick et al, 2007) are indeed an artefact of cognitive function, or that the variation in findings across studies is due to a variation in IQ. However, it remains that lower levels of intellectual functioning and educational attainment are highly prevalent within forensic populations (e.g. Davidson et al, 1995;

Herrington, 2009), and may therefore be fundamental to the underlying processes involved in prisoners' persistent risky and law-breaking behaviour. As such, treatment programmes aimed at modifying problematic behaviour and reducing recidivism may need to be more mindful of the potential impact of IQ on prisoners' decision-making processes and emotional processing ability.

Having said this, the current study also demonstrated robust links between impulsive behaviour (as measured by the MFFT) and interpersonal, lifestyle, and antisocial features of psychopathy, which were unaffected by the addition of other predictors. This is in line with previous research (e.g. Bagby et al, 2008; Chapman et al, 2008) and may also provide further support for offending behaviour programmes tailored to address the thinking style and lifestyle traits of prisoners with impulsive and irresponsible offence pathways.

Gender differences

- Associations with psychopathy

Risky decision-making was found to be associated with affective, lifestyle, and antisocial features of psychopathy to a greater extent in male than female prisoners. However, these associations were weak and often affected by the presence of comorbid PD. Thus, from the current study, the evidence for gender specific associations between neurocognitive function and psychopathy is weak.

- Associations with PD

One of the most robust findings from the current study is the inhibitive effect of Borderline PD on female prisoners' ability to correctly interpret *emotional signals* of anger and disgust in others. Specifically, a high degree of Borderline pathology in female prisoners was significantly associated with a decreased sensitivity to emotional signals of threat. Therefore, it may be that women with Borderline PD have a tendency to, and indeed are partly characterised by, engaging in risky behaviour and patterns of unstable, often abusive relationships (e.g. Laporte & Guttman, 2001; Lieb et al, 2004; De Moor et al, 2009) because they have a specific difficulty in recognising signals of threat. The current findings therefore indicate that female prisoners presenting with a high degree of Borderline pathology may benefit to a greater extent than their male counterparts from a Dialectical Behavioural approach, targeted at developing emotion

identification and regulation. Indeed, such an approach has been reported to be successful in female BPD populations (e.g. Linehan et al, 1991; Koons et al, 2001; Nee & Farman, 2005; Stepp et al, 2008), and is currently being implemented in female DSPD services in England (Susan Cooper, personal communication, 2009).

In addition to emotional processing, certain associations between PD and *risky decision-making* were found to differ significantly between genders. Specifically, risky choice was found to be associated with Antisocial PD to a greater extent in men than in women. This was regardless of similar co-existing psychopathology or other cognitive measures. There was also a tendency for risky decision making to be associated with impulsive and irresponsible personality traits (as measured by the PCL-R and SCID-II), but the evidence for this was less persuasive, as the significance of these associations were often affected by IQ and comparable personality traits. Thus, the current results suggest that treatment interventions with male prisoners who present with a high degree of Antisocial PD traits may be best targeted at developing strategies to reduce impulsivity and improve consequential thinking. These interventions may not be required to such an extent in an equivalent sample of female prisoners.

Overall, these findings provide further support for the need for gender-specific treatment programmes (e.g. The Corston Report, 2007), particularly in forensic services where men and women are seen as equivalent.

Links with neuropsychology

The finding that poor recognition of anger was associated to elevated scores on lifestyle features of psychopathy and Borderline PD provides tentative support for the hypothesis that OFC function is linked to the accurate recognition of anger in others (Blair & Cipolotti, 2000). Furthermore, the fact that this association was significantly stronger in female prisoners may suggest that this circuitry is further impaired in women.

In a similar respect to anger, poor fear recognition was related to elevated scores on lifestyle features of psychopathy and Borderline PD, and also to interpersonal, affective, and antisocial psychopathy features, and Schizoid PD. Therefore, as associations with such deficits were not limited to impulsive personality traits, and extend to traits of

deficient empathy (previously linked to amygdala impairment), it may be the case that the accurate recognition of fear in others is linked not only to activity in the OFC, but also to wider fronto-limbic circuitry. However, this interpretation is at best speculative, as the tests used in the current study are indirect measures of brain function, thus making comparisons to the existing literature difficult.

Regarding impulsivity, the fact that poor reflective-impulsivity was associated with lifestyle and antisocial traits (both of which have been linked to OFC dysfunction) also provides some support for the notion of a frontal deficit in prisoner populations. Similarly, the claim that recognition memory is related to the OFC was strengthened following significant associations between poor recognition memory and lifestyle features of psychopathy in the current study.

Overall, results from this analysis provide tentative support for theories of a fronto-limbic deficit in forensic populations. These findings go some way to supporting the suggestion that emotional processing and decision-making strategies are mediated by fronto-limbic circuitry, and that recognition memory is facilitated by the OFC. Moreover, these results highlight the importance for treatment strategies to be tailored as much as possible to an individuals' psychopathological presentation, and to be specific to male and female prisoner populations (see Chapter 7 for a full discussion).

Chapter 7: General Discussion

The psychopathological presentation of offenders incarcerated in prisons in England and Wales is an important issue to consider when planning and evaluating day to day management strategies, treatment outcome, and risk reduction. However, male and female prisoners have been found to exhibit numerous differences in their criminal histories, together with their psychopathological and neurocognitive presentations. It is therefore essential, from both an ethical and treatment efficacy point of view, that intervention and management strategies for male and female prisoners respond to these differences. This is particularly pertinent for services where male and female prisoners are viewed as comparable in their psychopathological presentation and level of dangerousness (e.g. Dangerous and Severe Personality Disorder (DSPD) service).

This study explored psychopathy, PD, criminality, and neurocognitive performance in a large sample of male and female prisoners incarcerated in penal establishments across England and Wales. It examined prevalence and performance rates and the associations between these measures, paying particular interest to gender-specific relationships. This chapter consolidates these findings by discussing how they relate to previous research and how they are useful in assisting treatment and management strategies to become more responsive to the needs of male and female prisoners.

Overall, findings from the current study highlight several important differences in the psychopathological and neuropsychological presentation of male and female prisoners with a serious offending history, in England and Wales. Firstly, significant gender differences were apparent in the type of crimes for which these prisoners were incarcerated, with more women having committed offences of robbery and serious violence, and more men having committed offences of a sexual nature and involving firearms. These offences showed differing relationships with measures of psychopathy between gender, with violence and robbery being more strongly associated with affective and antisocial features of psychopathy among women (respectively), and sexual offending being associated with greater affective deficiency among men. There was also evidence to suggest that Antisocial PD traits among women were related to more severe antisocial behaviour (as measured by the PCL-R), and that Borderline PD was associated with greater affective deficiency, than in an equivalent sample of men.

In line with this apparent affective deficit as measured by the PCL-R, female prisoners also showed significant impairment on neuropsychological measures of emotional processing, compared with their male counterparts. This was found to be inhibited further by the severity of presenting Borderline pathology, which did not have the same inhibitory effect in men. In contrast, male prisoners were found to be more risky on tasks of decision-making, which in turn was amplified in men with a higher number of Antisocial PD traits. This interaction was not significant among female prisoners. Therefore, the current study provides valuable insight into the prevalence rates, presenting features, and neuropsychological functioning of male and female prisoners incarcerated for serious offences in England and Wales. It also highlights important gender differences in how these factors interact, to help guide meaningful discussion for the development of more responsive, gender-specific services for prisoners with an equivalent level of risk and need (e.g. DSPD).

However, prior to any detailed discussion about what the current study tells us about the moderating effects of gender on the presenting features and observed impairments of this sample, it is important to firstly acknowledge the various limitations of the study.

Limitations

The most important limitation to acknowledge in the current study is the specificity of the sample. The sampling frame for the Prisoner Cohort Study (see Chapter 2 for further details) meant that a highly selected population of prisoners was used. As such, the applicability of the current results to the generalized prison population in England and Wales, and the rest of the literature, is limited. However, the current study affords an excellent opportunity to increase understanding about a particular group of prisoners with a higher degree of risk and more complex psychopathology. This, in turn, is very salient to expanding the knowledge-base for services like the DSPD programme.

Additionally, very little is known about the neurocognitive functioning in prisoner samples. The current study enabled a more detailed and thorough exploration to be conducted of how male and female prisoners from this unique group process emotional signals in others, and their ability to respond appropriately to risky situations. The current findings also allow for tentative links to be drawn with studies using cognitive tests thought to tap certain brain functions (though it is important to note that the current

measures are very indirect, and are highly susceptible to state effects). As such, the extent to which the current findings relate to the neuropsychology literature is unclear and it is recommended that they be interpreted with caution. For more clear links to be drawn, further research needs to be conducted using a more direct assessment of brain function during the performance of neuropsychological tests in prisoner samples.

Whilst the current sample size of male and female prisoners was larger than that used in similar studies, it is important to note (as mentioned in Chapter 6) that not all prisoners completed all measures. This was mainly due to nature of the prison regime (time constraints, other appointments, roll check, etc). However, the reduced numbers of observations on some neuropsychological tests were unlikely to have had an enormous impact on statistical validity.

Finally, in addition to gender differences in the completion of neuropsychological tests, male and female prisoners in the current study were found to differ in their level of risk (as measured by the OGRS). This remained the case after they were matched on levels of psychopathy. However, as this was partly controlled for with the inclusion of other predictors (i.e. age), it is less likely to have had a great impact upon the observed findings.

Notwithstanding these limitations, the current study provides a unique investigation and analysis of the psychopathology and neuropsychological functioning in this large sample of male and female prisoners, which may help inform treatment providers in services most suitable to these individuals.

Psychopathy, PD, and criminal history

Demography and criminal history

The finding that female prisoners were younger, less ethnically diverse, and with a greater rate of unemployment, compared with male prisoners in the total sample is in line with a recent literature of prisoners in England & Wales (NOMS, 2008). Considering criminality, female prisoners have historically been found to be most commonly incarcerated for crimes of theft, child abuse, drug offences, and property crime (Cale & Lilienfeld, 2002; d'Orbán, 1993; Hollin & Palmer, 2005; NOMS, 2005, 2008; Messer et al, 2004; Warren & South, 2006; Gunter et al, 2008), whereas men

most often commit crimes of violence, burglary, robbery, and sexual offences (Coid et al, 2000; Farrington & Painter, 2004; Blitz et al, 2005; NOMS, 2005; Watzke et al, 2006; Suter et al, 2002; Gunter et al, 2008). In addition, women in secure forensic psychiatric facilities are often found to be incarcerated for offences of arson, and to have a more severe history of arson offences over the lifetime (Coid et al, 2000).

However, findings from the current study portray a slightly different breakdown of offending behaviour between genders, which may be attributable to the specialized nature of the sample. Specifically, although the current study supported previous findings of an increased prevalence of arson in women, and of burglary and sexual offending in men, it challenged historical reports of a higher rate of robbery and violence in men. Indeed, in the current study, significantly more female prisoners were serving sentences for offences of robbery and extreme violence (i.e. homicide), and had a more serious history of robbery over the lifespan. These differences remained significant when male and female prisoners were matched on psychopathy.

A study by Watzke and colleagues (2006) may help clarify the discrepancy in violent offending. In their study of male and female prisoners in Germany, they found that women committed more serious acts of violence (i.e. murder or manslaughter) specifically, rather than violent offending more generally. Thus, these findings are more in line with those of the current study which showed that male prisoners are more often convicted of crimes of violence in general, but a higher proportion of female prisoners commit more serious acts of violence. The inconsistency of findings regarding robbery offences, however, is less clear. It may be that, as proposed by NOMS (2008), women's offending is more associated with poverty and financial difficulties than men (although women were not more prone to theft), and that there is a higher rate of substance misuse in the female offender population. This was indeed the case in the current study, with female prisoners having a significantly higher prevalence of alcohol and drug dependence compared to male prisoners.

However, as previously mentioned, the gender differences observed in the current study may be sample-specific (i.e. relevant to a highly selective group of prisoners). As such, their applicability to the overall prison population in England and Wales is unclear. Nevertheless, the current findings do provide support for the argument of gender-

specific strategies for assessment, treatment, and management of prisoners (argued by Nicholls et al, 2009), particularly those suitable for DSPD services.

Psychopathy

Gender differences in the prevalence of psychopathy supported previous findings of a lower prevalence among women than men; which has been reported in community samples (Rutherford et al, 1996), students (Fort et al, 1996), psychiatric patients (Nicholls et al, 2004), and prisoner populations (Salekin et al, 1997, Grann, 2000; Logan, 2002; Warren & South, 2006; Rogers, Jordan, & Harrison, 2007). Specifically, there was a trend for a greater percentage of men than women to be classified as psychopathic using a cut-off score of 25 (21.0% for men and 16.2% for women), but this only reached significance when the 30+ cut off was applied. This is contrary to the findings of Salekin et al (2004) who reported no difference in psychopathy prevalence (based on a 30+ cut off) between male and female adolescent offenders. Differences between male and female prisoners meeting criteria for DSPD in the current study were not significant, which may be a consequence of the higher rate of Axis II comorbidity observed in the women.

Dimensional analysis of the data yielded similar results. Male prisoners scored higher than female prisoners on PCL-R total scores, as well as measures of interpersonal style (Facet 1), affective deficiency (Facet 2), and antisocial behaviour (Facet 4). However, no significant gender differences were noted for lifestyle traits (Facet 3). This is contrary to the evidence put forward by Goldstein and colleagues (1996) who reported that women score higher on items related to irresponsibility, impulsivity, and failure to plan ahead (although their sample included 140 drug treatment clients, of which only 34 were female). However, the current findings support those of Rogers, Jordan, & Harrison (2007) who reported significant gender differences in PCL-R scores for interpersonal, affective, and antisocial traits, but not for lifestyle features.

Personality Disorder

Antisocial PD was the most prevalent Axis II disorder in male and female prisoner samples, which supports findings from UK studies (Singleton et al, 1998; O'Brien et al, 2003; Logan & Blackburn, 2009). Male prisoners in the unmatched sample had a significantly higher prevalence of Antisocial PD, which again is commensurate with

previous research (Singleton et al, 1998; Coid et al, 2000; Cale & Lilienfeld, 2002; Rogers, Jordan & Harrison, 2007; Nicholls et al, 2009). This gender difference was no longer present when male and female prisoners were matched for psychopathy. After Antisocial PD, Paranoid PD was the second most prevalent among male prisoners (from both the matched and unmatched sample), which again supports previous studies of UK sentenced populations (Singleton et al, 1998).

For female prisoners, the next most prevalent Axis II disorder was Borderline PD. This mirrors findings of Dolan and Mitchell (1994) and Logan & Blackburn (2009) in their studies of psychopathology among female offenders in the UK. The prevalence of Borderline PD was significantly higher among female than male prisoners, measured both dimensionally and categorically (in both matched and unmatched samples), which is commensurate with previous research (e.g. Singleton et al, 1998; Coid et al, 2000; Black et al, 2007; Rogers, Jordan & Harrison, 2007; Lynam & Widger, 2007; Nicholls et al, 2009).

On the other hand, compared with female prisoners, male prisoners had a significantly higher prevalence of Narcissistic PD (both dimensionally and categorically) across both matched and unmatched samples. Again, this is consistent with findings reported elsewhere (e.g. Lynam & Widiger, 2007). These findings therefore provide an indication of the likely prevalence of presenting psychopathology in services for high risk men and women with an equivalent level of risk and need.

However, when male and female prisoners were not matched on psychopathy, there was a greater degree of variability (with male prisoners presenting with a more complex dimensional constellation of PD traits). This is contrary to previous reports of a less complex PD presentation in men (e.g. Rogers, Jordan & Harrison, 2007); but it is supportive of findings of an increased prevalence of Paranoid, Schizoid, Schizotypal, Obsessive-Compulsive and Antisocial PD among men (Lynam & Widger, 2007).

Associations between Psychopathy and PD

In the current study, PDs from Cluster A (odd/ eccentric disorders) and Cluster B (dramatic, emotional, or unstable disorders) were found to have the strongest associations with psychopathy overall. This compliments previous research with male

prisoner samples which has reported significant positive associations between psychopathy and Antisocial, Paranoid, Narcissistic, Schizoid, and Histrionic PD (Hamburger et al, 1996; Hildebrand & de Ruiter, 2004; Ullrich & Marneros, 2007; Decuyper, De Fruyt, & Buschman, 2008; Coid et al, in press). Indeed, all of the above associations were significant in the matched sample of male and female prisoners in the current study.

Previous studies reporting strong associations between psychopathy overall and Cluster B PDs have found many of these associations to be facet-specific (e.g. Huchzermeier et al, 2007; Coid et al, in press). Similarly, in the current study, although significant associations were observed for numerous PDs and psychopathy (total score), only Antisocial, Borderline, and Paranoid PD were associated with all four facets of the PCL-R, and so were the only PDs which reflected the multi-faceted nature of psychopathy in its entirety. This suggests that both male and female prisoners assessed as a high level of risk, and presenting with Antisocial, Borderline, and/ or Paranoid PD are likely to display a high degree of psychopathy traits across the board.

In addition to the associations with all four dimensions of psychopathy, several independent associations between certain PDs and specific facets of psychopathy were also observed. These tended to reflect similarities in the defining features of certain personality traits across PCL-R and DSM-IV criteria (e.g. interpersonal features of psychopathy and Narcissistic and Obsessive-compulsive PD; and affective features of psychopathy and Schizoid PD). This, in turn, supports the notion that psychopathy is not a distinct clinical entity but rather a dimensional comorbid constellation of personality traits (Lynam & Derefinko, 2006).

Associations between offending history, psychopathy and PD

In the current study, *violent offending* was found to be positively associated with total PCL-R scores, and affective (F2) and antisocial (F4) features specifically. This supports previous findings of a strong association between violence and psychopathy in both male (Salekin, Rogers, & Sewell, 1996; Flores-Mendoza et al, 2008), and female prisoner populations (Nicholls et al, 2004; Logan & Blackburn, 2009), as well as associations with affective and antisocial features specifically (Penney & Moretti, 2006;

Kennealy, Hicks, & Patrick, 2007; Roberts & Coid, 2007; Logan & Blackburn, 2009 Coid et al, in press).

Predicted associations between violent offending and Antisocial and Borderline PD varied from those reported previously. For example, a high degree of association between these measures has been reported among women (Warren et al, 2002; Burnette, South, & Reppucci, 2007; Logan & Blackburn, 2009) and men (Leichsenrig et al, 2003; Mauricio et al, 2007; Tikkanen et al, 2007; de Barros & de Pa´dua Serafim, 2008), particularly if there is a high rate of comorbidity between the two (Howard et al, 2008). Initial associations between violence and Antisocial and Borderline PD in the current study were rendered non-significant following the inclusion of psychopathy to the model. This suggests that previous reports of an association with PD may in fact have been due to comorbid psychopathy traits (in studies where this was not controlled for), and thus may help account for divergent findings.

A serious history of *robbery offending* in the combined sample of male and female prisoners was also linked to total PCL-R scores, and specifically with interpersonal (F1), lifestyle (F3), and antisocial features (F4). The latter is commensurate with previous studies of UK penal populations (Coid et al, in press). Similarly, an extensive record of robbery offences was also associated with a greater number of Antisocial PD traits, but not with Borderline pathology as expected. This suggests that prisoners in the current study with a serious history of robbery offences have marked difficulties with impulsivity and antisocial behaviour, but are not as affectively deficient/ labile as prisoners with a serious history of violence.

A history of *sexual offending* in the current study was found to be associated with a greater number of traits from the interpersonal facet of psychopathy (F1). This suggests that individuals who have a significant history of sexual deviance are more skilled in their ability to manipulate others and have an inflated sense of grandiosity and self worth (in line with Leclerc, Carpentier & Proulx, 2006).

Gender-specific associations.

Psychopathy overall was more strongly associated with Borderline pathology in women and Narcissistic pathology in men. Thus, the notion that psychopathy in women

presents as a more Borderline presentation than it does in men (Warren et al, 2003) was supported. When analysed at a facet level, affective features of psychopathy were found to be more strongly related to Borderline PD traits among women, which is contrary to a recent study of female offenders in the UK (Logan & Blackburn, 2009). No such specificity was observed for Narcissistic PD.

In addition to presenting with more severe Borderline pathology, female prisoners with high rates of affective deficiency (as measured by F2) were also found to have a more serious history of violent offending compared to their male equivalents. These associations can not be attributed to a difference in violent offending or PCL-R scores, as men and women were matched on these measures. There was also a significant trend for violence in women to be more strongly related to antisocial features of psychopathy, but this was moderated by the presence of Borderline and Antisocial PD.

Contrary to the belief that psychopathy is more strongly associated with antisocial features in men; the current study found that female prisoners who presented with high levels of Antisocial PD traits were more antisocial (as measured by F4) then their male equivalents. This finding was consistent when Antisocial PD was broken down into conduct disorder and adult antisocial PD separately. Additionally, female prisoners with a high number of antisocial PCL-R traits were found to have a more serious history of robbery offences than male prisoners. Again, these differences could not be explained by a difference in offending history or psychopathy scores, as male and female prisoners were equivalent on these measures.

Therefore, the current findings raise the question of whether or not the items depicting affective and antisocial traits in the PCL-R adequately measure (or in fact underestimate) this construct in women. Indeed, from their review of the literature, Dolan & Völlm (2008) concluded that the items depicting facet 4 *'seem to be less applicable to women'*. Certainly, in the current study, female prisoners who presented with high levels of Antisocial PD traits were more antisocial (as measured by F4) than their male equivalents. This may be reflective of the 'threshold hypothesis' (Yang & Coid, 2007), whereby violent and antisocial women with Antisocial PD have a more severe form of Antisocial PD than men with Antisocial PD. It may also be due to a more generalized gender bias in the criminal justice system where crimes committed by

women are judged less seriously (Steffensmeier, Ulmer, & Cramer, 1998; MacDonald & Chesney-Lind, 2001; Mustard, 2001), and in the field of risk assessment, where women are seen as being less risky (e.g. Elbogen et al, 2001; Strand & Belfrage, 2001; Skeem et al, 2005). Nevertheless, the current findings suggest that female prisoners may benefit from extended work on empathy and perspective taking as part of a preventative strategy for violent recidivism, which their male counterparts may not require to the same degree.

Gender-specific differences were also observed for associations with sexual offending. Among men, a significant history of sexual offending was associated with greater affective deficiency than among women. Conversely, female prisoners with a history of sexual offending had a tendency to display more impulsive and antisocial traits, as depicted by F3 and F4. These findings therefore offer partial support for the hypothesis suggested by Roberts & Coid (2007) that women who engage in sexual offending behaviour are more impulsive and irresponsible and have a greater need for excitement and stimulation than their male counterparts. They are also supportive of reports of empathy deficits in male sexual offenders (Marshall et al, 1995; Marshall, Hamilton, & Fernandez, 2001; Covell & Scalora, 2002).

Therefore, the results from the current analysis indicate that there may be specific differences in the clinical and offending profiles of male and female prisoners in the UK. These differences may relate to an underestimation of presenting pathology in women, as measured by current assessment tools, and how this relates to offending behaviour. This, in turn, is an important issue to consider when evaluating methods of assessment and treatment in services where men and women are seen as equivalent in terms of risk (e.g. DSPD).

The neuropsychology of psychopathy and PD

In addition to the gender-specific interactions between psychopathy, PD, and offending behaviour, the current study also provided valuable insight into how gender moderates links with neuropsychological performance in this specialised sample of male and female prisoners. Prior to the implications of these findings being discussed, more general associations for the sample of prisoners as a whole will be considered.

Emotional processing

Both male and female prisoners in the current study displayed marked impairment in their ability to accurately identify emotional expressions, even at high intensities. This deficit was particularly prominent for facial expressions of anger, fear, sadness, and disgust, which is consistent with findings reported elsewhere (Blair et al, 2004; Lee et al, 2004; Kosson et al, 2002; Munro et al, 2007). This, in turn may account for the observation that prisoners frequently present with a lack of empathy and problems with perspective taking (Marshall, Hamilton, & Fernandez, 2001; Lauterbach & Hosser, 2007; Holmqvist, 2008). It may also be helpful in understanding how prisoners respond to the therapeutic process and react to emotional situations more generally.

In addition to the observation that emotional processing is often impaired in forensic samples, previous literature has reported that the degree of impairment is more pronounced among offenders with Borderline PD (Minzenberg, Poole, & Vinogradov, 2006) and high levels of psychopathy (Hastings et al, 2008; Eisenbarth et al, 2008). In the current study, this was found to be true for emotional expressions of fear in relation to psychopathy. Specifically, impaired recognition of fear was associated with high scores on interpersonal, affective, lifestyle, *and* antisocial facets of psychopathy. Such a global deficit was not observed with any of the other emotional expressions or with any PD. Therefore, the current study is contrary to claims that interpersonal and affective features work to enhance an individuals' perception of fear in others (Del Gaizo & Falkenbach, 2008), and suggest that these traits are associated with poor perceptions of these social signals in the same way as antisocial features. As such, clinically, it may be beneficial for programmes working with highly psychopathic offenders to target interventions at developing emotional awareness and perspective taking, particularly in relation to victim impact.

In addition to the extensive and robust associations between fear recognition and psychopathy noted above, several other associations were observed between other emotional expressions and specific traits of psychopathy and/ or PD. For example, impaired recognition of, and decreased sensitivity to, facial expressions of anger were associated with a greater number of impulsive and irresponsible behavioural traits (as depicted by F3 and Borderline PD). Also, the ability to recognise emotional signals in others was found to be negatively affected by Schizoid PD. However, the majority of these individual associations were rendered non-significant after controlling for the influence of IQ (although no significant interactions between IQ and measures of psychopathology in relation to emotional processing were noted). As such, it is possible that many of the observed deficits in this sample are an artefact of cognitive function. However, prisoner samples historically have a lower level of educational attainment and IQ than the general population (Davidson et al, 1995; Herrington, 2009), so it may be that this lower level of functioning has a generalised impact on the recognition of emotions in others. This may be an important factor to consider when planning and implementing offending behaviour programmes for prisoners presenting with a wide range of cognitive ability.

In addition to the possible clinical implications, the current findings of impaired emotional processing in this sample of prisoners provide tentative support for theories of a fronto-limbic deficit in this population. In studies measuring associations between emotional processing and brain function more directly, impaired emotional processing has been linked to dysfunction in fronto-limbic systems such as the orbitofrontal cortex and amygdala (Gray et al, 1997; Adolphs et al, 1999; Blair et al, 1999; Biseul et al, 2005; Clark, Neargarder, & Cronin-Golomb, 2008; Le Jeune et al, 2008; Derntl et al, in press). However, not much is known about similar neurocognitive processes in prisoner samples. This is mainly due to a paucity of studies using tangible measures of brain function in forensic samples. Therefore, the present findings indicate that a similar fronto-limbic deficit may be present in the current sample of male and female prisoners.

Gender-specific associations in emotional processing

As previously discussed, very little is known about how neuropsychological functioning relates to dimensions of psychopathology in prisoner samples. Even less is known

about how gender may moderate such associations. The current study goes some way to understanding the gender-specific nature of neurocognitive functioning in this specialised sample of prisoners and how it relates to dimensions of psychopathy and PD.

On a performance level, female prisoners were significantly more impaired in their ability to recognise (and in their sensitivity to) emotional expressions of fear in others. This difference was further pronounced in the sub-population of male and female prisoners who met the criteria for DSPD. Female prisoners were also more impaired in their ability to accurately label certain emotional expressions, but were more sensitive to emotional signals of anger and sadness than their male counterparts. These findings may be helpful in enhancing our understanding of how women perceive the therapeutic process and react to emotional situations more generally. Specifically, the current findings argue that female prisoners struggle to recognise when another person is frightened, and are over sensitive to signals of anger and sadness, compared with their male equivalents. This in turn could have a negative impact upon the group dynamics of any therapeutic process, and may mean that interventions with incarcerated women are best targeted at improving victim awareness and emotional management, prior to, or in accordance with any offence specific work.

The extent of this emotional processing deficit in women was further explained in the analysis exploring associations with psychopathy and PD. Specifically, it was found that Borderline PD served to inhibit sensitivity to emotional signals of anger, disgust, and surprise in women only (which is supportive of previous studies of emotional processing in Borderline PD women; Levine et al, 1997; Herpertz et al, 1999, 2001b). However, this deficit was not associated with Borderline pathology in an equivalent sample of male prisoners. This is an important issue to consider when evaluating the behavioural traits and the treatment and day to day management strategies in services for high risk women with a high prevalence of Borderline psychopathology. Indeed, it may be that women with Borderline PD have an increased tendency to engage in risky behaviour and unstable abusive relationships (e.g. Laporte & Guttman, 2001; Lieb et al, 2004; De Moor et al, 2009) because they have a specific difficulty in recognising signals of threat.

The current findings may also imply that Borderline PD impairs female prisoners' ability to modulate their behaviour on the basis of interpersonal signals. Moreover, findings from the current study suggest that interventions for such women may be best placed within a Dialectical Behavioural framework, targeted at developing emotion identification and regulation. Indeed, such an approach has been reported to be successful in female Borderline PD populations (e.g. Linehan et al, 1991; Koons et al, 2001; Nee & Farman, 2005; Stepp et al, 2008), and is currently being implemented in female DSPD services in England (Susan Cooper, personal communication, 2009).

Decision-making and reflective-impulsivity

As well as impaired emotional processing, both male and female prisoners in the current study made problematic and risky choices most frequently during tests of decision making (i.e. the IGT). This is comparable to other similar studies of prisoner populations (Mitchell et al, 2002; Broomhall, 2005), particularly those incarcerated for violent offences (Yechiam et al, 2008). This finding may be indicative of an emotional memory deficit, in that prisoners in the current sample struggle to remember the negative impact of receiving a large punishment, and so return to their risk-taking behaviour in the hope of a high reward. It may also explain into why these individuals engage in a persistently reckless and criminal lifestyle, leading to a high rate of recidivism.

In a similar way to emotional processing, the level of impairment observed in offender samples on tasks of decision-making is thought to be reflective of the severity of psychopathology present. Risky decision-making has been linked to a higher degree of psychopathy (Vassileva et al, 2007) and personality traits related to lack of consequential thinking and impulsivity (Kirkpatrick et al, 2007; Molto et al, 2007; Chapman et al, 2008; Bagby et al, 2008). However no significant associations were observed between risky decision-making and elevated scores on the PCL-R. Indeed, the reverse was found with interpersonal traits of psychopathy. Prisoners presenting with glib and manipulative traits made less risky decisions than prisoners who did not present in this way. These results may be consistent with the view proposed by Logan & Blackburn (2009) that individuals scoring highly on interpersonal measures of psychopathy are controlled and skilful in the manner in which they deceive others.

From this perspective, it is understandable that such individuals do not make impulsive, risky decisions.

Nevertheless, although psychopathy was not negatively associated with risky choice on the IGT, other measures of impulsivity (without monetary incentives) portrayed divergent findings. Specifically, impulsive choice (as measured by reflective-impulsivity on the MFFT) *was* found to be significantly associated with impulsive and antisocial traits of psychopathy. Therefore, it would seem that, when required to make a decision involving reward and punishment (i.e. the IGT), the interpersonal features of psychopathy work to enhance the individuals' response selection; but when incentive cues are not part of the task and require prisoners to take their time while considering the available evidence for one course of action versus another course of action (i.e. MFFT), impulsive behaviour *is* related to the typical antisocial aspects of psychopathy.

Overall, the current results support the use of cognitive-behavioural based programmes aimed at improving decision making and consequential thinking in prisoners with a history of reckless and impulsive behaviour. However, there is no convincing evidence that these programmes should be advanced for prisoners with a higher level of psychopathic traits.

Gender-specific associations in decision-making and reflective-impulsivity

Male prisoners were found to engage in more risk-taking behaviour, as measured by the IGT, than female prisoners. This behaviour, in turn, was found to be related to a greater number of affective and antisocial personality traits (as reflected in dimensional scores of F2 and Antisocial PD). No such associations were observed in the equivalent sample of female prisoners. An additional association was also observed with lifestyle features of impulsiveness and irresponsibility (F3) in the male sample specifically, but this was rendered non-significant after controlling for the influence of IQ (although no specific interactions were observed). As previously discussed, this may indicate that the behavioural deficits observed in prisoner samples could be due to a lower level of cognitive functioning. However, as the associations with affective and antisocial traits were not susceptible to the influence of IQ, this argument seems less likely. What the current results highlight more clearly is that interventions with male prisoners with a high degree of Antisocial PD traits may be best aimed at developing strategies to

improve consequential thinking, and understand how risky behaviour relates to affective lability. These interventions may not be required to such an extent in an equivalent sample of female prisoners.

Overall, the current study provides conflicting evidence to reports of more accurate emotion recognition in female, compared with male, non-prisoner samples (e.g. Miura, 1993; Thayer & Johnson, 2000). It is, however, supportive of the hypothesis that males and females may recruit different neural mechanisms when rating emotive pictures of others (Harenski et al, 2008; Schulte-Rüther et al, 2008). Also, as the emotion recognition deficit observed in women was not generalised across all domains, the current study suggests that female prisoners have a specific impairment in their ability to recognise certain emotional expressions in others. The specificity of impaired neuropsychological function between genders is further supported by the findings that male prisoners made more disadvantageous choices on measures of decision making (i.e. the IGT), whereas female prisoners were more impaired on measures of reflective-impulsivity (i.e. the MFFT).

Summary

The current study provides a thorough and robust analysis of the psychopathological and neurocognitive presentation of a large sample of male and female prisoners in England and Wales. It is unique from the perspective that rates of comorbidity and associations between psychopathy, PD, criminality, and neurocognitive functioning in a comparable sample of male and female prisoners have all been evaluated.

To date, very little is known about how neuropsychology relates to dimensions of psychopathology in prisoner samples. At best, the literature can attempt to draw speculative links with studies using direct measures of cognitive function in non-offender samples, or with studies using more indirect measures in forensic populations. Although the current study does not employ direct measures of brain functioning, it provides important insight into how gender may moderate neurocognitive processing in relation to dimensions of psychopathology in this specialised sample of male and female prisoners.

The results of the current study may therefore be helpful in developing more responsive treatment interventions and management strategies for male and female prisoners presenting with diverse psychopathological needs, particularly in services where risk and need is viewed as comparable across gender (i.e. DSPD).

The current study highlighted the heterogeneous nature of male and female prisoners in England and Wales. It corroborated previous reports of a high prevalence of Axis I disorders, Axis II comorbidity, and strong associations between psychopathy, criminality and PD (particularly those from Cluster B). Additionally, it supported theories of impaired neuropsychological functioning in prisoner samples, particularly regarding emotional processing and risky decision making.

In addition to the findings from the sample of prisoners as a whole, some important distinctions between male and female prisoners were also observed. Psychopathy among women was more strongly linked to borderline psychopathology compared with men, who presented as more narcissistic. Importantly, women scoring highly on antisocial features of psychopathy were found to be more antisocial than their male equivalents regarding violent conduct, Antisocial PD, and lifetime robbery offences. This suggests that the items underpinning Facet 4 of the PCL-R may be underestimating antisocial behaviour among female prisoners in England and Wales. Additionally, affective features of psychopathy were more strongly associated with violence and Borderline PD in women, thus implying that the traits underpinning affective deficiency in the PCL-R may need to account for more violent conduct in female prisoners (as both men and women in the current study had comparable violent histories). Further differences were observed regarding sexual offending and psychopathy. Specifically, sexual offending was related to affective deficiency among men, but to a more impulsive and antisocial lifestyle among women. However, it is important to note that sexual offending histories in the current study were not as extensive as those for violence or robbery, and may have been misinterpreted in women (see Chapter 3 discussion). The current results should therefore be interpreted with caution.

Regarding neuropsychological functioning, Borderline PD was found to inhibit sensitivity to emotional signals of threat among women specifically. This was not due to a global

deficit on measures of neuropsychological functioning more generally. Indeed, risky and impulsive decision-making among male prisoners was found to be specifically underpinned by behavioural traits of emotional lability and antisocial behaviour (which was not the case among female prisoners).

Clinically, the findings of the current study support the case for developing more gender-specific services and treatment interventions for male and female prisoners assessed as having an equivalent level of risk and need (The Corston Report, 2007; NOMS, 2008). They imply that treatment interventions for women may benefit from being targeted at addressing affective lability and impulsivity and how these traits in turn, relate to violent offending and an impaired ability to accurately process emotional signals in others. In contrast, interventions with an equivalent population of male prisoners may be best aimed at developing strategies to manage risky decision-making and how this relates to personality and lifestyle characteristics of affective lability and antisocial behaviour.

References

Addington, J., Penn, D., Woods, S. W., Addington, D., & Perkins, D. O. (2008). Facial affect in individuals at clinical high risk for psychosis. *British Journal of Psychiatry, 192*(1), 67-68.

Adolphs, R., Tranel, D., Damasio, H., & Damasio, A. (1994). Impaired recognition of emotion in facial expressions following bilateral damage to the human amygdala. *Nature, 372*, 669.

Adolphs, R., Tranel, D., Damasio, H., & Damasio, A. R. (1995). Fear and the human amygdala. *The Journal of Neuroscience, 15*(9), 5879-5891.

Adolphs, R., Tranel, D., Hamann, S., Young, A. W., Calder, A. J., Phelps, E. A., Anderson, A., Lee, G. P., & Damasio, A. R. (1999). Recognition of facial emotion in nine individuals with bilateral amygdala damage. *Neuropsychologica, 37*, 1111-1117.

Allnutt, S., Wedgwood, L., Wilhelm, K., & Butler, T. (2008). Temperament, substance use and psychopathology in a prisoner population: implications for treatment. *The Australian and New Zealand Journal of Psychiatry, 42*(11), 969-975.

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

Anderson, S. W., Barrash, J., Bechara, A., & Tranel, D. (2006). Impairments of emotion and real-world complex behaviour following childhood- or adult-onset damage to ventromedial prefrontal cortex. *Journal of the International Neuropsychological Society, 12*, 224–235.

Bagby, R. M., Vachon, D. D., Bulmash, E., & Quilty, L. C. (2008). Personality disorders and pathological gambling: A review and re-examination. *Journal of Personality Disorders, 22*(2), 191–207.

Barrash, J., Tranel, D., & Anderson, S. W. (2000). Acquired personality disturbances associated with bilateral damage to the ventromedial prefrontal region. *Developmental Neuropsychology, 18*(3), 355-381.

Bazanis, E., Rogers, R. D., Dowson, J. H., Taylor, P., Meux, C., Staley, C., Nevinson-Andrews, D., Taylor, C., Robbins, T. W., & Sahakian, B. J. (2002). Neurocognitive deficits in decision-making and planning of patients with DSM-III-R borderline personality disorder. *Psychological Medicine, 32,* 1395-1405.

Bearden, C. E., Glahn, D. C., Monkul, E. S., Barrett, J., Najit, P., Villarreal, V., & Soares, J. C. (2006). Patterns of memory impairment in bipolar disorder and unipolar major depression. *Psychiatry Research, 142*(2-3), 139-150.

Bechara, A., Damasio, A. R., Damasio, H., & Anderson, S. W. (1994). Insensitivity to future consequences following damage to human prefrontal cortex. *Cognition, 50*(1-3): 7-15.

Bechara, A., Damasio, H., Damasio, A. R., & Lee, G. P. (1999). Different contributions of the human amygdala and ventromedial prefrontal cortex to decision-making. *Journal of Neuroscience, 19*(13): 5473-5481.

Bechara, A., Damasio, H., Tranel, D., & Damasio, A. R. (1997). Deciding advantageously before knowing the advantageous strategy. *Science, 275* (5304): 1293-1295.

Bechara, A., Tranel, D., & Damasio, H. (2000). Characterization of the decision-making deficit of patients with ventromedial prefrontal cortex lesions. *Brain, 123*(11), 2189-2202.

Bechara, A. & Van Der Linden, M. (2005). Decision-making and impulse control after frontal lobe injuries. *Current Opinions in Neurology, 18*, 734–739.

Becker, D.F., Grilo, C.M., Edell, W.S, & McGlashan, T.H. (2000). Comorbidity of borderline personality disorder with other personality disorders in hospitalized adolescents and adults. *American Journal of Psychiatry, 157*, 2011–2016.

Benazzi, F. (2003). The role of gender in depressive mixed state. *Psychopathology, 36*(4), 213-7.

Bennett, S., Farrington, D. P., & Huesmann, L. R. (2005). Explaining gender differences in crime and violence: The importance of social cognitive skills. *Aggression and Violent Behaviour 10,* 263–288.

Bennett-Levy, J. (1984). Determinants of performance on the Rey-Osterreith Complex Figure Test: An analysis and a new technique for single case assessment. British *Journal of Clinical Psychology, 23*, 109-119.

Bentler, P. M. (1995). *EQS Structural Equations program manual*, Multivariate Software, Encino, CA.

Berlin, H. A., Rolls, E. T., & Iversen, S. D. (2005). Borderline personality disorder, impulsivity, and the orbitofrontal cortex. *American Journal of Psychiatry, 162*(12), 2360-2373.

Biele, C. and A. Grabowska (2006) Sex differences in perception of emotion intensity in dynamic and static facial expressions. *Experimental Brain Research, 171*(1), 1-6.

Birbaumer, N., Veit, R., Lotze, M., Erb, M., Hermann, C., Grodd, W., & Flor, H. (2005). Deficient fear conditioning in psychopathy: A functional magnetic resonance imaging study. *Archives of General Psychiatry, 62*(7), 799-805.

Biseul, I., Sauleau, P., Haegelen, C., Trebon, P., Drapier, D., Raoul, S., Drapier, S., Lallement, F., Riviera, I., Lajat, Y., & Verin, M. (2005). Fear recognition is impaired by subthalamic nucleus stimulation in Parkinson's disease. *Neuropsychologia, 43,* 1054–1059.

Black, D. W., Gunter, T., Allen, J., Blum, N., Arndt, S., Wenman, G., & Sieleni, B. (2007). Borderline personality disorder in male and female offenders newly committed to

prison. *Comprehensive Psychiatry, 48*, 400–405.

Blackburn, R., & Coid, J. W. (1998). Psychopathy and the dimensions of personality disorder in violent offenders. *Personality and Individual Differences, 25*, 129-145.

Blair, R. J. (2003). Neurobiological basis of psychopathy. *British Journal of Psychiatry, 182* (1), 5-7.

Blair, R. J. (2004). The roles of orbital frontal cortex in the modulation of antisocial behaviour. *Brain and Cognition, 55,* 198-208.

Blair, R. J. R. (2005a). Applying a cognitive neuroscience perspective to the disorder of psychopathy. *Development and Psychopathology, 17,* 865-891.

Blair, R. J. R. (2005b). Responding to the emotions of others: Dissociating forms of empathy through the study of typical and psychiatric populations. *Consciousness and Cognition, 14*, 698-718.

Blair, R. J. R. (2006). Subcortical brain systems in psychopathy: The amygdala and associated structures. In C. J. Patrick (Ed.), *Handbook of psychopathy* (pp. 296-312). New York: Guilford Press.

Blair, R. J. R., & Cipolotti, L. (2000). Impaired social response reversal: A case of 'acquired sociopathy'. *Brain, 123,* 1122-1141.

Blair, R. J. R., Colledge, E., Murray, L., & Mitchell, D. G. (2001). A selective impairment in the processing of sad and fearful expressions in children with psychopathic tendencies. *Journal of Abnormal Child Psychology, 29*(6), 491-498.

Blair, R. J. R., Morris, J. S., Frith, C. D., Perrett, D. I., & Dolan, R. J. (1999). Dissociable neural responses to facial expressions of sadness and anger. *Brain, 122*, 883-893.

Blair, R. J. R., Mitchell, D. G. V., Peschardt, K. S., Colledge, E., Leonard, R. A., Shine, J. H.,

Murray, L. K., & Perrett, D. I. (2004). Reduced sensitivity to others' fearful expressions in psychopathic individuals. *Personality and Individual Differences, 37*, 1111-1122.

Blanchette, K., & Brown, S. L. (2006). *The assessment and treatment of women offenders: An integrative perspective.* Chichester: Wiley.

Blitz, C. L., Wolff, N., Pan, K. Y., & Pogorzelski, W. (2005). Gender-specific behavioral health and community release patterns among New Jersey prison inmates: implications for treatment and community reentry. *American Journal of Public Health, 95*(10), 1741-1746.

Bolla, K. I., Eldreth, D. A., Matochik, J. A., & Cadet, J. L. (2004). Sex-related differences in a gambling task and its neurological correlates. *Cerebral Cortex, 14*, 1226-1232.

Bolt, D. M., Hare, R. D., Vitale, J. E., & Newman, J. P. (2004). A multigroup item response theory analysis of the Psychopathy Checklist-Revised. *Psychological Assessment, 16*(2), 155-168.

Boothby, J. L., & Durham, T. W. (1999). Screening for depression in prisoners using the Beck Depression Inventory. *Criminal Justice and Behavior*, *26*(1), 107-124.

Brandt, J. R., Kennedy, W. A., Patrick, C. J., & Curtin, J. (1997). Assessment of psychopathy in a population of incarcerated adolescent offenders. *Psychological Assessment, 9*(4), 429-435.

Breiter, H. C., Etcoff, N. L., Whalen, P. J., Kennedy, W. A., Rauch, S. L., Buckner, R. L., Strauss, M. M., Hyman, S. E., & Rosen, B. R. (1996). Response and Habituation of the Human Amygdala during Visual Processing of Facial Expression. *Neuron, 17,* 875–887.

Bremner, J. D., Soufer, R., McCarthy, G., Delaney, R., Staib, L. H., Duncan, J. S., & Charney, D. S. (2001). Gender differences in cognitive and neural correlates of remembrance of emotional words. *Psychopharmacology Bulletin, 35*(3), 55-78.

British Psychological Society (2006). *Understanding Personality Disorder*: A Professional Practice Board Report by the British Psychological Society; Leicester.

Broks, P., Young, A. W., Maratos, E. J., Coffey, P. J., Calder, A. J., Issac, C. L., Mayes, A. R., Hodges, J. R., Montaldi, D., Cezeyirli, E., Roberts, N., & Hadley, D. (1998). Face processing impairments after encephalitis: amygdala damage and recognition of fear. *Neuropsychologica, 36*(1), 59-70.

Broomhall, L. G. J. (2005). Acquired sociopathy: A neuropsychological study of executive dysfunction in violent offenders. *Psychiatry, Psychology and Law, 12*, 367–387.

Brower, M. C., & Price, B. H. (2001). Neuropsychiatry of frontal lobe dysfunction in violent and criminal behaviour: A critical review. *Journal of Neurology, Neurosurgery, and Psychiatry, 71*, 720-726.

Brugha, T., Singleton, N., Meltzer, H., Bebbington, P., Farrell, M., Jenkins, R., Coid, J., Fryers, T., Melzer, D., & Lewis, G. (2005). Psychosis in the community and in prisons: a report from the British National Survey of psychiatric morbidity. *American Journal of Psychiatry, 162*(4), 774-780.

Brüne, M. (2005). Emotion recognition, theory of mind, and social behavior in schizophrenia. *Psychiatry Research, 133*, 135– 147.

Burgess, J. W. (1992). Neurocognitive impairment in dramatic personalities: histrionic, narcissistic borderline and antisocial disorders. *Psychiatry Research, 42*, 283–290.

Burnette, M. L., South, S. C., & Reppucci, N. D. (2007). Cluster B Personality Pathology in Incarcerated Girls: Structure, Comorbidity, and Aggression. *Journal of Personality Disorders, 21*(3), 262–272.

Buss, A. H., & Perry, M. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology, 63*, 452-459.

Butler, T., Pan, H., Epstein, J., Protopopescu, X., Tuescher, O., Goldstein, M., Cloitre, M., Yang, Y., Phelps, E., Gorman, J., Ledoux, J., Sten, E., & Silbersweig, D. (2005). Fear-related activity in subgenual anterior cingulate differs between men and women. *Neuroreport, 16*(11), 1233-1236.

Cahill, L. (2005). His brain. Her brain. Scientific American, 292 (5), 40-47.

Calder, A. J., Young, A. W., Rowland, D., Perret, D. I., Hodges, J. R., & Etcoff, N. L. (1996). Facial emotion recognition after bilateral amygdala damage: Differential severe impairment of fear. *Cognitive Neuropsychology, 13*(5), 699-745.

Calder, A. J., Lawrence, A. D., & Young, A. W. (2001). Neuropsychology of fear and loathing. *Nature, 2,* 352-363.

Cale, E. M., & Lilienfeld, S. O. (2002a). Histronic personality disorder and antisocial personality disorder: Sex differentiated manifestations of psychopathy? *Journal of Personality Disorders, 16*(1), 52-72.

Cale, E. M., & Lilienfeld, S. O. (2002b). Sex differences in psychopathy and antisocial personality disorder: A review and integration. *Clinical Psychology Review, 22*, 1179-1207.

Campanella, S., Vanhoolandt, M.E., & Philippot, P. (2005). Emotional deficit in subjects with psychopathic tendencies as assessed by the MMPI-2: an event-related potentials study. *Neuroscience Letters, 373*(1), 26–31.

Clark, L., Bechara, A., Damasio, H., Aitken, M. R., Sahakian, B. J., & Robbins, T. W. (2008). Differential effects of insular and ventromedial prefrontal cortex lesions on risky decision-making. *Brain, 131*(5), 1311-1322.

Clark, U. S., Neargarder, S., & Cronin-Golomb, A. (2008). Specific impairments in the recognition of emotional facial expressions in Parkinson's disease.

Neuropsychologia, 46(9), 2300-2309.

Clark-Carter, D. (2003). Effect size: The missing piece in the jigsaw. *The Psychologist, 16* (12), 636-638.

Cleckley, H. M. (1982). *Mask of Sanity*. St. Louis: Mosby.

Cliftona, A., Turkheimerb, E., & Oltmannsc, T. F. (2009). Personality disorder in social networks: Network position as a marker of interpersonal dysfunction. *Social Networks, 31,* 26–32.

Coccaro, E. F., McCloskey, M. S., Fitzgerald, D. A., & Phan, K. L. (2007). Amygdala and orbitofrontal reactivity to social threat in individuals with impulsive aggression. *Biological Psychiatry, 62*, 168–178.

Coid, J. W. (1992). DSM-III diagnosis in criminal psychopaths: A way forward. *Criminal Behaviour and Mental Health, 2*(2), 78-94.

Coid, J. W. (1993). An affective syndrome in psychopaths with borderline personality disorder? *British Journal of Psychiatry, 162*, 641-50.

Coid, J. W. (1998). The management of dangerous psychopaths in prison. In T. Millon, E. Simonson, M. Birket-Smith, & R. D. Davis. (Eds.), *Psychopathy: Antisocial, Criminal, and Violent Behaviour* (pp. 431-457). New York, NY: Guilford Press.

Coid, J. W. (2002). Personality disorders in prisoners and their motivation for dangerous and disruptive behaviour. *Criminal Behaviour and Mental Health, 12*, 209-226.

Coid, J. W. (2003). Epidemiology, public health and the problem of personality disorder. *British Journal of Psychiatry, 182* (suppl. 44), 3-10.

Coid, J. W., Kahtan, N., Gault, S., & Jarman, B. (2000). Women admitted to secure forensic psychiatry services: I. Comparison of women and men. *The Journal of Forensic*

Psychiatry, 11(2), 275–295.

Coid, J. W., Yang, M., Tyrer, P., Roberts, A., & Ullrich, S. (2006). Prevalence and correlates of personality disorder in Great Britain. *British Journal of Psychiatry; 188*, 423–431.

Coid, J. W., Yang, M., Ullrich, S., Zhang, T., Sizmur, S., Roberts, C., Farrington, D. P., & Rogers, R. D. (2009a). Gender differences in structured risk assessment: Comparing the accuracy of five instruments. *Journal of Consulting and Clinical Psychology, 77*(2), 337-348.

Coid, J., Yang, M., Ullrich, S., Roberts, A., & Hare, R. D. (2009b). Prevalence and correlates of psychopathic traits in the household population of Great Britain. *International Journal of Law and Psychiatry, 32*(2), 65-73.

Coid, J., Yang, M., Ullrich, S., Roberts, A., Moran, P., Bebbington, P., Brugha, T., Jenkins, R., Farrell, M., Lewis, G., Singleton, N., & Hare, R. D. (in press). Psychopathy among Prisoners in England and Wales.

Cooke, D. J., Kosson, D. S., & Michie, C. (2001). Psychopathy and ethnicity: Structural, item, and test generalizability of the Psychopathy Checklist-Revised (PCL-R) in Caucasian and African American participants. *Psychological Assessment, 13*(4), 531-542.

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

Cooke, D. J., Michie, C., Hart, S. D., & Clark, D. (2005). Assessing psychopathy in the UK: Concerns about cross-cultural generalisability. *British Journal of Psychiatry, 186*(4), 335-341.

Cooke, D. J., Michie, C., & Skeem, J. (2007). Understanding the structure of the Psychopathy Checklist-Revised: An exploration of methodological confusion. *British Journal of Psychiatry, 190 (*suppl. 49), s39-s50.

Copas, J., & Marshall, P. (1998). The offender group reconviction scale: A statistical reconviction score for use by probation officers. *Applied Statistics, 47*, 159–171.

Corapcioğlu, A., & Erdoğan, S. (2004). A cross-sectional study on expression of anger and factors associated with criminal recidivism in prisoners with prior offences. *Forensic Science International, 140*, 167–174.

Corrigan, N. M., Richards, T., Webb, S. J., Murias, M., Merkle, K., Kleinhans, N. M., Johnson, L. C., Poliakov, A., Aylward, E., & Dawson, G. (2009). An Investigation of the Relationship Between fMRI and ERP Source Localized Measurements of Brain Activity during Face Processing. *Brain Topography.* 2009 Mar 26. [Epub ahead of print]

The Corston Report (2007). *The Corston Report: a review of women with particular vulnerabilities in the criminal justice system.* The Home Office: London. (http://www.homeoffice.gov.uk/documents/corston-report)

Covell, C. N., & Scalora, M. J. (2002). Empathic deficits in sexual offenders: An integration of affective, social, and cognitive constructs. *Aggression and Violent Behaviour, 7*(3), 251-270.

Coventry, K. R., & Hudson, J. (2001). Gender differences, physiological arousal and the role of winning in fruit machine gamblers. *Addiction, 96*, 871-879.

Craig, L. A., Browne, K. D., Beech, A., & Stringer, I. (2006). Differences in personality and risk characteristics in sex, violent, and general offenders. *Criminal Behaviour and Mental Health, 16*, 183-194.

Cunliffe, T., & Gacono, C. B. (2005). A Rorschach investigation of psychopathy and hysteria in incarcerated antisocial personality disordered female offenders. *International Journal of Offender Therapy and Comparative Criminology, 49*(5), 530-546.

Daoust, S. W., Loper, A. B., Magaletta, P. R., & Diamond, P. M. (2006).

Neuropsychological dysfunction and aggression among female federal inmates. *Psychological Services*, *3*(2), 88-96.

Davidson, M., Humphreys, M. S., Johnstone, E. C., & Owens, D. G. (1995). Prevalence of psychiatric morbidity among remand prisoners in Scotland. *The British Journal of Psychiatry, 167*, 545-548.

de Barros, D. M., & de Pa´dua Serafim, A. (2008). Association between personality disorder and violent behavior pattern. *Forensic Science International, 179*, 19–22.

Deckersbach, T., Dougherty, D. D., Savage, C., McMurrich, S., Fischman, A. J., Nierenberg, A., Sachs, G., & Rauch, S. L. (2006). Impaired Recruitment of the Dorsolateral Prefrontal Cortex and Hippocampus During Encoding in Bipolar Disorder. *Biological Psychiatry, 59*, 138–146.

Decuyper, M., De Fruyt, F., & Buschman, J. (2008). A five-factor model perspective on psychopathy and comorbid Axis-II disorders in a forensic-psychiatric sample. *International Journal of Law and Psychiatry, 31*(5), 394-406.

Del Gaizo, A. L., & Falkenbach, D. M. (2008). Primary and secondary psychopathic-traits and their relationship to perception and experience of emotion. *Personality and Individual Differences, 45*, 206–212.

De Moor, M. H., Distel, M. A., Trull, T. J., & Boomsma, D. I. (2009). Assessment of borderline personality features in population samples: Is the Personality Assessment Inventory-Borderline Features scale measurement invariant across sex and age? *Psychological Assessment, 21*(1), 125-130.

De Pascalis, V., Arwari, B., D'Antuono, L., & Cacace, I. (2009). Impulsivity and semantic/emotional processing: An examination of the N400 wave. *Clinical Neurophysiology, 120*, 85–92.

Department of Health, Home Office (1999). *Managing dangerous people with severe*

personality disorder: Proposals for policy development. London.

Derntl, B., Windischberger, C., Robinson, S., Kryspin-Exner, I., Gur, R. C., Moser, E., & Habel, U. (in press). Amygdala activity to fear and anger in healthy young males is associated with testosterone. *Psychoneuroendocrinology*.

Dikman Z. V., & Allen, J. B. J. (2000). Error monitoring during reward and avoidance learning in high and low socialised individuals. *Psychophysiology, 37*(1), 43-54.

Dinn, W. M., & Harris, C. L. (2000). Neurocognitive function in antisocial personality disorder. *Psychiatry Research, 97*(2-3), 173-190.

Dinn, W. M., Harris, C. L., Aycicegi, A., Greene, P. B., Kirkley, S. M., & Reilly, C. (2004). Neurocognitive function in borderline personality disorder. *Progress in Neuro-Psychopharmacology and Biological Psychiatry, 28*(2), 329-341.

Dolan, B. and Mitchell, E. (1994). Personality disorder and psychological disturbance of female prisoners: a comparison with women referred for NHS treatment of personality disorder. *Criminal Behaviour and Mental Health, 4*, 130–143.

Dolan, M., & Völlm, B. (2009). Antisocial personality disorder and psychopathy in women: A literature review on the reliability and validity of assessment instruments. *International Journal of Law and Psychiatry, 32*(1), 2-9.

Donegan, N. H., Sanislow, C. A., Blumberg, H. P., Fulbright, R. K., Lacadie, C., Skudlarski, P., Gore, J. C., Olson, I. R., McGlashan, T. H., & Wexler, B. E. (2003). Amygdala hyperreactivity in borderline personality disorder: Implications for emotional dysregulation. *Biological Psychiatry, 54*(11), 1284-1293.

D'Orbán, P. T. (1993). Female offenders. In: Tyrer, P. (Ed.) *Forensic Psychiatry: Clinical, Legal, and Ethical Issues.* Oxford: Butterworth-Heinemann.

Dreessen, L. & Arntz, A. (1998). Short-interval test-retest interrater reliability of the

Structured Clinical Interview for DSM-III-R personality disorders (SCID-II) in outpatients. *Journal of Personality Disorders, 12*(2), 138-148.

Driessen, M., Schroeder, T., Widmann, B., von Schönfeld, C. E., & Schneider, F. (2006). Childhood trauma, psychiatric disorders, and criminal behaviour in prisoners in Germany: a comparative study in incarcerated women and men. *The Journal of Clinical Psychiatry, 67*(10), 1486-92.

Eccleston, L., & Ward, T. (2004). Assessment of dangerousness and criminal responsibility. In: O'Donohue, W. T., & Levensky, E. R. (Eds.) *Handbook of Forensic Psychology: Resource for mental health and legal professionals* (pp 85-101). New York: Elsevier.

Edens, J. F., & Cahill, M. A. (2007). Psychopathy in adolescence and criminal recidivism in young adulthood: Longitudinal results from a multiethnic sample of youthful offenders. *Assessment 14*(1), 57-64.

Edens, J. F., Marcus, D. K., Lilienfeld, S. O., & Poythress, N. G. (2006). Psychopathic, not psychopath: Taxometric evidence for the dimensional structure of psychopathy. *Journal of Abnormal Psychology, 115*(1), 131-144.

Eisenbarth, H., Alpers, G. W., Segrè, D., Calogero, A., & Angrilli, A. (2008). Categorization and evaluation of emotional faces in psychopathic women. *Psychiatry Research, 159*, 189–195.

Elbogen, E. B., Williams, A. L., Kim, D., Tomkins, A. J., & Scalora, M. J. (2001). Gender and perceptions of dangerousness in civil psychiatric patients. *Legal and Criminological Psychology*, *6*, 215–228.

Elizabeth, C. (1993). The assessment of psychopathy in female offenders. *Dissertation Abstracts International B, 55*(8), 3634.

Eyestone, L. L., & Howell, R. J. (1994). An epidemiological study of attention-deficit hyperactivity disorder and major depression in a male prison population. *The Bulletin*

of the American Academy of Psychiatry and the Law, 22(2), 181-193

Eysenck, H. J. (1994). Personality: Biological Foundations. In: Vernon, P. A. (Ed.) *The Neuropsychology of Individual Differences*. (pp 151-207). San Diego: Academic Press.

Farrington, D. P. (2003). Developmental and life-course criminology: Key theoretical and empirical issues – the 2002 Sutherland Award Address. *Criminology, 41*(2), 221 – 225.

Farrington, D. P., & Painter, K. A. (2004). *Gender differences in offending: implications for risk-focused prevention*. Home Office Online Report 09/04: London. http://www.homeoffice.gov.uk/rds/pdfs2/rdsolr0904.pdf

Fazel, S., & Danesh, J. (2002). Serious mental disorder in 23 000 prisoners: a systematic review of 62 surveys. *Lancet*; 359: 545–550.

Fellows, L. K., & Farah, M. J. (2005). Different underlying impairments in decision-making following ventromedial and dorsolateral frontal lobe damage in humans. *Cerebral Cortex, 15*, 58-63.

Fertuck, E. A., Lezenweger, M. F., & Clarkin, J. F. (2005). The association between attentional and executive controls in the expression of borderline personality disorder features: A preliminary study. *Psychopathology, 38*, 75-81.

Finch, A. J., Edwards, G. L., & Searcy, J. D. (1984). impulsivity and. short-term memory in emotionally disturbed children. *The Journal of Psychology, 116*(2), 263-267.

First, M. B., Gibbon, M., Spitzer, R. L., Williams, J. B. W., & Benjamin, L. S. (1997). *Structured Clinical Interview for DSM-IV® Axis II Personality Disorders (SCID-II).* Washington: American Psychiatric Press.

Fischer, H., Sandblom, J., Nyberg, L., Herlitz, A., & Bäckman, L. (2007). Brain activation while forming memories of fearful and neutral faces in women and men. *Emotion,*

7(4), 767–773.

Flores-Mendoza, C. E., Alvarenga, M. A. S., Herrero, Ó., & Abad, F. J. (2008). Factor structure and behavioural correlates of the Psychopathy Checklist-Revised [PCL-R] in a Brazilian prisoner sample. *Personality and Individual Differences, 45,* 584–590.

Forouzan, E. & Cooke, D. J. (2005). Figuring out la femme fatale: conceptual and assessment issues concerning psychopathy in females. *Behavioral Sciences and the Law, 23*(6), 765-778.

Forth, A. E., Brown, S. L., Hart, S. D., & Hare, R. D. (1996). The assessment of psychopathy in male and female non-criminals: Reliability and validity. *Personality and Individual Differences, 20*(5), 531-543.

Fowles, D. C. (1980). The three arousal model: Implications of Gray's two-factor learning theory for heart rate, electrodermal activity, and psychopathy. *Psychophysiology, 17*(2), 87-104.

Freudenberg, N., Moseley, J., Labriola, M., Daniels, J., & Murrill, C. (2007). *Comparison of health and social characteristics of people leaving New York City jails by age, gender and race/ ethnicity: Implications for Public Health Interventions*. Public Health Reports, 122, 733 -743. (http://www.publichealthreports.org/userfiles/122_6/6_PHR122-6_733-743.pdf).

Fritz, M. V., Wiklund, G., Koposov, R. A., Klinteberg, B., &. Ruchkin, V. V. (2008). Psychopathy and violence in juvenile delinquents: What are the associated factors? *International Journal of Law and Psychiatry, 31*(3), 272-279.

Fukui, H., Murai, T., Fukuyama, H., Hayashi, T., & Hanakawa, T. (2005). Functional activity related to risk anticipation during performance of the Iowa gambling task. *Neuroimage, 24*, 253–259.

Furmark, T., Fischer, H., Wik, G., Larsson, M., & Fredrikson, M. (1997). The amygdala and

individual differences in human fear conditioning. *NeuroReport, 8*, 3957-3960.

Gasbarri, A., Arnone, B., Pompili, A., Marchetti, A., Pacitti, F., Calil, S. S., Pacitti, C., Tavares, M. C., Tomaz, C. (2006). Sex-related lateralized effect of emotional content on declarative memory: an event related potential study. *Behaviour and Brain Research, 168*(2), 177-184.

Gagliardi, C., Frigerio, E., Burt, D. M., Cazzaniga, I., Perrett, D. I., & Borgatti, R. (2003). Facial expression recognition in Williams syndrome. *Neuropsychologia, 41*(6), 733-738.

Gerevich, J., Bácskai, E., & Czobor, P. (2007). The generalizability of the Buss-Perry Aggression Questionnaire. *International Journal of Methods in Psychiatric Research, 16(3*), 124-136.

Gershon, J. (2002). A meta-analytic review of gender differences in ADHD. *Journal of Attention Disorders, 5*(3), 143–154.

Glass, S. J. & Newman, J. P. (2006). Recognition of Facial Affect in Psychopathic Offenders. *Journal of Abnormal Psychology, 115*(4), 815–820.

Gohier, B., Ferracci, L., Surguladze, S. A., Lawrence, E., El Hage, W., Kefi, M. Z., Allain, P., Garre, J., & Le Gall, D. (in press). Cognitive inhibition and working memory in unipolar depression. *Journal of Affective Disorders.*

Goldstein, R. B., Powers, S. I., McCusker, J., Mundt, K. A., Lewis, B. F., & Bigelow, C. (1996). Gender differences in manifestations of antisocial personality disorder among residential drug abuse treatment clients. *Drug and Alcohol Dependence, 41*, 35-45.

Gordon, H. L., Baird, A. A., & End, A. (2004). Functional differences among those high and low on a trait measure of psychopathy. *Biological Psychiatry, 56*, 516-521.

Grann, M. (2000). The PCL-R and Gender. *European Journal of Psychological Assessment, 16*(3), 147–149.

Gray, J. A. (1970). The psychophysiological basis of introversion-extraversion. *Behaviour Research and Therapy, 8,* 249-266.

Gray, J. A. (1976). The behaviour inhibition system: a possible substrate for anxiety. In: Feldman, P. M., & Broadhurst, A. (Eds.), *Theoretical and Experimental Bases of the Behaviour Therapies* (pp 3-41). New York: John Wiley & Sons.

Gray, J. A. (1987). *The psychology of fear and stress* (2nd Ed.). Cambridge: Cambridge University Press.

Gray, J. M., Young, A. W., Barker, W. A., Curtis, A., & Gibson, D. (1997). Impaired recognition of disgust in Huntington's disease gene carriers. *Brain, 120,* 2029–2038.

Gray, N. S., Hill, C., McGleish, A., Timmons, D., MacCulloch, M. J., & Snowden, R. J. (2003). Prediction of violence and self-harm in mentally disordered offenders: A prospective study of the efficacy of HCR-20, PCL-R and psychiatric symptomatology. *Journal of Clinical and Consulting Psychology, 71*(3), 443-451.

Gray, N. S., Snowden, R. J., MacCulloch, S., Phillips, H., Taylor, J., & MacCulloch, M. J. (2004). Relative Efficacy of Criminological, Clinical, and Personality Measures of Future Risk of Offending in Mentally Disordered Offenders: A Comparative Study of HCR-20, PCL: SV, and OGRS. *Journal of Consulting and Clinical Psychology, 72*(3), 523–530.

Green, R. E., Colella, B., Christensen, B., Johns, K., Frasca, D., Bayley, M., & Monette, G. (2008). Examining Moderators of Cognitive Recovery Trajectories After Moderate to Severe Traumatic Brain Injury. *Archives of Physical Medicine and Rehabilitation, 89*(12), Suppl. 1, 16-24.

Grimshaw, G. M., Bulman-Fleming, B., & Ngo, C. (2004). A signal-detection analysis of sex

differences in the perception of emotional faces. *Brain and Cognition, 54*, 248-250.

Guay, J. P., Ruscio, J., Knight, R. A., & Hare, R. D. (2007). A taxometric analysis of the latent structure of psychopathy: Evidence for dimensionality. *Journal of Abnormal Psychology, 116*(4), 701-716.

Gunter, T. D., Arndt, S., Wenman, G., Allen, J., Loveless, P., Sieleni, B., & Black, D. W. (2008). Frequency of mental and addictive disorders among 320 men and women entering the Iowa prison system: Use of the MINI-Plus. *Journal of the American Academy of Psychiatry and the Law, 36,* 27–34.

Haaland, V. ø. Esperaas, L., & Landrø, N. I. (2009). Selective deficit in executive functioning among patients with borderline personality disorder. *Psychological Medicine,* Feb 26:1-11. [Epub ahead of print].

Habel, U., Kuehn, E., Salloum, J. B., Devos, H., & Schneider, F. (2002). Emotional processing in psychopathic personality. *Aggressive Behaviour, 28*(5), 394-400.

Hamburger, M. E., Lilienfeld, S. O., & Hogben, M. (1996). Psychopathy, gender, and gender roles: Implications for antisocial and histrionic personality disorders. *Journal of Personality Disorders, 10*(1), 41-55.

Hamann, S. B., Stefenacci, L., Squire, L. R., Adolphs, R., Tranel, D., Damasio, H., & Damasio, A. (1996). Recognizing facial emotion. *Nature, 379,* 497.

Hare, R. D. (1965). Temporal gradient of fear arousal in psychopaths. *Journal of Abnormal Psychology, 70,* 442-445.

Hare, R. D. (1991). *The Hare Psychopathy Checklist - Revised*. Multi Health Systems: Toronto.

Hare, R. D. (2001). Psychopaths and their nature: Some implications for understanding human predatory violence. In A. Raine & J. Sanmartin (Eds.), *Violence and*

psychopathy (pp. 5-34). Dordrecht, The Netherlands: Kluwer Academic Publishing.

Hare, R. D. (2003). *The Hare Psychopathy Checklist – Revised (2nd Edition).* Multi Health Systems: Toronto.

Hare, R. D., Clark, D., Grann, M., & Thornton, D. (2000). Psychopathy and the predictive validity of the PCL-R: An international perspective. *Behavioural Sciences and the Law, 18*(5), 623-645.

Hare, R. D., Harpur, T. J., Hakstian, A. R., Forth, A. E., Hart, S. D., & Newman, J. P. (1990). The Revised Psychopathy Checklist: Descriptive statistics, reliability, and factor structure. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 2*, 338-341.

Hare, R. D., & Neumann, C. S. (2005). Structural models of psychopathy. *Current Psychiatry Reports, 7*(1), 57-64.

Harenski, C. L., Antonenko, O., Shane, M. S., & Kiehl, K. A. (2008). Gender differences in neural mechanisms underlying moral sensitivity. *SCAN, 3*, 313–321.

Harmer, C. J., Bhagwagar, Z., Cowen, P. J., & Goodwin, G. M. (2002). Acute administration of citalopram facilitates memory consolidation in healthy volunteers. *Psychopharmacology, 163*(1), 106-110.

Harmer, C. J., Grayson, L., & Goodwin, G. M. (2002). Enhanced recognition of disgust in bipolar illness. *Biological Psychiatry, 51*(4), 298-304.

Harmer, C. J., Hill, S. A., Taylor, M. J., Cowen, P. J., & Goodwin, G. M. (2003). Toward a neuropsychological theory of antidepressant drug action: increase in positive emotional bias after potentiation of norepinephrine activity. *American Journal of Psychiatry, 160*(5), 990-992.

Harmer, C. J.; Perrett, D. I.; Cowen, P. J.; Goodwin, G. M. (2001a). Administration of the

beta-adrenoceptor blocker propranolol impairs the processing of facial expressions of sadness. *Psychopharmacology, 154*(4), 383-389.

Harmer, C. J.; Thilo, K. V.; Rothwell, J. C.; Goodwin, G. M. (2001b). Transcranial magnetic stimulation of medial-frontal cortex impairs the processing of angry facial expressions. *Nature Neuroscience, 4*(1), 17-18.

Harpur, T. J., & Hare, R. D. (1994). The assessment of psychopathy as a function of age. *Journal of Abnormal Psychology, 103*(4), 604-609.

Harpur, T. J., Hare, R. D., & Hakstian, A. R. (1989). Two-factor conceptualization of psychopathy: construct validity and assessment implications. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 1*(1), 6-17.

Harpur, T. J., Hakstian, R., & Hare, R. D. (1988). Factor structure of the Psychopathy Checklist. *Journal of Consulting and Clinical Psychology, 56*, 741-747.

Harris, C. L., Dinn, W. M., & Marcinkiewicz, J. A. (2002). Partial seizure-like symptoms in borderline personality disorder. *Epilepsy and Behaviour, 3*, 433-438.

Hart, S. D., Cox, D. N., & Hare, R. D. (1995). *Manual for the Psychopathy Checklist: Screening Version (PCL:SV)*. Toronto: Multi-Health Systems.

Hart, S. D., Forth, A. F., & Hare, R. D. (1990). Performance of criminal psychopaths on selected neuropsychological tests. *Journal of Abnormal Psychology, 99,* 374-379.

Hart, S. D., & Hare, R. D. (1996). Psychopathy and risk assessment. *Current Opinions in Psychiatry, 9,* 380-383.

Hart, S. D., Kropp, P. R., & Hare, R. D. (1988). Performance of psychopaths following conditional release from prison. *Journal of Consulting and Clinical Psychology, 56*, 227-232.

Hartung, C. M., & Widiger, T. A. (1998). Gender differences in the diagnosis of mental disorders: conclusions and controversies of the DSM-IV. *Psychological Bulletin, 123*, 260–278.

Hastings, M. E., Tangney, J. P., & Stuewig, J. (2008). Psychopathy and identification of facial expressions of emotion. *Personality and Individual Differences, 44*, 1474–1483.

Hauber, W., & Sommer, S. (2009). Prefrontostriatal Circuitry Regulates Effort-Related Decision Making. *Cerebral Cortex*. 2009 Jan 8. [Epub ahead of print].

Heckel, R. V., Allen, S. S., Andrews, L., Roeder, G., Ryba, P., & Zook, W. (1989). Normative data on the Kagan Matching Familiar Figures test for adult male incarcerates. *Journal of Clinical Psychology, 45*(1), 155-60.

Hemphill, J. F., Hare, R. D., & Wong, S. (1998). Psychopathy and recidivism: A review. *Legal and Criminological Psychology, 3*, 141-172.

Hemphill, J. F., Hart, S. D., & Hare, R. D. (1994). Psychopathy and substance use. *Journal of Personality Disorders, 8*(3), 169-180.

Herpertz, S. C., Dietrich, T. M., Wenning, B., Krings, T., Erberich, S. G., Willmes, K., Thron, A., & Sass, H. (2001a). Evidence of abnormal amygdale functioning in borderline personality disorder: a functional MRI study. *Biological Psychiatry, 50*(4), 292-298.

Herpertz, S. C., Kunert, H. J., Schwenger, U. B., & Sass, H. (1999). Affective responsiveness in borderline personality disorder: A psychophysiological approach. *American Journal of Psychiatry, 156*(10), 1550-1556.

Herpertz, S. C., Werth, U., Lukas, G., Qunaibi, M., Schuerkens, A., Kunert, H. J., Freese, H. J., Flesch, M., Mueller-Isberner, R., Osterheider, M., & Sass, H. (2001b). Emotion in criminal offenders with psychopathy and borderline personality disorder. *Archives of general psychiatry, 58*(8), 737-745.

Herrington, V. (2009). Assessing the prevalence of intellectual disability among young male prisoners. *Journal of Intellectual Disability Research*, 2009, Feb 3. [Epub ahead of print]

Herrmann, C. (1997). International experiences with the Hospital Anxiety and Depression Scale: A review of validation data and clinical results. *Journal of Psychosomatic Research, 42*(1), 17-41.

Hildebrand, M., & de Ruiter, C. (2004). PCL-R psychopathy and its relation to DSM-IV Axis I and Axis II disorders in a sample of male forensic psychiatric patients in the Netherlands. *International Journal of Law and Psychiatry, 24*, 233-248.

Hildebrand, M., de Ruiter, C., & de Vogel, V. (2004). Psychopathy and sexual deviance in treated rapists: Association with sexual and non-sexual recidivism. *Sexual Abuse: A Journal of Research and Treatment, 16*(1), 1-24.

Hill, C. D., Neumann, C. S., & Rogers, R. (2004). Confirmatory factor analysis of the Psychopathy Checklist: Screening Version in offenders with Axis I disorders. *Psychological Assessment, 16*(1), 90-95.

Hobson, J., & Shine, J. (1998). Measurement of psychopathy in a UK prison population referred for long-term psychotherapy. *British Journal of Criminology, 38*(3), 504-515.

Hochhausen, N. M., Lorenz, A. R., & Newman, J. P. (2002). Specifying the impulsivity of female inmates with borderline personality disorder. *Journal of Abnormal Psychology, 111*(3), 495-501.

Hollin. C.R. and Palmer, E.J. (2005). *Criminogenic Factors among Women Offenders*. HM Prison Service.

Holmqvist, R. (2008). Psychopathy and affect consciousness in young criminal offenders. *Journal of Interpersonal Violence, 23*(2), 209-224.

Howard, R. C., Huband, N., Duggan, C., & Mannion, A. (2008). Exploring the link between personality disorder and criminality in a community sample. *Journal of Personality Disorders, 22*(6), 589–603.

Howard, R., & McCullagh, P. (2008). Neuroaffective processing in criminal psychopaths: Brain event-related potentials reveal task-specific anomalies. *Journal of Personality Disorders, 21*(3), 322–339.

Howell, D. C. (1997). *Statistical methods for psychology*. Boston: Duxbury Press.

Huchzermeier, C., Geiger, F., Bruß, E., Godt, N., Köhler, D., Hinrichs, G., & Aldenhoff, J. B. (2007). The relationship between DSM-IV cluster B personality disorders and psychopathy according to Hare's criteria: Clarification and resolution of previous contradictions. *Behavioural Sciences and the Law, 25*, 901-911.

Hunt, M. K., Hopko, D. R., Bare, R., Lejuez, C. W. & Robinson, E. V. (2005). Construct Validity of the Balloon Analog Risk Task (BART): Associations With Psychopathy and Impulsivity. *Assessment, 12*(4), 416-428.

Intrator, J., Hare, R., Stritzke, P., Brichtswein, K., Dorfman, D., Harpur, T., Bernstein, D., Handelsman, L., Schaefer, C., Keilp, J., Rosen, J. & Machac, J. (1997). A brain imaging (single photon emission computerised tomography) study of semantic and affective processing in psychopaths. *Biological Psychiatry, 42*, 96-103.

Ireland, J. L., Archer, J., & Power, C. L. (2007). Characteristics of male and female prisoners involved in bullying behaviour. *Aggressive Behaviour, 33*, 220–229.

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

Jackson, R. L., Rogers, R., Neumann, C. S., & Lambert, P. L. (2002). Psychopathy in female offenders: An investigation of its underlying dimensions. *Criminal Justice and*

Behaviour, 29(6), 692-704.

Johansson, P., Andershed, H., Kerr, M., & Levander, S. (2002). On the operationalization of psychopathy: Further support for a three-faceted personality-oriented model. *Acta Psychiatrica Scandinavica, 106* (Suppl. 412), 81-85.

Johnson, J G. Cohen, P., Kasen, S. Skodol, A E. Hamagami, F. Brook, J S. (2000). Age-related change in personality disorder trait levels between early adolescence and adulthood: a community-based longitudinal investigation. *Acta Psychiatrica Scandinavica. 102*(4), 265-275.

Judd, P. H., & Ruff, R. M. (1993). Neuropsychological dysfunction in borderline personality disorder. *Journal of Personality Disorders, 7*, 275–284.

Kagan, J., Rosman, B. L., Day, D., Albert, J., & Phillips,W. (1964). Information processing in the child: Significance of analytic and reflective attitudes. Psychological Monographs, 78(578), 1–37.

Kagan, J. (1965). *The Matching Familiar Figures Test.* Harvard, MA: Cambridge University Press.

Kamarajan, C., Rangaswamy, M., Chorlian, D. B., Manz, N., Tang, Y., Pandey, A. K., Roopesh, B. N., Stimus, A. T., & Porjesz, B. (2008). Theta oscillations during the processing of monetary loss and gain: A perspective on gender and impulsivity. *Brain Research, 1235*, 45-62.

Kataoka, S. H., Zima, B. T., Dupre, D. A., Moreno, K. A., Yang, X., & McCracken, J. T. (2001). Mental health problems and service use among female juvenile offenders: Their relationship to criminal history. *Journal of American Academic Child and Adolescent Psychiatry, 40*(5), 549-555.

Kennealy, P. J., Hicks, B. M., & Patrick, C. J. (2007). Validity of factors of the Psychopathy Checklist-Revised in female prisoners: Discriminant relations with antisocial behavior,

substance abuse, and personality. *Assessment, 14*(4), 323-340.

Kennedy, N., Boydell, J., Kalidindi, S., Fearon, P., Jones, P. B., van Os, J., Murray, R. M. (2006). Gender Differences in Incidence and Age at Onset of Mania and Bipolar Disorder Over a 35-Year Period in Camberwell, England. *American Journal of Psychiatry, 162,* 257–262.

Kiehl, K. A., Hare, R. D., Liddle, P. F., & McDonald, J. J. (1999b). Reduced P300 responses in criminal psychopaths during a visual oddball task. *Biological Psychiatry, 45*(11), 1498-1507.

Kiehl, K. A., Hare, R. D., McDonald, J. J., & Brink, J. (1999a). Semantic and affective processing in psychopaths: An ERP study. *Psychophysiology, 36*, 765-774.

Kiehl, K. A., Liddle, P. F., & Hopfinger, J. B. (2000). Error processing in the rostral anterior cingulate: An event related fMRI study. *Psychophysiology, 37*, 216-223.

Kiehl, K. A., Smith, A. M., Hare, R. D., Mandrek, A., Forster, B. B., Brink, J., & Liddle, P. F. (2001). Limbic abnormalities in affective processing by criminal psychopaths as revealed by functional magnetic resonance imaging. *Biological Psychiatry, 50*(9), 677-684.

Kirkpatrick, T., Joyce, E., Milton, J., Duggan, C., Tyrer, P., & Rogers, R. D. (2007a). Altered memory and affective instability in prisoners assessed for dangerous and severe personality disorder. *British Journal of Psychiatry, 190* (suppl. 49), 20-26.

Kirkpatrick, T., Joyce, E., Milton, J., Duggan, C., Tyrer, P., & Rogers, R. D. (2007b). Altered emotional decision-making in prisoners with borderline personality disorder. *Journal of Personality Disorders, 21*(3), 243–261.

Klinteberg, B., Humble, K., & Schalling, D. (1992). Personality and psychopathy of males with a history of early criminal behaviour. *European Journal of Personality, 6*(4), 245-266.

Koons, C. R., Robins, C. J., Tweed, J. L., Lynch, T. R., Gonzalez, A. M., Morse, J. Q., Bishop, G. K., Butterfield, M. I., & Bastian, L. A. (2001). Efficacy of Dialectical Behavior Therapy in Women Veterans With Borderline Personality Disorder. *Behaviour Therapy, 32*, 371-390.

Kosson, D. S., Blackburn, R., Byrnes, K. A., Park, S., Logan, C., & Donnelly, J. P. (2008). Assessing interpersonal aspects of schizoid personality disorder: preliminary validation studies. *Journal of Personality Assessment, 90*(2), 185-96.

Kosson, D. S., Suchy, Y., Mayer, A. R., & Libby, J. (2002). Facial affect recognition in criminal psychopaths. *Emotion, 2*(4), 398-411.

Kurtz, J. E., & Morey, L. C. (1999). Verbal memory dysfunction in depressed outpatients with and without borderline personality disorder. *Journal of Psychopathology and Behavioral Assessment, 21(2), 141-156.*

Långström, N., & Grann, M. (2002). Psychopathy and violent recidivism among young criminal offenders. *Acta Psychiatrica Scandinavica, 106* (Suppl. 412), 86-92.

LaPierre, D., Braun, C. M. J., & Hodgins, S. (1995). Ventral frontal deficits in psychopathy: Neuropsychological test findings. *Neuropsychologica, 33*(2), 139-151.

LaPlante, D. A., Nelson, S. E., LaBrie, R. A., & Shaffer, H. J. (2006). Men & women playing games: Gender and the gambling preferences of Iowa Gambling Treatment Program participants. *Journal of Gambling Studies, 22*(1), 65-80.

Laporte, L., & Guttman, H. (2001). Abusive relationships in families of women with borderline personality disorder, anorexia nervosa and a control group. *Journal of Nervous and Mental Disorders, 189*(8), 522-531.

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

101.

Lawrence, N. S., Jollant, F., O'Daly, O., Zelaya, F., & Phillips, M. L. (2009). Distinct roles of prefrontal cortical subregions in the Iowa Gambling Task. *Cerebral Cortex, 19*(5), 1134-1143.

Lee, S. J., Miller, H. A., & Moon, J. (2004). Exploring the forensic use of the Emotional Recognition Test (ERT). *International Journal of Offender Therapy and Comparative Criminology, 48*(6), 664-682.

Leclerc, B., Carpentier, J., & Proulx, J. (2006). Strategies adopted by sexual offenders to involve children in sexual activity. In R. Wortley & S. Smallbone (Eds.), *Situational prevention of child sexual abuse: Crime Prevention Studies*, Vol. 19. (pp. 251−270). Monsey, N.Y.: Criminal Justice Press.

Leichsenring, F., Kunst, H., & Høyer, J. (2003), Borderline personality organization in violent offenders: Correlations of identity diffusion and primitive defense mechanisms with antisocial features, neuroticism, and interpersonal problems, *Bulletin of the Menninger Clinic*, *67*, 314–327.

Le Jeune, F., Peron, J., Biseul, I., Fournier, S., Sauleau, P., Drapier, S., Haegelen, C., Drapier, D., Millet, B., Garin, E., Herry, J-Y., Malbert, C-H., & Verin, M. (2008). Subthalamic nucleus stimulation affects orbitofrontal cortex in facial emotion recognition: a pet study. *Brain, 131*, 1599-1608.

Levine, D., Marziala, E., & Hood, J. (1997). Emotion processing in borderline personality disorder. *Journal of Nervous and Mental Diseases, 185*, 240-246.

Lew, H. L., Poole, J. H., Chiang, J. Y. P., Lee, E. H., Date, E. S., & Warden, D. (2005). Event-related potential in facial affect recognition: Potential clinical utility in patients with traumatic brain injury. *Journal of Rehabilitation Research and Development, 42*(1), 29-34.

Lezak, M. D. (1983; 2004). *Neuropsychological assessment (2nd Ed.).* New York: Oxford University Press.

Lezenweger, M. F., Clarkin, J. F., Fertuck, E. A., & Kernberg, O. F. (2004). Executive neurocognitive functioning and neurobehavioural systems indicators in borderline personality disorder: A preliminary study. *Journal of Personality Disorders, 18*(5), 421-438.

Lieb, K., Zanarini, M. C., Schmahl, C., Linehan, M. M., & Bohus, M. (2004). Borderline personality disorder. *Lancet, 364*(9432), 453-461.

Lilienfeld, S. O., & Andrews, B. P. (1996). Development and preliminary validation of a self report measure of psychopathic personality traits in noncriminal populations. *Journal of Personality Assessment, 66,* 488-524.

Linehan, M. M. (1993). *Cognitive-behavioural treatment for borderline personality disorder*. New York: Guilford Press.

Linehan, M. M., Armstrong, H. E., Suarez, A., Allmon, D., Heard, H. L. (1991). Cognitive-Behavioral Treatment of Chronically Parasuicidal Borderline Patients. *Archives of General Psychiatry*, *48*, 1060 –1064.

Lisspers, J., Nygren, A., & Soderman, E. (1997). Hospital Anxiety and Depression Scale (HAD): some psychometric data for a Swedish sample. *Acta Psychiatrica Scandanavia, 96*, 281-286.

Liu, Q., Shono, M., & Kitamura, T. (2009). Psychological well-being, depression, and anxiety in Japanese university students. *Depression and Anxiety, 0*, 1–7.

Logan, C. (2002). *Dangerous and Severe Personality Disorder Women's Services Pre-assessment Pilot: Academic Report*. London: Home Office and HM Prison Service.

Logan, C., & Blackburn, R. (2009). Mental disorder in violent women in secure settings:

Potential relevance to risk for future violence. *International Journal of Law and Psychiatry, 32*(1), 31-38.

Looman, J., Abracen, J., Serin, R., & Marquis, P. (2005). Psychopathy, treatment change, and recidivism in high-risk, high need, sexual offenders. *Journal of Interpersonal Violence, 20*(5), 549-568.

Louth, S. M., Hare, R. D., & Linden, W. (1998). Psychopathy and alexithymia in female offenders. *Canadian Journal of Behavioural Science, 30*(2), 91-98.

Loucks, A. D., & Zamble, E. (2000). Predictors of criminal behaviour and prison misconduct in serious female offenders. *Empirical and Applied Criminal Justice Review, 1(1).*

Lykken, D. T. (1957). A study of anxiety in the sociopathic personality. *Journal of Abnormal and Social Psychology, 55*, 6-10.

Lykken, D. T. (1995). *The Antisocial Personalities*. New Jersey: Lawrence Erlbaum.

Lynam, D. R., & Derefinko, K. J. (2006). Psychopathy and personality. In: *Handbook of psychopathy* (pp. 133-155); C. J. Patrick (Ed.). New York: Guilford Press.

Lynam, D. R., & Widiger, T. A. (2007). Using a general model of personality to identify the basic elements of psychopathy. *Journal of Personality Disorders, 21*(2), 160-178.

MacDonald, J. M., & Chesney-Lind, M. (2001). Gender Bias and Juvenile Justice Revisited: A Multiyear Analysis. *Crime Delinquency, 47*, 173-195.

Maden, T. (1996). *Women, Prisons, & Psychiatry: Mental disorder behind bars*. London: Butterworth-Heinemann.

Maffei, C., Fossati, A., Agostoni, I., Barraco, A., Bagnato, M., Deborah, D., Namia, C., Novella, L., & Petrachi, M. (1997). Interrater reliability and internal consistency of the structured clinical interview for DSM-IV axis II personality disorders (SCID-II), version

2.0. *Journal of Personality Disorders, 11*(3), 279-284.

Maier, W., Minges, J., Lichtermann, D., & Heun, R. (1995). Personality disorders and personality variations in relatives of patients with bipolar affective disorders. *Journal of Affective Disorders, 53*, 173-181.

Marcus, D. K., John, S. L., & Edens, J. F. (2004). A taxometric analysis of psychopathic personality. *Journal of Abnormal Psychology, 113(*4), 626-635.

Marsh, A. A., Blair, K. S., Vythilingam, M., Busis, S., & Blair, R. J. R. (2007). Response options and expectations of reward in decision-making: The differential roles of dorsal and rostral anterior cingulate cortex. *NeuroImage, 35,* 979–988.

Martinez-Selva, J. M., Sanchez-Navarro, J. P., Bechara, A., & Roman, F. (2006). Brain mechanisms involved in decision-making. *Revista de Neurologica, 42*(7), 411-418.

Marsee, M. A., Silverthorn, P., & Frick, P. J. (2005). The association of psychopathic traits with aggression and delinquency in non-referred boys and girls. *Behavioural Sciences and the Law, 23*(6), 803-817.

Marshall, W. L., Hamilton, K., & Fernandez, Y. (2001). Empathy Deficits and Cognitive Distortions in Child Molester. *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.

Martínez-Arán, A., Vieta, E., Reinares, M., Colom, F., Torrent, C., Sánchez-Moreno, J., Benabarre, A., Goikolea, J. M., Comes, M., & Salamero, M. (2004). Cognitive function across manic or hypomanic, depressed, and euthymic states in bipolar disorder. *American Journal of Psychiatry, 161*, 262–270.

Matthews, K., Coghill, D., & Rhodes, S. (2008). Neuropsychological functioning in

depressed adolescent girls. *Journal of Affective Disorders, 111*(1), 113-118.

Mauricio, A. M., Tein, J., & Lopez, F. G. (2007). Borderline and antisocial personality scores as mediators between attachment and intimate partner violence. *Violence and Victims, 22,* 139-157.

McCormick, B., Blum, N., Hansel, R., Franklin, J., St. John, J., Pfohl, B., Allen, J., & Black, ED. W. (2007). Relationship of sex to symptom severity, psychiatric comorbidity, and health care utilization in 163 subjects with borderline personality disorder. *Comprehensive Psychiatry, 48*(5), 406-412.

McLellan, A. T., Grissom, G. R., Zanis, D., Randall, M., Brill, P., & O'Brien, C. P. (1997). Problem service 'matching' in addiction treatment: A prospective study in 4 programs. *Archives of General Psychiatry, 54*(8), 730–735.

Mela, M., Balbuena, L., Duncan, R., Wong, S., Gu, D., Polvi, N., & Gordon, A. (2008). The STAXI as a measure of inmate anger and a predictor of institutional offending. *The Journal of Forensic Psychiatry & Psychology, 19*(3), 396–406.

Meletti, S., Benuzzi, F., Rubboli, G., Cantalupo, G., Stanzani Maserati, M., Nichelli, P., & Tassinari, C. A. (2003). Impaired facial emotion recognition in early-onset right mesial temporal lobe epilepsy. *Neurology, 60*(3), 426-431.

Messer, J., Maughan, B., Quinton, D., & Taylor, A. (2004). Precursors and correlates of criminal behaviour in women. *Criminal Behaviour and Mental Health, 14,* 82-107.

Miller, G. A., & Chapman, J. P. (2001). Misunderstanding analysis of covariance. *Journal of Abnormal Psychology, 110*(1), 40-48.

Mitchell, D. G. V., Colledge, E., Leonard, A., & Blair, R. J. R. (2002). Risky decisions and response reversal: Is there evidence of orbitofrontal cortex dysfunction in psychopathic individuals? *Neuropsychologica, 40*, 2013-2022.

Minzenberg, M. J., Poole, J. H., & Vinogradov, S. (2006). Adult social attachment disturbance is related to childhood maltreatment and current symptoms in borderline personality disorder. *Journal of Nervous and Mental Disease, 194*(5), 341-8.

Minzenberg, M. J., Poole, J. H., & Vinogradov, S. (2008). A neurocognitive model of borderline personality disorder: effects of childhood sexual abuse and relationship to adult social attachment disturbance. *Developmental Psychopathology, 20*(1), 341-368.

Miura, M. (1993). Individual differences in the perception of facial expression: the relation to sex difference and cognitive model. *Shinrigaku Kenkyu, 63*(6), 409-413.

Moffitt, T. E., Caspi, A., Rutter, M., & Silva, P. A. (2001). *Sex differences in antisocial behaviour: Conduct disorder, delinquency, and violence in the Dunedin Longitudinal Study*. Cambridge: Cambridge University Press.

Molto, J., Poy, R., Segarra, P., Pastor, M. C., & Montanes, S. (2007). Response perseveration in psychopaths: interpersonal/affective or social deviance traits? *Journal of Abnormal Psychology, 116*(3), 632–637.

Monarch, E. S., Saykin, A. J., & Flashman, L. A. (2004). Neuropsychological impairment in borderline personality disorder. *Psychiatric Clinics of North America, 27*(1), 67-82.

Morana, H. C. P., Arboleda-Flórez, J., & Câmara, F. P. (2005). Identifying the cutoff score for the PCL-R scale (Psychopathy Checklist-Revised) in a Brazilian forensic population. *Forensic Science International, 147*(1), 1-8.

Moran, P., Walsh, E., Tyrer, P., Burns, T., Creed, F., & Fahy, T. (2003). Impact of comorbid personality disorder on violence in psychosis: report from the UK700 trial. *British Journal of Psychiatry, 182*, 129-134.

Morrell, R. F., Merbitz, C. T., Jain, S., & Jain, S. (1998). Traumatic brain injury in prisoners. *Journal of Offender Rehabilitation, 27*(3-4), 1-8.

Morris, J. S., Friston, K. J., Bűchel, C., Frith, C. D., Young, A. W., Calder, A. J., & Dolan, R. J. (1998). A neuromodulatory role for the human amygdala in processing emotional facial expressions. *Brain, 121*, 47-57.

Müller, J. L., Sommer, M., Wagner, V., Lange, K., Taschler, H., Röder, Schuierer, G., Klein, H. E., & Hajak, G. (2003). Abnormalities in emotion processing with cortical and subcortical regions in criminal psychopaths: Evidence from a functional magnetic resonance imaging study using pictures with emotional content. *Biological Psychiatry, 54*, 152-162.

Munro, G. E. S., Dywan, J., Harris, G. T., McKee, S., Unsal, A., & Segalowitz, S. J. (2007). ERN varies with degree of psychopathy in an emotion discrimination task. *Biological Psychology, 76*, 31–42.

Mustard, D. B. (2001). Racial, ethnic, and gender disparities in sentencing: Evidence from the U. S. federal courts. *Journal of Law and Economics, 44*(1), 285-314.

Narud, K., Mykletun, A., & Dahl, A. A. (2005). Quality of life in patients with personality disorders seen at an ordinary psychiatric outpatient clinic. *BMC Psychiatry, 5* (10).

Nee, C., & Farman, S. (2005). Female prisoners with Borderline Personality Disorder: some promising treatment developments. *Criminal Behaviour and Mental Health, 15*(1), 2-16.

Neumann, C. S. & Hare, R. D. (2008). Psychopathic traits in a large community sample: Links to violence, alcohol use, and intelligence. *Journal of Consulting and Clinical Psychology, 76*(5), 893-899.

Newton-Howes, G., Tyrer, P., Anagnostakis, K., Cooper, S., Bowden-Jones, O., & Weaver, T. (2009). The prevalence of personality disorder, its comorbidity with mental state disorders, and its clinical significance in community mental health teams. *Social Psychiatry and Psychiatric Epidemiology,* Jun 20, [Epub ahead of print].

Nicholls, T. L., Brink, J., Greaves, C., Lussier, P., & Verdun-Jones, S. (2009). Forensic psychiatric inpatients and aggression: An exploration of incidence, prevalence, severity, and interventions by gender. *International Journal of Law and Psychiatry, 32* (1), 23-30.

Nicholls, T. L., Ogloff, J. R. P., & Douglas, C. S. (2004). Assessing risk for violence among male and female civil psychiatric patients: The HCR-20, PCL:SV, and VSC. *Behavioral Sciences and the Law, 22,* 127–158.

Nickel, M. K., Muehlbacher, M., Kaplan, P., Krawczyk, J., Buschmann, W., Kettler, C., Rother, N., Egger, C., Rother, W. K., Loew, T. K., & Nickel, C. (2006). Influence of family therapy on bullying behaviour, cortisol secretion, anger, and quality of life in bullying male adolescents: A randomized, prospective, controlled study. *Canadian Journal of Psychiatry, 51*(6), 355-362.

Nigg, J. T., Silk, K. R., Stavro, G., & Miller, T. (2005). Disinhibition and borderline personality disorder. *Development and Psychopathology, 17*, 1129-1149.

NOMS (2005). *Offender Management Caseload Statistics: Quarterly Brief. October to December 2005, England and Wales.* National Offender Management Service: London. (http://www.homeoffice.gov.uk/rds/pdfs06/omcsq405.pdf).

NOMS (2008). *National Service Framework. Improving services to women offenders.* National Offender Management Service: London. (http://noms.justice.gov.uk/news-publications-events/publications/strategy/NSF-Women-08?view=Binary)

Northoff, G., Grimm, S., Boeker, H., Schmidt, C., Bermpohl, F., Heinzel, A., Hell, D., & Boesiger, P. (2006). Affective judgment and beneficial decision making: Ventromedial prefrontal activity correlates with performance in the Iowa Gambling Task. *Human Brain Mapping, 27,* 572–587.

O'Leary, K. M., Brouwers, P., Gardner, D. L., & Cowdry, R. W. (1991). Neuropsychological

testing of patients with borderline personality disorder. *American Journal of Psychiatry, 148*(1), 106-111.

O'Neill, M. L., Lidz, V., & Heilbrun, K. (2003). Adolescents with psychopathic characteristics in a substance abusing cohort: treatment process and outcomes. *Law and Human Behaviour, 27*(3), 299-313.

Osone, A., & Takahashi, S. (2003). Twelve month test-retest reliability of a Japanese version of the Structured Clinical Interview for DSM-IV Personality Disorders. *Psychiatry and Clinical Neurosciences, 57*(5), 532-538.

Paris, J. (1997). Antisocial and borderline personality disorders: Two separate diagnoses of two aspects of the same psychopathology? *Comprehensive Psychiatry, 38*(4), 237-242.

Pastor, M. C., Molto, J., Vila, J., & Lang, P. J. (2003). Startle reflex modulation, affective ratings, and autonomic reactivity in incarcerated Spanish psychopaths. *Psychophysiology, 40*(6), 934-938.

Patrick, C. J., & Zempolich, K. A. (1998). Emotion and aggression in the psychopathic personality. *Aggression and Violent Behaviour, 3*(4), 303-338.

Patrick, C. J., Bradley, M. M., & Lang, P. J. (1993). Emotion in the criminal psychopath: Startle reflex modulation. *Journal of Abnormal Psychology, 102*(1), 82-92.

Penney, S. R., Moretti, M. M. (2007). The relation of psychopathy to concurrent aggression and antisocial behaviour in high-risk adolescent girls and boys. *Behavioral Sciences and the Law, 25*, 21–41.

Piefke, M., Weiss, P. H., Markowitsch, H. J., Fink, G. R. (2005). Gender differences in the functional neuroanatomy of emotional episodic autobiographical memory. *Human Brain Mapping, 24*(4), 313-324.

Phillips, M. L., Medford, N., Young, A. W., Williams, L., Williams, S. C. R., Bullmore, E. T., Gray, J. A., & Brammer, M. J. (2001). Time courses of left and right amygdala responses to fearful facial expressions. *Human Brain Mapping, 12,* 193-202.

Phillips, M. L., Young, A. W., Senior, C., Brammer, M., Andrews, C., Calder, A. J., Bullmore, E. T., Perrett, D. I., Rowland, D., Williams, S. C. R., Gray, J. A., & David, A. S. (1997). A specific neural substrate for perceiving facial expressions of disgust. *Nature, 389,* 495-498.

Posner, M. I., Rothbart, M. K., Vizueta, N., Levy, K. N., Evans, D. E., Thomas, K. M., & Clarkin, J. F. (2002). Attentional mechanisms of borderline personality disorder. *Proceedings of the National Academy of Sciences of the United States of America, 99*(25), 16366-16370.

Porter, R. J., Gallagher, P., Thompson, J. M., & Young, A. H. (2003). Neurocognitive impairment in drug-free patients with major depressive disorder. *British Journal of Psychiatry, 182*, 214-220.

Poythress, N. G., Skeem, J. L., & Lilienfeld, S. O. (2006). Associations among early abuse, dissociation, and psychopathy in an offender sample. *Journal of Abnormal Psychology, 115*(2), 288–297.

Pridmore, S., Chamners, A., & McArthur, M. (2005). Neuroimaging in psychopathy. *Australian and New Zealand Journal of Psychiatry, 39*, 856-865.

Prisons Inspectorates for Scotland (1998). *Women Offenders - A Safer Way. Review of Community Disposals and the Use of Custody for Women Offenders in Scotland 1998*. http://www.scotland.gov.uk/library/documents5/off-01.htm

Probation Circular (November 2008). *Managing High Risk of Serious Harm Offenders With Severe Personality Disorder.* (http://www.dspdprogramme.gov.uk/media/pdfs/ProbationCircular_Nov08.pdf)

Putkonen, A., Ryynänen, O. -P., Eronen, M., & Tiihonen, J. (2002). The quantitative risk of violent crime and criminal offending: a case-control study among the offspring of recidivistic Finnish homicide offenders. *Acta Psychiatrica Scandinavica, 106* (Suppl. 412), 54-57.

Ranger, M., Mathuen, C., Rutter, D., Rao, B., & Tyrer, P. (2004). Prevalence of personality disorder in the case-load of an inner-city assertive outreach team. *Psychiatric Bulletin*, 28, 441-443.

Rasmussen, K., Storsæter, O., & Levander, S. (1999). Personality disorders, psychopathy, and crime in a Norwegian prison population. *International Journal of Law and Psychiatry, 22*, 91-97.

Reiss, D., Leese, M., Meux, C., & Grubin, D. (2001). Casenote assessment of psychopathy in a high security hospital. *Criminal Behaviour and Mental Health, 11*(1), 27-37.

Reyes, A. C., & Amador, A. A. (2009). Qualitative and quantitative EEG abnormalities in violent offenders with antisocial personality disorder. *Journal of Forensic and Legal Medicine, 16*, 59–63.

Richards, H. J., Casey, J. O., & Lucente, S. W. (2003). Psychopathy and treatment response in incarcerated female substance abusers. *Criminal Justice & Behaviour, 30*(2), 251-276.

Ridderinkhof, K. R., de Vlugt, Y., Bramlage, A., Spaan, M., Elton, M., Snel, J., & Band, G. P. H. (2002). Alcohol consumption impairs detection of performance errors in mediofrontal cortex. *Science Magazine, 298*, 2209-2211.

Roberts, A. D. L., & Coid, J. W. (2007). Psychopathy and offending behaviour: Findings from the national survey of prisoners in England and Wales. *The Journal of Forensic Psychiatry, 18*(1), 23-43.

Rogers, R. D. (2006). The functional architecture of the frontal lobes: Implications for

research with psychopathic offenders. In C. J. Patrick (Ed.), *Handbook of psychopathy* (pp. 313-333). New York: Guilford Press.

Rogers, R. D., & Kirkpatrick, T. (2005). The neuropsychology of borderline personality disorder. *Psychiatry, 4*(3), 31-35.

Rogers, R., Salekin, R. T., Hill, C., Sewell, K. W., Murdock, M. E., & Neumann, C. S. (2000). The Psychopathy Checklist-Screening Version: An examination of criteria and subcriteria in three forensic samples. *Assessment, 7*(1), 1-15.

Rogers, R., Jordan, M. J., & Harrison, K. S. (2007). Facets of psychopathy, Axis II traits, and behavioural dysregulation among jail detainees. *Behavioural Sciences and the Law, 25*, 471-483.

Rolls, E. T. (2004). Functions of the orbitofrontal cortex. *Brain and Cognition, 55*, 11-29.

Rudebeck, P. H., Behrens, T. E., Kennerley, S. W., Baxter, M. G., Buckley, M. J., Walton, M. E., & Rushworth, M. F. (2008). Frontal cortex subregions play distinct roles in choices between actions and stimuli. *Journal of Neuroscience, 28*(51), 13775-13785.

Rutherford, M. J., Alterman, A. I., Cacciola, J. S., & Snyder, E. C. (1996). Gender differences in diagnosing antisocial personality disorder in methadone patients. *American Journal of Psychiatry, 152*(9), 1309-1316.

Ryan, J. J., Carruthers, C. A., Miller, L. J., Souheaver, G. T., Gontkovsky, S. T., & Zehr, M. D. (2003). Exploratory factor analysis of the Weschler Abbreviated Scale of Intelligence (WASI) in adult standardisation and clinical samples. *Applied Neuropsychology, 10*(4), 252-256.

Saklofske, D. H., Caravan, G., & Schwartz, C. (2000). Concurrent Validity of the Wechsler Abbreviated Scale of Intelligence (WASI) with a Sample of Canadian Children. *Canadian Journal of School Psychology, 16*(1), 87-94.

Salekin, R.T., Rogers, R., & Sewell, K. W. (1996). A review and meta-analysis of the Psychopathy Checklist and Psychopathy Checklist-Revised: Predictive validity of dangerousness. *Clinical Psychology: Science and Practice, 3*(3), 203-215.

Salekin, R. T., Neumann, C., Leistico, A. R., DiCicco, T. M., & Duros, R. L. (2004). Psychopathy and comorbidity in a young offender sample: Taking a closer look at psychopathy's potential importance over disruptive behavior disorders. *Journal of Abnormal Psychology, 113*(3), 416–427.

Salekin, R. T., Rogers, R., & Sewell, K. W. (1997). Construct validity of psychopathy in a female offender sample: A multitrait-multimethod evaluation. *Journal of Abnormal Psychology, 106*(4), 576-585.

Salekin, R. T., Rogers, R., Ustad, K. L., & Sewell, K. W. (1998). Psychopathy and recidivism among female inmates. *Law and Human Behaviour, 22*(1), 109-128.

Satterfield, J. H., Faller, K. J., Crinella, F. M., Schell, A. M., Swanson, J. M., & Homer, L. D. (2007). A 30-year prospective follow-up study of hyperactive boys with conduct problems: adult criminality. *Journal of the American Academy of Child & Adolescent Psychiatry. 46*(5):601-610.

Schofield, P. W., Butler, T. G., Hollis, S. J., Smith, N. E., Lee, S. J., & Kelso, W. M. (2006). Traumatic brain injury among Australian prisoners: rates, recurrence and sequelae. *Brain Injury, 20*(5), 499-506.

Schulte-Rüther, M., Markowitsch, H. J., Shah, J., Fink, G. R., & Piefkea, M. (2008). Gender differences in brain networks supporting empathy. *NeuroImage, 42*, 393–403.

Séguin, J. R. (2004). Neurocognitive elements of antisocial behaviour: Relevance of an orbitofrontal cortex account. *Brain and Cognition, 55*, 185-197.

Serin, R. C. (1996). Violent recidivism in criminal psychopaths. *Law and Human Behaviour, 20*(2), 207-217.

Serin, R. C., Mailloux, D. L., & Malcolm, P. B. (2001). Psychopathy, deviant sexual arousal, and recidivism among sexual offenders. *Journal of Interpersonal Violence, 16*(3), 234-246.

Serin, R. C., Peters, R. D., & Barbaree, H. E. (1990). Predictors of psychopathy and release outcome in a criminal population. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 2*(4), 419-422.

Shah, S. S., Ayub, Q., Firasat, S., Kaiser, F., & Mehdi, S. Q. (2009). Y haplogroups and aggressive behavior in a Pakistani ethnic group. *Aggressive Behaviour, 35*(1), 68-74.

Shapiro, S. K., Quay, H. C., Higan, A. E., & Schwartz, K. P. (1988). Response perseveration and delayed responding in undersocialised aggressive conduct disorder. *Journal of Abnormal Psychology, 97*(3), 371-373.

Sharp, C., van Goozen, S., & Goodyer, I. (2006). Children's subjective emotional reactivity to affective pictures: gender differences and their antisocial correlates in an unselected sample of 7-11-year-olds. *Journal of Child Psychology and Psychiatry, 47*(2), 143-150.

Shea, M.T., Stout, R.L., Yen, S., Pagano, M.E., Skodol, A.E., Morey, L.C., Gunderson, J.G., McGlashan, T.H., Grilo, C.M., Sanislow, C.A., Bender, D.S., & Zanarini, M.C. (2004) Associations in the course of personality disorders and Axis I disorders over time. *Journal of Abnormal Psychology, 113*, 499-508.

Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin, 86*, 420-428.

Simons, J. S., Gilbert, S. J., Owen, A. M., Fletcher, P. C., & Burgess, P. W. (2005). Distinct roles for lateral and medial anterior prefrontal cortex in contextual recollection. *Journal of Neurophysiology, 94,* 813-820.

Singleton, N., Meltzer, H., Gatward, R., Coid, J., and Deasy, D. (1998). *Psychiatric Morbidity among Prisoners in England and Wales*. London: The Stationery Office.

Skeem, J. L., Mulvey, E. P., & Grisso, T. (2003). Applicability of traditional and revised models of psychopathy to the Psychopathy Checklist: Screening Version. *Psychological Assessment, 15*(1), 41-55.

Skeem, J., Schubert, C., Stowman, S., Beeson, S., Mulvey, E., Gardner, W., & Lidz, C. (2005). Gender and risk Assessment accuracy: Underestimating women's violence potential. *Law and Human Behaviour, 29*(2)*,* 173-186.

Skilling, T. A., Harris, G. T., Rice, M. E., & Quinsey, V. L. (2002). Identifying persistently antisocial offenders using the Hare Psychopathy Checklist and DSM Antisocial Personality Disorder Criteria. *Psychological Assessment, 14*(1), 27-38.

Slaughter, B., Fann, J. R., & Ehde, D. (2003). Traumatic brain injury in a county jail population: prevalence, neuropsychological functioning and psychiatric disorders. *Brain Injury, 17*(9), 731-741.

Smith, B. W., Mitchell, D. G., Hardin, M. G., Jazbec, S., Fridberg, D., Blair, R. J., & Ernst, M. (2009). Neural substrates of reward magnitude, probability, and risk during a wheel of fortune decision-making task. *Neuroimage, 44*(2), 600-609.

Smith, P., Waterman, M., & Ward, N. (2006). Driving aggression in forensic and non-forensic populations: relationships to self-reported levels of aggression, anger and impulsivity. *British Journal of Psychology, 97*(3), 387-403.

Soderstrom, H., Hultin, L., Tullberg, M., Wikkelso, C., Ekholm, S., & Forsman, A. (2002). Reduced frontotemporal perfusion in psychopathic personality. *Psychiatry Research Neuroimaging, 114,* 81–94*.*

Spielberger, C.D. (1988). *State Trait Anger Expression Inventory*. Odessa: Psychological assessment Resources.

Sprock, J., Rader, T. J., Kendall, J. P., and Yoder, C.Y. (2000). Neuropsychological functioning in patients with borderline personality disorder. *Journal of Clinical Psychology, 56,* 1587-1600.

Stadtland, C., Hollweg, M., Kleindienst, N., Dietl, J., Reich, U., & Nedopil, N. (2005). Risk assessment and prediction of violent and sexual recidivism in sex offenders: Long-term predictive validity of four risk assessment instruments. *Journal of Forensic Psychiatry & Psychology, 16*(1), 92-108.

Stafford, E., & Cornell, D. G. (2003). Psychopathy scores predict adolescent inpatient aggression. *Assessment, 10*(1), 102-112.

Steffensmeier, D., Ulmer, J., & Cramer, J. (1998). The interaction of race, gender, and age in criminal sentencing: The punishment cost of being young, black, and male. *Criminology, 36*(4), 763-798.

Stepp, S. D., Epler, A. J., Jahng, S., & Trull, T. J. (2008). The effect of dialectical behaviour therapy skills use on borderline personality disorder features. *Journal of Personality Disorders, 22*(6), 549–563.

Stevens, A., Burkhardt, M., Hautzinger, M., Schwarz, J., & Unckel, C. (2004). Borderline personality disorder: impaired visual perception and working memory. *Psychiatry Research,* 125(3), 257-267.

Stevens, D., Charman, T., & Blair, R. J. R. (2001). Recognition of emotion in facial expressions and vocal tones in children with psychopathic tendencies. *The Journal of Genetic Psychology, 162*(2), 201-211.

Strachan, C. (1995). The assessment of psychopathy in female offenders [Abstract]. *Dissertation Abstracts International, 55* (8-b), 3634.

Strand, S., & Belfrage, H. (2005). Gender differences in psychopathy in a Swedish offender

sample. *Behavioral Sciences & the Law, 23*(6), 837-850.

Stuart, G. L., Moore, T. M., Gordon, K. C., Ramsey, S. E., & Kahler, C. W. (2006). Psychopathology in women arrested for domestic violence. *Journal of Interpersonal Violence, 21*(3), 376-389.

Sullivan, E. A., & Kosson, D. S. (2006). Ethnic and cultural variations in psychopathy. In C. J. Patrick (Ed.), *Handbook of psychopathy* (pp. 437-458). New York: Guilford Press

Suter, J. M., Byrne, M. K., Byrne, S., Howells, K., & Day, A. (2000). Anger in prisoners: women are different from men. *Personality and Individual Differences, 32*, 1087–1100.

Sutton, S. K., Vitale, J. E., & Newman, J. P. (2002). Emotion among women with psychopathy during picture perception. *Journal of Abnormal Psychology, 111*(4), 610-619.

Templeman, R., & Wong, S. (1994). Determining the factor structure of the Psychopathy Checklist: A converging approach. *Multivariate Experimental Clinical Research, 10*(3), 157-166.

Thayer, J. F., & Johnsen, B. H. (2000). Sex differences in judgement of facial affect: a multivariate analysis of recognition errors. *Scandinavian Journal of Psychology, 41*, 243–246.

Timmons-Mitchell, J., Brown, C., Schulz, S. C., Webster, S. E., Underwood, L. A., & Semple, W. E. (1997). Comparing the mental health needs of female and male incarcerated juvenile delinquents. *Behavioral Sciences and the Law, 15*, 195–202.

Tikkanen, R., Holi, M., Lindberg, N., & Virkkunen, M. (2007). Tridimensional Personality Questionnaire data on alcoholic violent offenders: specific connections to severe impulsive cluster B personality disorders and violent criminality. *BMC Psychiatry*, 7:36.

Tranel, D., Damasio, H., Denburg, N. L., & Bechara, A. (2005). Does gender play a role in the functional asymmetry of ventromedial prefrontal cortex? *Brain, 128*, 2872-2881.

Tritt, K., Nickel, C., Lahmann, C., Leiberich, P. K., Rother, W. K., Loew, T. H., & Nickel, M. K. (2005). Lamotrigine treatment of aggression in female borderline-patients: a randomized, double-blind, placebo-controlled study. *Journal of Psychopharmacology, 19*(3), 287-291.

Tye, C. S., & Mullen, P. E. (2006). Mental disorders in female prisoners. *Australian and New Zealand Journal of Psychiatry, 40*, 266–271.

Tyrer, P. (2004). New approaches to the diagnosis of psychopathy and personality disorder. *Journal of the Royal Society of Medicine, 97*(3), 371-374.

Tyrer, P. & Johnson, T. (1996). Establishing the severity of personality disorder. *American Journal of Psychiatry, 153,* 1593–1597.

Tyrer, P., Cooper, S., Rutter, D., Seivewright, H., Duggan, C., Maden, T., Barrett, B., Joyce, E., Rao, B., Nur, U., Cicchetti, D., Crawford, M., & Byford, S. (2009). The assessment of dangerous and severe personality disorder: lessons from a randomised controlled trial linked to qualitative analysis. *The Journal of Forensic Psychiatry & Psychology,* 20(1), 132–146.

Ullrich, S. & Marneros, A. (2007). Underlying dimensions of ICD-10 personality disorders: Risk factors, childhood antecedents, and adverse outcomes in adulthood. *Journal of Forensic Psychiatry & Psychology, 18,* 44-58.

Vassileva J, Petkova P, Georgiev S, Martin EM, Tersiyski R, Raycheva M, Velinov V, & Marinov P. (2007). Impaired decision-making in psychopathic heroin addicts. *Drug Alcohol Dependence, 86*(2-3), 287-9.

Vernet, M., Baudouin, & Franck, N. (2008). Facial emotion space in schizophrenia.

Cognitive Neuropsychiatry, 13(1), 59-73.

Verona, E., & Vitale, J. (2006). Psychopathy in women: Assessment, manifestations, and etiology. In C. J. Patrick (Ed.), *Handbook of psychopathy* (pp.415-436). New York: Guilford Press.

Vitale, J. E., & Newman, J. P. (2001). Response perseveration in psychopathic women. *Journal of Abnormal Psychology, 110*(4); 644-647.

Vitale, J. E., Newman, J. P., Bates, J. E., Goodnight, J., Dodge, K. A., & Pettit, G. S. (2005). Deficient Behavioral Inhibition and Anomalous Selective Attention in a Community Sample of Adolescents with Psychopathic Traits and Low-Anxiety Traits. *Journal of Abnormal Child Psychology, 33*(4), 461–470.

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 Behaviour, 29*, 202-231.

Vitacco, M. J., Neumann, C. S., & Jackson, R. L. (2005). Testing a four-factor model of psychopathy and its association with ethnicity, gender, intelligence, and violence. *Journal of Consulting and Clinical Psychology, 73*(3), 466-476.

Völlm, B., Richardson, P., Stirling, J., Elliott, R., Dolan, M., Chaudhry, I., Del Ben, C., McKie, S., Anderson, I., & Deakin, B. (2004). Neurobiological substrates of antisocial and borderline personality disorder: preliminary results of a functional fMRI study. *Criminal Behaviour and Mental Health, 14*(1), 39-54.

Wagner, A. D., Desmond, J. E., Glover, G. H., & Gabrieli, J. D. E. (1998). Prefrontal cortex and recognition memory: Functional MRI evidence for context-dependent retrieval processes. *Brain, 121,* 1985-2002.

Wagner, A. W., & Linehan, M. M. (1999). Facial expression recognition ability among women with borderline personality disorder: Implications for emotion regulation.

Journal of Personality Disorder, 13(4), 329-344.

Walters, G. D., Duncan, S. A., & Mitchell-Perez, K. (2007). The latent structure of psychopathy: A taxometric investigation of the Psychopathy Checklist-Revised in a heterogeneous sample of male prison inmates. *Assessment, 14*(3), 270-278.

Walters, G. D., Gray, N. S., Jackson, R. L., Sewell, K. W., Rogers, R., Taylor, J., & Snowden, R. J. (2007). A taxometric analysis of the Psychopathy Checklist: Screening Version (PCL:SV): Further evidence of dimensionality. *Psychological Assessment, 19*(3), 330-339.

Warren, L. I., Burnette, M. L., South, S. C., Chauhan, P., Bale, R., Friend, R., & Van Patten, I. (2003). Psychopathy in women: Structural modelling and comorbidity. *International Journal of Law and Psychiatry, 26,* 223-242.

Warren, J. I., & South, S. C. (2006). Comparing the constructs of antisocial personality disorder and psychopathy in a sample of incarcerated women. *Behavioural Sciences and the Law, 24*(1), 1-20.

Warren, J. I., South, S. C., Burnette, M. L., Rogers, A., Friend, R., Bale, R., & Van Patten, I. (2005). Understanding the risk factors for violence and criminality in women: The concurrent validity of the PCL-R and HCR-20. *International Journal of Law and Psychiatry, 28*(3), 269-289.

Warrington, E. K. (1996). *The Camden Memory Tests*. East Sussex: Psychology Press.

Watzke, S., Ullrich, S., & Marneros, A. (2006). Gender- and violence-related prevalence of mental disorders in prisoners. *European Archives of Psychiatry and Clinical Neuroscience, 256*(7), 414–421.

Weaver, C. M., Meyer, R. G., Van Nort, J. J., & Tristan, L. (2006). Two-, three-, and four-factor PCL-R models in applied sex offender risk assessments. *Assessment, 13*(2), 208-216.

Wechsler, D. (1999). *The Wechsler Intelligence Scale-Abbreviated (WASI).* Texas: The Psychological Corporation.

Weiler, B. L., & Widom, C. S. (1996). Psychopathy and violent behaviour in abused and neglected young adults. *Criminal Behaviour and Mental Health, 6*(3), 253-271.

Weizmann-Henelius, G., Sailas, E., Viemerö, V., & Eronen, M. (2002). Violent Women, Blame Attribution, Crime, and Personality. *Psychopathology, 35*, 355-361.

Weizmann-Henelius, G., Viemerö, V., & Eronen, M. (2004). Psychological risk markers in violent female behaviour. *International Journal of Forensic Mental Health, 3*(2), 185-196.

Westen, D., Shedler, J., Durrett, C., Glass, S., & Martens, A. (2003). Personality disorders in adolescence: DSM-IV Axis II diagnoses and an empirically derived alternative. *American Journal of Psychiatry, 160*, 952-966.

Widiger, T. A. (2006). Psychopathy and DSM-IV Psychopathology. In C. J. Patrick (Ed.), *Handbook of psychopathy* (pp. 156 - 171). New York: Guilford Press.

Widiger, T., Hare, R. D., & Rutherford, M. (1996). DSM-IV antisocial personality disorder field trial. *Journal of Abnormal Psychology, 105,* 3-16.

Williamson, S. E., Harpur, T. J., & Hare, R. D. (1991). Abnormal processing of affective words by psychopaths. *Psychophysiology, 28,* 260-273.

Williams, K. M., Nathanson, C. & Paulhus, D. L. (2002). *Factor structure of the self-report psychopathy scale: Two and three factor solutions.* Poster presented at the 2002 meeting of the Canadian Psychological Association, Vancouver, British Columbia, Canada.

Yang, M., & Coid, J. W. (2007). Gender differences in psychiatric morbidity and violent

behaviour among a household population in Great Britain. *Social Psychiatry and Psychiatric Epidemiology, 42*(8), 599-605.

Yechiam, E., Kanz, J. E., Bechara, A., Stout, J. C., Busemeyer, J. R., Altmaier, E. M., & Paulsen, J. S. (2008). Neurocognitive deficits related to poor decision making in people behind bars. *Psychonomic Bulletin & Review, 15*, 44-51.

Young, A. W., Hellawell, D. J., Van De Wal, C., & Johnson, M. (1996). Facial expression processing after amygdalotomy. *Neuropsychologica, 34*(1), 31-39.

Zanarini, M. C., Skodol, A. E., Bender, D., Dolan, R., Sanislow, C., Schaefer, E., Morey, L. C., Grilo, C. M., Shea, M. T., McGlashan, T. H., & Gunderson, J. G. (2000). The collaborative longitudinal personality disorders study: reliability of axis I and II diagnoses. *Journal of Personality Disorders, 14*(4), 291-299.

Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica, 67*, 361-370.