

Emotional Processing in Psychopathic Offenders

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SUMMARY

Psychopathy is a disorder that is characterised by significant emotional deficits. The aim of this thesis was therefore to continue to explore emotional processing in a sample of offenders who were assessed as having different levels of psychopathic traits using the PCL-R and a self-report measure the PPI-R. Central to Blair, Mitchell & Blair's (2005) neurocognitive theory of psychopathy is the idea that psychopathic individuals experience specific difficulty identifying fear and sadness in others. Kosson, Suchy, Mayer & Libby (2002) have made an interesting distinction between being able to recognise/label and demonstrate appropriate physiological responsiveness to emotional material. Kosson et al. (2002) concluded that psychopathic individuals do not appear to experience difficulty recognising and labelling fear but they may not experience appropriate physiological responses to such stimuli. One aim of this thesis was to test the theories of Blair et al. (2005) and Kosson et al. (2002).

Two different measures of emotional intelligence were therefore administered during this study, an ability EI measure, the MSCEIT and a trait EI measure the TMMS. A facial recognition task (DEFT task) was administered to examine the idea that psychopathic individuals are impaired in their recognition of sad and fearful expressions. An emotional priming task (EPT) was also administered to measure participants' reactions to the emotional valence of slides.

Overall, my results are mixed and appear to provide some support for both Blair et al.'s (2005) and Kosson et al.'s theories (2002). In support of Blair et al.'s (2005) theory I found that psychopathic individuals experience difficulty identifying sadness

in others. In support of Kosson et al.'s theory (2002) I found no evidence at all that participants with high levels of psychopathy demonstrated poorer performance at detecting or labelling fear. I also found that participants with high scores on PPI-I of the PPI-R demonstrated superior performance at recognising and labelling anger. In the EPT, I also found that Factor 2 of the PCL-R was related to poor responsiveness to the emotional content of negative slides.

One finding, which is of particular interest, is the significant negative correlation between MSCEIT and TMMS total scores. One possible explanation for these results is that they provide evidence that the TMMS and MSCEIT may be tapping different underlying constructs associated with EI. However, these results suggest that participants who rated themselves as having high levels of EI on the TMMS actually demonstrated poor performance on the MSCEIT. This result may reflect the fact that participants lacked insight into the difficulties they experienced in accurately identifying and managing emotions.

These results also provide support for Patrick & Bernat (2009) and Patrick's (2010) ideas that the PPI and PCL-R are measuring different underlying constructs of psychopathy. I found that the underlying factors of the PCL-R were related but this was not the case for the PPI-R. I also found that Factor 1 of the PCL-R was related to the Coldheartedness scale of the PPI-R but not PPI-I. The PCL-R and PPI-R also demonstrated different relationships with the tasks used in this research.

CHAPTER 1 WHAT IS PSYCHOPATHY?

1. INTRODUCTION

1.1 The notion of the psychopath

It is hard to know how long the notion of the psychopath has existed. This is partly because the definition of the “psychopath” has evolved over many years and this evolution continues into the most modern literature (Hare & Neumann, 2007).

Certainly there were distinctions in the middle ages between those individuals who were not aware and those who were aware that they were committing antisocial acts. This latter type, those that chose to act in an antisocial manner, appears akin to the modern day notion of psychopathic behaviour. By the turn of the 19th century various terms came into existence such as *mania without delirium* (Pinel, 1801) whilst in Britain, Pritchard (Pritchard, 1835) described what he called the “moral imbecile” again in contrast to those that were just imbecilic.

The modern day notion of the psychopath, however, is firmly rooted in the work of Herv Cleckley whose book *The Mask of Sanity* (Cleckley, 1941) was extremely influential among those clinicians interested in the concept of psychopathy. Cleckley described many aspects of what he regarded as the psychopathic individual and was keen to describe such individuals in terms of their personality traits and not merely through their observable behaviours or indeed antisocial ones. Whilst Cleckley’s work was influential and his book reprinted on a number of occasions, it did not manage to unite either clinicians or researchers into what the definition of a psychopath was. Hence, the modern era of work into psychopathy is really defined and underpinned by the development of the Psychopathy Checklist (PCL) and the revised version, the

Psychopathy Checklist Revised (PCL-R), under the guidance of Robert Hare and colleagues (see section 1.2). The development of the PCL (Hare, 1980) and then the PCL-R (Hare, 1991) provided a reliable instrument with which to measure this personality construct and allowed both clinicians and researchers to speak the same language.

Despite the widespread use of the PCL-R and related instruments, and the belief in the importance of the concept of psychopathy, it is not a diagnosis that has its place in the most widely used diagnostic nosology the DSM-IV. Instead, psychopathy is referred to under the category of antisocial personality disorder (ASPD). Many researchers have expressed their concern about this situation (Hart & Hare, 1996) and it most certainly has led to confusion in many undergraduate students and even clinicians and may well have contaminated many research studies. The distinction between ASPD and psychopathy is related to the personality traits of the latter that include cold-hearted, unemotional and detached nature of such individuals. Indeed, some researchers have attempted to distance themselves from antisocial behaviour *per se* by suggesting that these are merely ‘downstream’ consequences of the psychopathic personality (Skeem & Cooke, 2010). Others (Babiak & Hare, 2006) have noted that psychopathic traits may not necessarily lead to criminal behaviour and that some psychopathic individuals may use these traits successfully in certain areas of life such as politics or business! Even experienced clinicians need to be aware that these personality traits may be used to the advantage of psychopathic individuals without resorting to criminal or antisocial behaviour (Porter, ten Brinke & Wilson, 2009).

The concept of the psychopath is one that fascinates and even excites the general public. Films such as *Silence of the Lambs* have portrayed the psychopath as a scheming, cold-blooded killer to be feared by all. Whilst this portrayal does highlight some of the characteristics of psychopathy, it is of course a stereotype for fictional effect. The aim of this thesis is to explore a feature that is well illustrated by Dr. Lectre who is the main character in the film *Silence of the Lambs*. I will examine the notion that there is a deficit in the ability of psychopathic individuals to appreciate and /or react to the emotional aspects of situations and events.

1.2 Development of the Hare Psychopathy Checklist Revised (PCL-R)

The Psychopathy Checklist (PCL) was developed by Hare (Hare, 1980) as a tool to measure psychopathic traits. It consisted of a series of items that describe the personality traits and behavioural manifestations of psychopathy, as defined by clinical tradition, and in particular in the writings of Cleckley. The PCL underwent a revision to become the PCL-R (Hare, 1991, 2003). The PCL-R consists of 20 items that underpin the construct of psychopathy. The major impact of the PCL was therefore to increase the reliability of the measurement of psychopathy, which resulted in an explosion of research in this area and for greater clinical meaning to be applied to the concept.

1.3 Factor structure of the PCL-R

Research has consistently shown that the concept of psychopathy, as defined by the PCL-R, is not a unitary construct. There is broad agreement that there are at least two related subfactors. Factor 1 reflects a combination of affective and interpersonal features, whereas Factor 2 reflects socially deviant behaviour. There are a number of

published studies that have replicated Hare's original findings and provide support for the two factor model (Cooke, 1995; Harpur, Hakstian & Hare, 1989; Hobson & Shine, 1998; McDermott, Alterman, Cacciola, Rutherford, Newman & Mulholland, 2000; Templeman & Wong, 1994).

Whilst there is good agreement over the existence of at least two factors underpinning the total PCL-R measurement, there is disagreement over whether there should be three or four Factors. Hare (2003) identified a four facet model in which Factor 1 is split into Facet 1 (interpersonal) and Facet 2 (affective). Factor 2 is split into Facet 3 (lifestyle) and Facet 4 (antisocial). Entering into the debate about the factor structure of the PCL-R is beyond the scope of this thesis. However, Hare (2003) points out that different factor models can be derived from combinations of different PCL-R items but the most important score is the total score. The four facet model will be used in this thesis as it appears to encompass the three factor model and retains 'antisocial behaviour' that some see as an important part of the concept of psychopathy (Hare & Neumann, 2010).

1.4 Is psychopathy a discrete taxon or dimensional in nature?

Hare (2003) states that researchers and clinicians (and indeed the public) often ask the question about whether psychopathic individuals are in some way qualitatively different to non-psychopathic or healthy individuals. This has given rise to the debate about whether psychopathy should be considered a discrete taxon (category) or a dimensional construct. There are a number of studies that have explored this issue. However, I will only focus on studies that have explored psychopathy in adults. A review of the statistical methods used to distinguish between taxonic and dimensional

structures (Meehl & Golden, 1982; Meehl & Yonce, 1994, 1996; Waller & Meehl, 1998) is beyond the scope of this thesis.

A study by Harris, Rice & Quinsey (1994) was the first to explore whether psychopathy should be considered a taxon. Based on a sample of 653 mentally disordered forensic psychiatric patients, they concluded that psychopathy measured using the PCL-R was a taxon. Edens, Marcus, Lilienfeld & Poythress (2006) raised concerns about Harris et al.'s (1994) sample of patients and how the PCL-Rs used in this study were completed. Guay, Ruscio, Knight & Hare (2007) also raised concerns about the statistical tests used by Harris et al. (1994). Guay et al. (2007) do not believe that the statistical tests used by Harris et al. (1994) would allow exploration of whether the data was taxonic or dimensional in nature. After re-analysing Harris et al.'s (1994) data, Edens et al. (2006) concluded that psychopathy measured by the PCL-R was dimensional in nature. Walters, Gray, Jackson, Sewell, Rogers et al. (2007) also concluded that psychopathy measured using the Psychopathy Checklist: PCL: SV (Hart, Cox, & Hare, 1995) was dimensional in nature.

There are also a number of studies that have explored the structure of a self-report measure of psychopathy, the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996). Marcus, John & Edens (2004) concluded that psychopathy measured by the PPI was also dimensional in structure. Walters, Brinkley, Magaletta & Diamond (2008) explored the structure of another self-report psychopathy measure, Levenson's Self-Report Psychopathy scale (Levenson, Kiehl & Patrick, 1995). Despite using a different self-report psychopathy measure, they also concluded that psychopathy was dimensional in nature.

Guay et al. (2007) pointed out that one of the important implications associated with viewing psychopathy as a dimensional construct rather than a taxon is related to how psychopathy is studied. Guay et al. (2007) stated that viewing psychopathy as dimensional means moving away from research designs that create extreme groups, for example, psychopaths versus non-psychopaths. Participants have been traditionally assigned to these groups on the basis of their PCL-R scores.

Walters et al. (2007) pointed out that another implication of viewing psychopathy as a dimensional construct is the issue of cut-off points. Hare (1991) originally stated that a score of 30 was the cut-off point for psychopathy, which means that individuals with a score of 30 or above on the PCL-R should be considered psychopathic. Walters et al. (2007) asked the question of how an individual with a PCL-R score of 29 might be different to another individual with a score of 30, even though the former might be considered to be non-psychopathic and the latter psychopathic. Edens et al. (2006) also identified concerns about viewing psychopathy as a taxon. They pointed out that in the criminal justice system there are often serious consequences for offenders associated with being assigned to a category such as psychopathic based on their PCL-R score. For example, a score of 30 or over on the PCL-R might result in a referral to the Dangerous and Severe Personality Disorder (DSPD) service in HM Prison Service. Such a score on the PCL-R might also mean that an offender may not be offered a place on an offending behaviour programme.

Overall, the results of studies, using a number of different measures of psychopathy, have reached the same conclusion which is that psychopathy is dimensional in nature.

Guay et al. (2007) and Walters et al. (2007) have raised concern about comparing individuals with high scores on psychopathy measures with low scores by allocating them to either of these groups. Instead, it would seem more sensible to use the actual score on the psychopathy-measuring instrument, rather than creating groups based on somewhat arbitrary cut-off scores. Despite these concerns, the grouping-based approach continues to be a popular method used by researchers who explore the relationship between psychopathy and a range of other factors.

1.5 Uses of the PCL-R

The PCL-R was developed by Hare and colleagues over 20 years ago in an attempt to measure the construct of psychopathy. Hare (2003) argues that it is the single most important clinical construct in criminal justice systems worldwide. Although it was not designed as a risk assessment tool, a number of earlier studies found a strong relationship between PCL-R total score and both general and violent reoffending. These results have been replicated in samples outside North America and Canada (Clark, 2000; Freese, Sommer, Muller-Isberner & Ozokya, 1999; Grann, Langstrom, Tenstrom & Kullgren, 1999; Hare, Clark, Grann & Thornton, 2000; Harris, Rice & Quinsey, 1993; Hart, Kropp & Hare, 1988; Hemphill, Hare & Wong, 1998; Hodgins, Cote & Ross, 1992; Molto, Poy & Torrubia, 2000; Pham, Philipott & Rime, 2000; Serin, 1996; Serin & Amos, 1995; Serin, Peters & Barbaree, 1990; Welsh & Hart, 2001; Wilson & Bakker, 2000).

Salekin, Rogers & Sewell (1996) described the ability of the PCL-R to predict violence as “*unparalleled*” and “*unprecedented.*” Hart (1998) said that psychopathy “*should be considered in any assessment of violence. It is empirically related to future*

violence, is theoretically important in the explanation of violence, and is pragmatically relevant in making decisions about risk management. Indeed, failure to consider psychopathy when conducting a risk assessment may be unreasonable (from a legal perspective) or unethical (from a professional perspective)” (pp.368-369).

As a result of earlier studies, the PCL-R has been considered the tool of choice as part of any risk assessment. However, a more recent study by Yang, Wong and Coid (2010) examined how accurately nine of the most widely used risk assessment tools, including the PCL-R, predicted future violence. Yang et al. (2010) found that the PCL-R was similar to other risk assessment tools such as the HCR-20 (Webster, Douglas, Eaves & Hart, 1997) in terms of predicting violent reoffending. This study also found that Factor 1 of the PCL-R was predictive of future violence only at the level of chance in men. Although earlier studies found a strong relationship between the PCL-R and general and violent recidivism, Yang et al. (2010) suggest that the PCL-R should be considered as interchangeable with other risk assessment tools.

There are a number of published studies that have explored the relationship between psychopathy and response to interventions that are designed to target and reduce offending behaviour. A number of studies have found that psychopathic individuals do not appear to benefit from prison based offending behaviour work and that such interventions might actually result in an increase in recidivism (Clark, 2000; Hemphill & Hart, 2003; Losel, 1988; Quinsey, Harris, Rice & Cormier, 1998; Rice, Harris & Cormier, 1992; Suedfeld & Landon, 1978; Wong & Hare, 2005; Young, Justice, Erdberg & Gacono, 2000). These studies generated pessimism amongst professionals working with offenders and as a result the PCL-R is often used when making

decisions about whether to offer an offender a place on an offending behaviour programme. Offenders assessed as having a high score on the PCL-R (30 or above) are often excluded from offending behaviour programmes (Attrill, 2004).

2. EMOTIONAL DEFICTS AND PSYCHOPATHY

Psychopathic individuals appear to experience significant difficulty perceiving, understanding and responding to emotional material. Emotional or affective difficulties are believed to be central to the concept of psychopathy. For example, Hare (1999) described psychopathic individuals as follows, *“They seem unable to get into the skin or walk in the shoes of others except in a purely intellectual sense. The feelings of other people are of no concern to psychopaths. In some respects they are like emotionless androids depicted in science fiction, unable to imagine what real humans experience”* (p.44). Johns & Quay (1962) said, *“He knows the words but not the music”* (p. 217). Patrick (2006) described psychopathic individuals as, *“Like *Amyciaea lineatipes*, a species of arachnid that mimics the appearance of ants on which it preys, psychopathic individuals readily gain the trust of others because they come across on initial contact as likeable, adjusted and well meaning. It is only through continued interaction and observation that the psychopath’s true “darker” nature is revealed”* (preface xiii).

2.1 Processing the emotional content of language

Given the clinical descriptions that individuals with psychopathic traits appear to lack normal affective responses in particular situations, there have been many attempts to assess this notion using laboratory based tasks. There are a number of studies that

have explored how psychopathic individuals respond to the emotional content of words.

2.1.1 Lexical decision task

In a lexical decision task, the participant must decide if a briefly presented string of letters is a real (English) word (e.g. BATTER) or not (BOTTER). Typically the non-words also follow the orthographic principles of English and so the participant must use their semantic memory to decide if they have a memory of this word or not (rather than depending on more superficial characteristics). An often replicated finding is that the emotional content of the word affects reaction time with which the discrimination can be made (Begleiter, Gross & Kissin, 1967; Day & Wong, 1996; Graves, Landis & Goodglass, 1981; Strauss, 1983; Williamson, Harpur & Hare, 1991). Thus, words with negative affective content (e.g. CANCER) and positive affective content (e.g. JACKPOT) are responded to faster than those words of neutral content (e.g. KETTLE).

Williamson et al. (1991) argued that individuals who lacked the ability to process the emotional content of words would not show this difference between neutral and affect-laden words. Using the PCL-R as a measurement of psychopathy, they did indeed find that participants with high PCL-R scores had reduced differences in reaction times between the neutral and affect-laden words.

In a similar vein, Lorenz & Newman (2002) presented participants with neutral (bowl, event, vacuum) positive (kiss, sunset, heaven) and negative (tomb, devil, hostage) words. Emotional responsiveness was calculated by subtracting the reaction time for

emotional words from the reaction time for neutral words. They found that psychopathic participants were less emotionally responsive than non-psychopathic participants, regardless of whether the words were positive or negative in nature.

2.1.2 Priming tasks

Blair, Richell, Mitchell, Leonard, Morton & Blair (2006) explored psychopathic participants' responses to the affective and semantic meaning of words in two tasks.

In the semantic priming task, either an animal or fruit target word was preceded by a prime word that was also a fruit or an animal. Participants were asked to respond by pushing a button to indicate whether the target word was a fruit or an animal.

Participants were presented with the following combinations; fruit-animal, fruit-fruit, animal-fruit, animal-animal. In the affective priming task, the same procedure was employed but the words were neutral, negative or positive in nature. Participants were asked to press one button if they thought the word was positive and a different button if they thought the word was negative. Participants' reaction times to the target were also recorded. Blair et al. (2006) predicted that the psychopathic participants would show no differences in reaction times when presented with negative primes compared to positive or neutral primes.

The non-psychopathic participants (PCL-R score <20) demonstrated slower reaction times when presented with negative compared to neutral primes. This result suggests an 'interfering effect' and that the non-psychopathic participants' slower reaction time indicates that they were responding to the emotional content of the negative prime word. The psychopathic group (PCL-R score >30) did not show any significant

differences in their reaction times when presented with negative primes indicating that they were not responding to the emotional content of the negative prime word.

Blair et al. (2006) also found that psychopathic participants made significantly more errors in the affective priming task by failing to accurately identify whether words were positive or negative. They experienced difficulty identifying both positive and negative words. There were no differences between psychopathic and non-psychopathic participants on the semantic priming task. Blair et al. (2006) believe that this result means that the psychopathic individuals did not demonstrate generalised difficulties in processing language. The difference between the psychopathic and non-psychopathic groups was the ability to process emotional language.

Blair et al. (2006) concluded that psychopathic participants experience difficulty processing emotional information that is both positive and negative in nature, but this difficulty is more pronounced when processing negative information.

2.1.3 Other cognitive based tasks

Hare, Williamson & Harpur (1988) explored the extent to which psychopathic participants were able to use the emotional significance of words and phrases. In their first study, participants were presented with word triads, for example, “deep, shallow foolish” and asked to identify which two out of the three words ‘best go together’.

Participants were presented with six types of word pairings. For example, 1) autonym (deep-shallow), 2) domain (foolish-loving, both relate to people), 3) metaphor (wise-deep), 4) polarity (foolish-shallow, both words have a negative connotation), 5) domain and polarity (wise-loving, for example, both relate to people and are positive)

and 6) no relationship (warm-foolish). The non-psychopathic participants were more likely to identify words based on emotional significance. In contrast, the psychopathic participants appeared to base their decisions on learnt associations between words rather than using the emotional significance.

In a second study (Hare et al., 1988), participants were presented with an emotional target phrase, for example, "*A man was thrown overboard a sinking ship.*"

Participants were presented with four test phrases that accompanied each target phrase, for example, 1) Same emotional tone, different descriptive feature ("A man running from a monster") 2) Opposite emotional tone, similar descriptive features ("A man was surfing on a wave") 3) Neutral emotional tone, same descriptive feature ("A woman was standing on a yacht") and 4) Neutral tone, different descriptive features ("A boy carrying a lamp into his room"). Participants were asked which of the four test phrases most closely matched the emotional tone of the target phrase. The non-psychopathic participants experienced little difficulty in matching the target phrase with the correct test phrase. However, psychopathic participants were more likely to match a target phrase with a test phrase with an opposite emotional polarity. Hare et al. (1988) concluded that psychopathic participants failed to use the emotional significance of words and phrases and based their decision on semantic similarities.

There appears to be evidence from laboratory based experiments that psychopathic individuals process the emotional content of language differently to healthy individuals. Unlike healthy individuals, psychopathic participants do not respond quicker to emotional words (Day & Wong, 1996). Psychopathic individuals also fail to use the emotional significance of words and phrases and appear to base their

decisions on learnt associations or semantic similarities between words and phrases (Hare et al., 1988) and experience particular difficulty processing negative words in comparison to positive (Blair et al., 2006).

2.1.4 Psychophysiological indicators

A number of other studies have used psychophysiological indicators to assess if psychopathic individuals process the emotional content of words differently to non-psychopathic individuals (e.g. evoked response potentials, ERPs). In healthy individuals, certain ERPs components are larger in response to emotional words compared with neutral words (Begleiter et al., 1967). Typically, psychopathic participants failed to show any differences in ERPs to emotional compared with neutral words (Kiehl, Hare, McDonald & Brink, 1999; Williamson et al., 1991). Again this suggests that the words are processed in merely a semantic manner and the emotional content is not processed by those with high levels of psychopathic traits.

To conclude, psychopathic individuals appear to experience difficulty processing the emotional content of language. A number of tasks have compared the responses of participants to neutral compared with emotional words. Psychopathic participants do not demonstrate any differences in reaction times, make more errors and also fail to show any differences in ERPs when responding to emotional compared with neutral words. Psychopathic participants also experience difficulty grouping words based on their emotional similarity (e.g., jealous, envy) and instead base their decision making on the semantic similarities between words (e.g. batter, butter).

2.2 Reduced physiological responsiveness to aversive stimuli

Patrick, Cuthbert & Lang (1994) measured electrodermal activity while participants were requested to imagine fearful and neutral situations (the electrodermal activity of the skin is the amount of sweat produced and a number of studies have found that there is a direct relationship between electrodermal activity and emotional arousal). Participants were presented with six neutral and six fearful sentences. An example of a fearful sentence would be, "*Taking a shower, alone in the house, I hear the sound of someone forcing the door and I panic.*" The other fearful sentences related to undergoing painful dental treatment, seeing a friend hit by a car, receiving an injection, making a speech and finding a spider in the house. An example of a neutral sentence would be, "*I am relaxing on my living room couch looking out of the window on a sunny autumn day.*"

Participants were told that they were required to memorise the sentences and that they would hear two tones. At the first tone, they were told to silently memorise the sentence (sentence articulation) and the second (sentence imagery) they were told to imagine that they were in the situation described in the sentence. Electrodermal activity was measured prior to each sentence being presented, at the first tone (sentence articulation) and six seconds after the second tone (sentence imagery). Healthy individuals typically show an increase in electrodermal activity to the fearful sentences in comparison with neutral sentences.

The psychopathic participants demonstrated reduced levels of electrodermal activity in comparison to non-psychopathic participants during the task in which they were

asked to imagine a fearful situation. Patrick et al. (1994) also divided their participants into three groups on the basis of PCL-R Factor 1 and Factor 2 scores. The socialised group had low Factor 1 and 2 scores, the simple antisocial had a high score on Factor 2 and a low score on Factor 1 and the detached antisocial group had high scores on Factors 1 and 2. All three groups demonstrated higher electrodermal activity to the fearful slides during the sentence imagery phase. However, both the simple antisocial (high score on Factor 2 and a low score on Factor 1) and detached antisocial (high Factors 1 and 2) showed smaller differences in electrodermal activity between fearful and neutral slides compared with the socialised group.

The results of Patrick et al. (1994) therefore suggest that psychopathic individuals do not demonstrate an increase in electrodermal activity when imagining a fearful situation.

2.3 Reduced aversive conditioning

A number of the studies that attempt to measure aversive conditioning in psychopathic individuals are based on classical conditioning principles, first demonstrated by Pavlov (1927). I will summarise classical conditioning as the design of many studies are based on these principles. Pavlov's famous experiments involved the study of the physiology of digestion in dogs. Pavlov noticed that at feeding time, the dogs salivated at the sight of the laboratory technicians who fed them. He concluded that presentation of the unconditioned stimulus (US), in this case meat, resulted in salivation, which is described as the unconditioned response (UR). The laboratory technician had become associated with the presentation of meat and the former is described as a conditioned stimulus (CS). When the dogs salivated at the

sight of the laboratory technician this is referred to as the conditioned response (CR). Pavlov carried out classic experiments during which the presentation of food (US) was paired with a bell (CS); eventually ringing the bell alone resulted in salivation (CR). Aversive conditioning is when a conditioned stimulus (neutral face for example) is paired with an aversive unconditioned stimulus (electric shock, loud noise) the goal being to create an aversion to the conditioned stimulus.

Lykken (1957) was one of the first researchers to identify a possible relationship between psychopathy and reduced levels of fear and anxiety. In his study, a buzzer (CS) was paired with an electric shock (US). Typically individuals produce sweat (UR) in response to being shocked. So the amount of sweat produced by participants was measured as the conditioned response (CR) to the buzzer which was the conditioned stimulus (CS). Lykken (1957) found that psychopathic participants, (not assessed using the PCL-R) showed a significantly reduced conditioned response (sweating) compared with the non-psychopathic group in response to the conditioned stimulus (CS).

The results of a number of studies suggest that psychopathic individuals fail to demonstrate appropriate physiological responses in anticipation of an unpleasant or painful stimulus. A number of studies have used a 'count down' design in which participants are aware that they are about to receive an electric shock and when this will occur. Participants' electrodermal activity was measured during the 'countdown' period. Healthy individuals typically demonstrate an increase in electrodermal activity during the 'countdown' period. The results of a number of studies suggest that psychopathic participants show smaller levels of electrodermal activity than non-

psychopathic participants during this countdown and that their responses occur closer to the electric shock being administered (Hare, 1965, 1982; Hare & Craigen, 1974; Ogloff & Wong, 1990).

Hare & Quinn (1971) said that in studies that use electric shocks as the unconditional stimulus, the electrodermal activity in the skin reflects the extent to which anticipatory fear has been conditioned. Hare & Quinn (1971) presented three tones to two groups of offenders assessed as psychopathic and non-psychopathic. A loud tone was followed by an electric shock, a medium tone was followed by a picture of a naked woman and a quiet tone was presented alone. Participants' electrodermal activity was measured during the task. Hare & Quinn (1971) calculated the difference in electrodermal activity for participants prior to and after the electric shock. Hare & Quinn (1971) found that psychopathic participants produced smaller electrodermal responses to the electric shock than the non-psychopathic participants.

Flor, Birbaumer, Hermann & Patrick (2002) also explored whether participants were aware of the relationship between neutral faces (CS) and a noxious smell (US). During the experiment, participants were asked to rate the relationship between the neutral face (CS) and the noxious smell (UC). They were asked to rate, *how likely is it that the odour will follow now?* on a 9-point rating scale ranging from 1-9. The non-psychopathic participants demonstrated significantly higher levels of electrodermal activity when presented with the conditioned stimulus (CS) in contrast to the psychopathic participants. The psychopathic participants showed neither electrodermal nor electromyographic conditioning when presented with the conditioned stimulus. Flor et al. (2002) concluded that the psychopathic participants

were attentive to the conditioned stimulus (as there were no differences between the psychopathic and non-psychopathic participants in predicting when the noxious smell was likely to occur) but did not attach any significance to it. Flor et al. (2002) concluded that their results suggest that psychopathy is associated with a general impairment in aversive emotional conditioning not just fear conditioning.

2.4 Impaired responses to punishment

Blair, Morton, Leonard & Blair (2006) explored psychopathic participants' ability to respond to reward and punishment in a learning task. They used a task called the Differential Reward/Punishment Learning task which involved the presentation of pictures of objects such as a house, cup and fork. Each object was randomly assigned a value of points that could be either gained (reward) or deducted (punishment) from the participants' overall level of points. The participant is not told how many points each object is worth prior to the start of the task. The aim of the task is for the participant to acquire as many points as possible. During each trial, the participant is presented with two objects and told how many points they have either gained or lost. Participants therefore have to work out how many points each object is worth and choose one of the items. A correct response is therefore choosing the item that has gained the most points and an error is selecting the item that loses points. The following conditions were explored in the study; punishment-punishment (both objects lose points), punishment-reward (one object loses points and one gains) and reward-reward (both objects gain points).

The psychopathic participants lost significantly more points than the non-psychopathic participants in all three conditions but this was particularly marked in the punishment-punishment condition.

To conclude, Blair et al. (2006) believe that coding of information about punishment for the formation of stimulus-punishment associations is particularly impaired in psychopathic individuals.

2.5 The blink startle reflex

The blink startle reflex has also been measured in a number of studies. The startle reflex is the reaction demonstrated by humans and animals, often 'jumping' when they are exposed to a threatening stimulus, for example, an unexpected loud noise. Typically, the magnitude of the blink is larger during the presentation of negative stimuli relative to positive. The blink startle reflex can be measured by placing electrodes around the eyes to measure the magnitude of eye blink and has been demonstrated to be a reliable method of measuring responsiveness to emotional material (Bradley, Cuthbert & Lang, 1990a, 1990b; Cuthbert, Bradley & Lang, 1990a, 1990b; Bradley, Lang & Cuthbert, 1990; Cuthbert, Vrana & Bradley, 1991; Hamm, Stark & Vaitl, 1990; Lang, Bradley & Cuthbert, 1997). Of interest is the extent to which the startle response can be modified by the affective or emotional state of the individual. When presented with negative images, healthy individuals tend to demonstrate a larger startle response to a loud noise than when viewing neutral images.

Patrick, Bradley & Lang (1993) measured the blink startle response in a sample of 54 participants in a forensic treatment facility. Participants were shown pleasant, neutral and negative slides and their startle responses were measured by administering an acoustic probe. Typically healthy participants demonstrate the largest startle response to negative slides and smallest to positive slides. Participants were allocated to one of three groups depending on their PCL-R score. The non-psychopathic group had PCL-R scores <20, the mixed group PCL-R had scores of 20-30 and the psychopathic group had PCL-R scores >30. Patrick et al. (1993) found that the non-psychopathic and mixed groups demonstrated the largest blink startle responses to negative slides, followed by neutral and positive slides. The magnitude of the blink response was significantly smaller for negative slides compared with neutral slides for the psychopathic group.

In a non-incarcerated community based sample of volunteers, Vanman, Mejia, Dawson, Schell & Raine (2003) replicated the findings of Patrick et al. (1993) and also found that psychopathic individuals demonstrated smaller blink startle responses when viewing negative slides. They also found that a high PCL-R Factor 1 score was related to reduced blink startle when viewing negative slides.

Levenston, Patrick, Bradley & Lang (2000) measured participants' blink startle responses to victim slides (e.g. scenes of mutilated bodies and assaults on others) and to threatening slides (e.g. looming attackers and loaded weapons). The psychopathic participants demonstrated reduced blink startle to both victim and threatening slides. Levenston et al. (2000) concluded that emotional deficits in psychopathic individuals are not limited to viewing distress in others.

The above studies therefore suggest that psychopathic participants do not demonstrate blink startle modulation when viewing negative slides which is typically observed in healthy individuals. A number of studies have also found that a high score on Factor 1 is related to reduced blink startle response. However, Vanman et al. (2003) found that Factors 1 and 2 are both related to the blink startle response and that a high score on Factor 2 is related to increased startle modulation.

2.6 Recognition of emotion

A common theme in the emotional dysfunction theory of psychopathy is that there are impairments in the ability of psychopaths to understand emotions in other people and in particular to read emotions from the face of another person (Blair, Mitchell & Blair, 2005).

Although this study was not actually a facial recognition task, Blair, Jones, Clark & Smith's (1997) study was significant because they found that psychopathic individuals failed to respond to distress cues portrayed in pictures. Blair et al. (1997) recorded participants' electrodermal activity whilst they were presented with a number of slides. The slides were classified as distressing (group of crying adults, screaming boy holding onto a rail), threatening (close up of a shark's mouth, partially coiled snake) and neutral (umbrella, food, wicker basket). The non-psychopathic participants demonstrated greatest electrodermal activity to the distress slides, followed by threatening and the lowest level of electrodermal activity to neutral slides. In contrast, the psychopathic participants showed significantly greater electrodermal activity to threatening slides, followed by distress and the lowest level

of electrodermal activity to neutral slides. Blair et al. (1997) found that the psychopathic group had a significantly lower electrodermal response to the distress slides compared with the non-psychopathic group.

Kosson, Suchy, Mayer & Libby (2002) presented participants with slides of facial expressions depicting the six basic emotions; happy, sad, anger, fear, surprise and disgust. Participants were asked to press one of six buttons on a keyboard to identify the emotion that had been presented. Kosson et al. (2002) found that the psychopathic participants were significantly worse at identifying facial expressions portraying disgust compared with the non-psychopathic participants. No other differences were found between the psychopathic and non-psychopathic participants. In terms of overall performance, the psychopathic participants demonstrated comparable performance on this task to non-psychopathic participants.

Blair, Mitchell, Peschardt, Colledge, Leonard & Shine et al. (2004) investigated the relationship between psychopathy and responsiveness to facial expressions. In this task, participants were presented with facial expressions that gradually morphed into one of the six basic emotions (sad, fear, happy, disgust, surprise and anger). The participants were told that they would see a neutral face that would gradually change into one of six emotions and that they should say out loud which emotion was being presented. The number of stages before the correct emotion was identified was calculated for each emotion. A significant difference was found between psychopathic and non-psychopathic participants when identifying fearful facial expressions. The psychopathic participants demonstrated greater impairment in their recognition of fearful facial expressions (the facial expressions needed to be morphed at a greater

intensity before they were accurately recognised). However, no differences were found between psychopathic and non-psychopathic participants in the recognition of sad facial expressions.

Dolan & Fullam (2006) also asked participants to participate in a facial recognition task based on the six basic emotions. The faces were morphed to vary the intensity of emotion expressed (25%, 50%, 75% and 100%). Dolan & Fullam (2006) found that the psychopathic participants, assessed with the PCL:SV (Hart et al., 1995) were significantly less accurate at identifying sad and happy faces (at 100% intensity) in comparison to a control group of healthy individuals. Dolan & Fullam (2006) also pointed out that the psychopathic participants had significantly longer reaction times for all emotions in comparison with the control group, which means that the psychopathic participants did not appear to be completing the task in an impulsive manner.

Hastings, Tangney & Stuewig (2008) investigated the relationship between psychopathy and facial recognition in a sample of 154 offenders. Participants were presented with six emotions (happy, angry, sad, shame, surprise and fear) at two different levels of intensity (60% and 100%). Hastings et al. (2008) found a significant negative relationship between psychopathy (assessed with the PCL:SV) and total score on the facial recognition task. They also found significant negative correlations between psychopathy and the accurate identification of happiness and sadness. Participants with a high score on the PCL:SV were therefore less able to accurately identify happy and sad facial expressions and had an overall lower score on this facial recognition task. Hastings et al. (2008) also found significant negative

relationships between Part 1 (which is equivalent to Factor 1 of the PCL-R) and Part 2 (which is equivalent to Factor 2 of the PCL-R) of the PCL:SV and the accurate identification of sad faces. Part 2 of the PCL:SV was also negatively correlated with the identification of happy faces. Hastings et al. (2008) concluded that psychopathy is associated with difficulty identifying less intense facial expressions. They found a significant negative relationship between psychopathy and total score on the facial recognition task only at 60% intensity. The relationship between psychopathy and total score on the facial recognition was not significant at 100%.

Blair, Mitchell, Richell, Kelly, Leonard, Newman et al. (2002) found that psychopathic participants appear to experience difficulty recognising fear or sadness regardless of whether the presentation is visual or auditory. They investigated the relationship between psychopathy and responsiveness during a Vocal Affect Recognition Test. Participants were asked to identify the feeling that the speaker was experiencing whilst speaking a word. The emotions conveyed were fear, happiness, disgust, sadness and anger. Blair et al. (2002) found that the psychopathic participants made significantly more errors than non-psychopathic participants when identifying fear in the speaker's voice. There were no significant differences between the psychopathic and non-psychopathic participants in recognising the other emotions. Blair et al. (2002) concluded that psychopathic individuals experience greater difficulty processing fear compared with other emotions.

Iria & Barbosa (2009) used a different experimental paradigm to explore the processing of fearful facial expressions in psychopathic offenders. This study is also interesting as it compares the performance of convicted offenders against non-

criminal participants from the community. Participants were assigned to one of four groups; criminal psychopathic, criminal non-psychopathic, non-criminal psychopathic and non-criminal non-psychopathic. Psychopathy was assessed using the PCL:SV (screening version). Iria & Barbosa (2009) used a go/no go method whereby responses were given for just one type of stimulus (go) but withheld for other types (no go). Participants were randomly presented with faces (one at a time) displaying fear, happiness, sadness and surprise. Participants were told to hit a key on the keyboard when a face displaying fear appeared on a screen. Iria & Barbosa (2009) calculated the number of errors (when participants wrongly identified other facial expressions as fear) and omissions (when participants did not respond to a fearful face). The participants assessed as psychopathic (regardless of criminal status) made significantly more errors and omissions than the non-psychopathic participants, which means that overall they were significantly less able to accurately identify fearful facial expressions. Of interest is that no significant results were found for participants' criminal status. This study has therefore found that psychopathy, rather than criminal status *per se*, was the significant factor that affected the recognition of fearful facial expressions.

The results of these studies suggest that psychopathic individuals demonstrate impairment in the recognition of fear and sadness in others (though this is not found with any consistency). However, there is some evidence that this impairment may also extend to the recognition of disgust (Hansen et al., 2008; Kosson et al., 2002).

3. IS PSYCHOPATHY RELATED TO A SPECIFIC EMOTIONAL DEFICIT?

Central to Blair et al.'s (2005) neurocognitive theory of psychopathy is the idea that psychopathic individuals experience specific difficulty identifying fear and sadness in others (Blair et al., 1997; Blair et al., 2002; Blair et al., 2004; Dolan & Fullam, 2006; Hastings et al., 2008). I note that Del Gaizo & Falkenbach (2008) found that a self-report measure of psychopathy (PPI) was also associated with poor recognition of fear in facial expressions (self-report measures of psychopathy will be discussed in chapter 2). There are a number of studies that have demonstrated that psychopathic individuals demonstrate reduced physiological responsiveness to the distress of others (Aniskiewicz, 1979; Blair et al., 1997; House & Milligan, 1976). There are also studies that have found that children assessed as having psychopathic and anti-social traits demonstrate difficulty recognising fearful expressions in others (Blair & Coles, 2000; Bowen & Dixon, 2010; Stevens, Charman & Blair, 2001).

Blair et al. (2005) believe that the amygdala is central to the development of emotional learning and that there is a genetic contribution to the development of psychopathy which disrupts the functioning of the amygdala.

Psychopathic individuals demonstrate impaired aversive conditioning (Flor et al., 2002; Hare, 1970; Lykken, 1957), which means that they fail to learn the relationship between a stimulus that is associated with a negative consequence, for example, a shock or a noxious odour. Reduced levels of amygdala activity have been demonstrated during a neuro-imaging study with individuals assessed as having high levels of psychopathic traits (Veit, Flor, Erb, Hermann, Lotze, Grodd et al., 2002).

In terms of emotional learning, psychopathic individuals have also been found to not demonstrate blink startle modulation when viewing negative slides, which is typically observed in healthy individuals (Levenston et al., 2000; Patrick et al., 1993; Vanman et al., 2003). There are a number of studies that have found that the amygdala is involved in the modulation of the blink startle response (Angrilli, Mauri, Palomba, Flor, Birbaumer, Sartori, et al., 1996; Davis, 2000).

There are also a number of studies that have also found that the amygdala is involved in the recognition of fearful and sad facial expressions (Adolphs & Tranel, 2004; Adolphs, Tranel & Damasio, 1998; Morris, Frith, Perrett, Rowland, Young & Calder, et al., 1996).

However, there are a number of studies that have failed to demonstrate that psychopathic participants demonstrate difficulty recognising sadness and fear cues (Book, Quinsey & Langford, 2007; Day & Wong, 1996; Deeley, Daly, Surguladze, Tunstall, Mezey, Beer et al., 2006; Glass & Newman, 2006; Habel, Kuhn, Salloum, Devos, Schneider, 2002; Hansen et al., 2008; Kosson et al., 2002; Pham & Philipott, 2010).

There is also a published study that has failed to find a relationship between the four Facets of psychopathy and sadness and fear (Hansen et al., 2008). Hansen et al. (2008) state that it seems logical that Facet 2 of the PCL-R, which measures the affective component of psychopathy, should be related to performance on a facial recognition test. However, Hansen et al. (2008) found strong, significant positive correlations between the accurate identification of disgusting faces and Facet 3 ($r =$

.45) and Facet 4 ($r = .53$). Hansen et al. (2008) also found that for female faces only, there was a significant negative correlation between Facet 1 and disgust ($r = -.31$). Hansen et al. (2008) therefore found no relationship between the four Facets of psychopathy and the recognition of sad or fearful facial expressions.

Pham & Philipott (2010) attempted to directly test Blair et al.'s (2005) theory. They asked participants, 43 offenders located in a high security prison in Belgium, to complete a facial recognition test. Participants were presented with slides of faces displaying the following emotions; sad, fear, happy, anger and disgust. Pham & Philipott (2010) added together participants' responses to sad and fearful stimuli and created a category called amygdalian emotion. They also added together participants' responses to happy, angry and disgust slides and created a category called nonamygdalian emotion. Pham & Philipott (2010) used the PCL-R to assess psychopathy. They created a high psychopathy group where participants had PCL-R scores between 25-32 and a low psychopathy group whose scores ranged from 4-20. Pham & Philipott (2010) explored whether there were any differences between the high and low psychopathy groups' accuracy rates in detecting amygdalian and nonamygdalian emotion. No differences were found between the psychopathic group's responses to amygdalian and nonamygdalian emotion. However, a significant difference was found between the low psychopathy group's responses to amygdalian compared with nonamygdalian emotion. The low psychopathy group was significantly less accurate at identifying amygdalian emotion. Pham & Philipott (2010) concluded that their results are at odds with Blair et al.'s (2005) theory.

The results of some studies suggest that psychopathic individuals might even be skilled at reading facial expressions. Kosson et al. (2002) found that 44% of the psychopathic participants (from prison and hospital treatment facilities) and 42% of healthy individuals (community based volunteers) accurately identified 100% of sad faces and Habel et al. (2002) found that psychopathic participants' accuracy rate was significantly higher than the healthy individuals.

Book et al. (2007) examined participants' ability to correctly identify the emotion and the intensity of the emotion being displayed. Participants were presented with a number of slides of Caucasian faces (slides depicting people from other racial groups were excluded to control for the effects of race). Each slide was presented and then the participant was asked, "*What was the previous person feeling?*" Participants were presented with five different emotions from which to choose; happy, sad, angry, disgust and fear. Participants were also asked to rate the intensity of the emotion being displayed by the faces in the slides from 1-10 (a score of 10 being very intense). Book et al. (2007) measured the total number of errors in identifying fear, accuracy of intensity for emotions other than fear and accuracy of fear intensity ratings.

Participants were 50 convicted male offenders and 60 men from the community. Psychopathy was assessed using the PCL-R for the offenders and both samples completed Levenson's Self-Report Psychopathy scale (LSRP; Levenson et al., 1995).

Book et al. (2007) found no relationship between the LSRP and the total number of errors in identifying fear, accuracy of intensity for emotions other than fear and accuracy of fear intensity ratings. However, in contrast, Book et al. (2007) found that

PCL-R total score was positively correlated with accuracy in identifying emotional intensity for all emotions ($r = .20$) and specifically for fearful faces ($r = .21$). Both these results just failed to reach statistical significance. These results mean that participants with a high level of psychopathic traits were more able to accurately identify the emotional intensity of slides and specifically fearful facial expressions.

Kosson et al. (2002) concluded that their results were not consistent with the findings of Blair et al. (2005). They make an interesting distinction between being able to recognise/label and demonstrate appropriate physiological responsiveness to emotional material. Kosson et al. (2002) concluded that psychopathic individuals do not appear to experience difficulty recognising and labelling fear but they may not experience appropriate physiological responses to such stimuli. This would also fit with the clinical profile of psychopathy. Not only does the PCL-R measure lack of remorse and empathy (Facet 2 of the PCL-R), it also captures an exploitative interpersonal style measured by Facet 1 of the PCL-R; glib superficial charm (impression management) and most importantly conning and manipulation. The ability to con, manipulate and exploit others often depends on being able to target individuals who may be vulnerable. It would therefore appear that psychopathic individuals need to be skilled at reading facial expressions and non-verbal cues in others, such as sadness and fear, in order to be able to target and exploit their victims. In fact, Kosson et al. (2002) suggest that psychopathic individuals may demonstrate a superior ability to 'decode anger'.

4. CONCLUSION

A number of studies have found that psychopathic individuals experience specific difficulty recognising sadness and or fear which is the basis for Blair et al.'s (2005) neurocognitive theory of psychopathy. However, Kosson et al. (2002) have a different view which is that psychopathic individuals do not appear to experience difficulty recognising and labelling fear but they may not experience appropriate physiological responses to such stimuli.

The aim of this thesis is therefore to provide further tests of the “emotional dysfunction” theory of psychopathy. In particular, whether any deficits in emotional processing are best characterised in term of the inability to detect/recognise a particular emotion (Blair et al., 2005) or whether the problems occur at a later stage that involves the generation of an affective response to such stimuli and therefore using this response to guide behaviour (Kosson et al., 2002). I will attempt to explore emotional processing and psychopathy by administering a number of emotionally based tasks to offenders who have been assessed as having different levels of psychopathic traits.

CHAPTER 2 HOW IS PSYCHOPATHY MEASURED?

1. HOW IS PSYCHOPATHY MEASURED?

1.1 The PCL-R

The Psychopathy Checklist (PCL) was developed by Hare (1980) as a tool to measure psychopathic traits. It consisted of a series of items that describe the personality traits and behavioural manifestations of psychopathy, as defined by clinical tradition, particularly in the writings of (Cleckley, 1941, 1976). The PCL underwent a revision to become the PCL-R (Hare, 1991, 2003). The PCL-R consists of 20 items that underpin the construct of psychopathy. For each item, there is a description and a set of guidelines for scoring. Each item is then scored as to whether the item is absent (score = 0), partially present (score =1), or definitely present (score =2). An interview is an important, though not an essential, part of the PCL-R assessment. The completion of the PCL-R is also based on a thorough review of file information (which the manual states is an essential part of the assessment). Given the known capacity of people with psychopathic traits to con, manipulate and lie, this lack of reliance on self-report seems desirable.

Hare (1991) originally identified a two Factor model, referred to as Factors 1 and 2. Factor 1 reflects a combination of affective and interpersonal features and Factor 2 socially deviant behaviour. There are a number of published studies that have replicated Hare's original findings and provide support for the two factor model. More recently, Hare (2003) identified a four Facet model in which Factor 1 is split into Facet 1, interpersonal and Facet 2, affective. Factor 2 is split into Facet 3, lifestyle and Facet 4,

antisocial.

1.2 Rationale for the development of a self-report measure of psychopathy

Lilienfeld & Andrews (1996) identified two main reasons for the development of a self-report measure of psychopathy. The first is ease of administration, as completion of the PCL-R is a lengthy and resource intensive process that should involve interviewing the offender, access to file information and be completed by a trained assessor. The second reason for the development of a self-report measure of psychopathy is that it would allow assessment of the prevalence of psychopathy in the general population for whom there is an absence of file information. This inability to conduct PCL-R assessments in the general population has significantly hindered experimental research on psychopathy. It would also allow comparisons to be made between different populations, e.g. offenders and community samples.

There are a number of self-report measures that purport to measure psychopathic traits;

- Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996) and the revised version PPI-R (Lilienfeld & Widows, 2005).
- Self-Report Psychopathy Scale (SRP; Hare, 1985).
- Levenson's Self-Report Psychopathy Scale (LSRP; Levenson, Kiehl & Patrick, 1995).
- Psychopathic deviate (Pd) scale of Minnesota Multiphasic Personality Inventory (MMPI-2; McKinley & Hathaway, 1944).
- California Personality Inventory (CPI So scale; Gough & Bradley, 1996).

- Antisocial Process Screening Device (APSD; Frick & Hare, 2001).
- Widiger and Lynam's (1998) Five Factor Model of Personality (FFM; Costa & McCrae, 1992).
- The Personality Assessment Inventory (PAI; Morey, 1991).¹

Although a number of self-report measures of psychopathy have been developed, only the Self-Report Psychopathy Scale (Hare, 1985), Levenson's Self-Report Psychopathy Scale, (Levenson et al., 1995), and the Psychopathic Personality Inventory (Lilienfeld & Andrews, 1996) were designed to assess psychopathy as conceptualised by Hare (Hare, 2003). I will therefore only review the PPI, SRP and LSRP. For each measure, I will review its psychometric properties, factor structure and relationship with the PCL-R. The extent to which a self-report measure of psychopathy relates to the PCL-R is probably the most important factor that will be considered when attempting to identify a measure to be used in this thesis.

As stated in chapter 1, emotional difficulties are believed to be at the heart of psychopathy (Johns & Quay, 1962; Patrick, 2006). I will therefore review studies that have explored the relationship between self-report psychopathy measures and physiological responsiveness during emotional tasks. I will not review any of the studies that have explored the extent to which self-report psychopathy measures can predict outcomes, such as antisocial behaviour or poor institutional behaviour (in offenders) as

¹ This initial review of self-report instruments occurred at the commencement of my thesis (circa 2005) in order to choose which instrument to use in my experiments. It therefore does not include instruments that appeared after this date. However, this review has been updated to take into account information relating to the instruments that already existed in 2005 that have been published since the initial review.

this is not directly relevant to this thesis.

2. THE PPI AND PPI-R

2.1 Development of the PPI-R

Lilienfeld & Andrews (1996) developed the first version of the PPI with close attention to the concept of psychopathy as described by (Cleckley, 1941). It was developed to measure personality traits, attitudes and dispositions rather than antisocial behaviours.

The PPI, and its successor the PPI-R (Lilienfeld & Widows, 2005) provides a global psychopathy score and eight content scales; Machiavellian Egocentricity, Social Potency (called Social Influence on the PPI-R), Coldheartedness, Carefree Nonplanfulness, Fearlessness, Alienation (called Blame Externalization on the PPI-R), Impulsive Nonconformity (called Rebellious Nonconformity on the PPI-R) and Stress Immunity. The PPI-R is based on the same goals and assumptions as the PPI and the latter was revised in order to reduce the reading level, reword outdated items and develop new items for the Stress Immunity scale (Lilienfeld & Widows, 2005).

The PPI-R contains three validity scales that are designed to measure response style; Virtuous Responding which measures impression management, Deviant Responding which is designed to measure responses that are random or careless and Inconsistent Responding which also measures random or inconsistent responses or reading difficulty.

2.2 Factor structure of the PPI and PPI-R

I will firstly focus on studies that have examined the factor structure of the PPI (Benning,

Patrick, Hicks, Blonigen & Krueger, 2003; Benning, Patrick & Iacono, 2005; Blonigen, Hicks, Krueger, Patrick & Iacono, 2005; Edens, Poythress, Lilienfeld & Patrick, 2008; Neumann, Malterer & Newman, 2008; Patrick, Edens, Poythress, Lilienfeld & Benning, 2006). Benning et al. (2003) were the first to identify a two factor solution. The first factor (PPI-I) termed Fearless Dominance, is underpinned by Social Potency, Fearlessness and Stress Immunity. The second factor (PPI-II) termed Self-Centred Impulsivity, captures Machiavellian Egocentricity, Impulsive Nonconformity, Blame Externalization and Carefree Nonplanfulness. Benning et al. (2003) also found that the Coldheartedness scale, which is a 16 item scale that captures the absence of strong affective responses believed to be at the heart of psychopathy, did not load on PPI-I or PPI-II and was therefore left as a stand alone item. Neumann et al. (2008) state that the Coldheartedness scale appears to be empirically related to the PCL-R. This scale appears to resemble Facet 2 of the PCL-R which is also underpinned by lack of remorse, callous lack of empathy and shallow affect.

Two studies have also found support for the two factor structure in samples of offenders (Edens et al, 2008; Patrick et al., 2006), although Neumann et al. (2008) failed to find support for the two factor solution in a much larger sample of 1,224 offenders .

There only appears to be one published study that has explored the factor structure of the PPI-R in a forensic sample. Based on a sample of 200 forensic psychiatric patients, Edens & McDermott (2010) found support for the two factor structure, which they concluded was consistent with the findings of (Benning et al., 2003). However, Uzieblo,

Verschuere, Van den Bussche & Crombez (2010) failed to find support for the two factor structure of the PPI-R in a much larger sample of 713 community based volunteers.

The results of these studies are therefore inconclusive about the presence of the underlying two factor structure of both the PPI and PPI-R in samples of community based healthy individuals and forensic samples.

2.3 Psychometric properties of the PPI-R

Lilienfeld & Widows (2005) report Cronbach alphas for the PPI-R in two samples; a community based college sample and an offender sample. For the college sample, they report a Cronbach alpha value of (.93) for PPI-R total score and (.92) for PPI-I and (.92) for PPI-II. For the sample of offenders, they report Cronbach alphas of (.86) for PPI-R total score and (.91) for PPI-I and (.76) for PPI-II. Sandler (2004) reports Cronbach alpha values of (.95) for PPI-R total score and (.75-.90) for PPI-R subscales. Neumann et al. (2008) report Cronbach alphas for their sample of 1,224 offenders. The Cronbach alpha value for PPI total score was (.91) and PPI subscales ranged from (.73-.87). Together these studies show the PPI-R has good internal consistency.

There are a number of studies that report test-retest correlations for the PPI-R total score. Lilienfeld & Widows (2005) report test-retest reliability correlations for the PPI-R over a period ranging from 12-45 days. The PPI-R total score showed good test-retest reliability ($r = .93$) as did the subscales ($r = .82-.95$). Chapman, Gremore & Farmer (2003) report a test-retest correlation for the PPI-R total score of ($r = .92$) over a 49 day period. Sandler (2004) also reports a high test-retest correlation for PPI-R total score of ($r = .94$). It

therefore appears that the PPI-R has good test-retest reliability.

2.4 Relationship between the PCL-R and PPI

Given the potential usefulness of a self-report measure of psychopathy, it is not surprising that there have been attempts to examine the relationship between the PPI and the PCL-R. Poythress, Edens & Lilienfeld (1998) reported a strong correlation ($r = .54$) between PCL-R and total PPI score in a sample of 50 convicted prisoners. Kruh, Whittermore, Arnaut, Manley, Gage & Gagliardi (2005) also found a positive correlation between the PCL:SV (PCL-R Screening Version, Hart, Cox & Hare, 1995) and PPI ($r = .62$), in a sample size of 50 'insanity acquittees'. Skeem & Lilienfeld (2004) found correlations between PCL-R Factor 1 ($r = .31$) and Factor 2 ($r = .48$) and PPI total score. These results suggest that there is a strong relationship between total PCL-R and PPI scores.

There are published studies that have explored the relationship between the four Facets of the PCL-R and the PPI (Edens et al., 2008) and PPI-R (Edens & McDermott, 2010). More recent studies have also explored the use of the PPI (Edens et al., 2008; Malterer, Lilienfeld, Neumann & Newman, 2010; Poythress, Lilienfeld, Skeem, Douglas, Edens, Epstein et al., 2010) and PPI-R (Edens & McDermott, 2010) in forensic populations.

In a sample of 876 adult male offenders located in either a high or low security prison, Malterer et al. (2010) found a significant strong correlation ($r = .39$) between PCL:SV and PPI total score. They also found a weak but significant relationship between PCL:SV

(Hart et al., 1995) Factor 1 and PPI-I ($r = .18$) and a significant relationship between PCL:SV Factor 2 and PPI-II ($r = .41$).

Using the PPI (in a sample of 46 young offenders) Edens et al. (2008) found that the PPI-I was not related to Facets 1 and 2 but they found significant positive correlations between PPI-II and Facet 1 ($r = .42$) and Facet 2 ($r = .40$) of the PCL-R. Edens et al. (2008) found significant positive correlations between PPI-II and all four Facets of the PCL-R. They found a strong relationship between PPI and PCL-R total scores ($r = .54$).

Poythress et al. (2010) explored the relationship between the PCL-R and PPI in a large sample of 1,603 offenders. They found a positive correlation of moderate effect size between PCL-R and PPI total scores ($r = .43$). They also investigated the relationship between the underlying factors of the two measures. They found a significant positive correlation between PCL-R Factor 1 and PPI-I of the PPI ($r = .25$). A significant but stronger correlation was found between PCL-R Factor 2 and PPI-II of the PPI ($r = .39$).

In a sample of 200 forensic psychiatric in-patients, using the PPI-R, Edens & McDermott (2010) report a significant correlation of ($r = .17$) between PPI-R and PCL-R total scores. They also found that PPI-I failed to demonstrate any relationship with any of the four Facets of the PCL-R. They also found that PPI-II was only significantly correlated with Facets 3 and 4 of the PCL-R which is more in line with what might be expected.

Patrick & Bernat (2009) state that the two factors of the PPI and PCL-R are not identical.

They point out that the PPI factors are independent of each other in comparison to the two PCL-R factors which are moderately correlated. Patrick & Bernat (2009) state that the design of the PPI and PCL-R are based on different assumptions. The PCL-R was designed to measure a unitary construct of psychopathy whereas Patrick & Bernat (2009) state that the PPI was designed to measure a range of psychopathic traits. They also state that PPI-I is different to PCL-R Factor 1 in that the former is more closely associated with features of psychological adjustment such as social dominance and resilience. Patrick & Bernat (2009) conclude that, "*In sum, the two factors of the PPI index major components of the psychopathy construct in a more clearly differentiated way than the two correlated factors of the PCL-R*" (pp. 1113).

2.5 PPI and emotional processing

There are a number of studies that have explored the relationship between PPI scores and physiological responsiveness during tasks that have an emotional component. Gordon, Baird & End (2004) used Magnetic Resonance Imaging (MRI) whilst their participants took part in two tasks. Participants were shown eight adult faces displaying different emotions; anger, fear, sadness and joy. In the 'emotional' task, participants were shown a target face and asked to hit a button when another face was shown displaying the same emotion as the target face. In this task, participants were told not to focus on the gender or identity of the faces shown, only the emotion. In the 'identity' task, participants were shown a target face and asked to hit a button when the same face was shown.

All participants, who were 20 adult male students, completed the PPI. Participants were

assigned to either high PPI or low PPI groups depending on their total PPI score. Gordon et al. (2004) found that there were no differences between the high and low groups in terms of their speed and accuracy on both tasks, which they believe is an encouraging result as there were no differences in performance. However, differences in MRI activity were found between the high and low PPI groups during their performance on the emotional task. The MRI results suggest that there was more activity in the dorsolateral prefrontal cortex for participants with high PPI scores during the emotional task.

Gordon et al. (2004) suggest that activation of this area of the brain is associated with working memory and they believe that this is evidence of use of a cognitive strategy to solve an emotional task. In contrast, the low PPI group showed activity in the inferior frontal, medial prefrontal and amygdala which are the parts of the brain believed to be responsible for processing information of an emotional nature. It is also of note that the groups did not differ significantly in terms of the areas of the brain that were activated during the 'identity' task.

Benning et al. (2005) explored the relationship between emotional processing and the subscales of the PPI. Participants' blink startle responses and electrodermal activity were measured whilst viewing pictures with or without emotional content. The typical response in healthy individuals is that the magnitude of the blink startle response is larger during the presentation of negative pictures relative to positive (see chapter 1). Healthy individuals also demonstrate increased electrodermal activity in response to aversive stimuli. Benning et al. (2005) examined the Fearless Dominance (PPI-I) and Self-Centred Impulsivity (PPI-II) scales of the PPI. Participants were each shown pictures from the

International Affective Picture System (IAPS). Benning et al. (2005) only analysed the results of participants with scores in the top and bottom 10% on PPI-I and PPI-II, in order to create extreme groups. A significant difference in startle responses to negative pictures was found between the high and low PPI-I groups. The high PPI-I group demonstrated a reduced blink startle to the negative pictures in comparison to the low PPI-I group. The high PPI-I group had a significantly lower level of electrodermal activity to negative pictures compared with the low PPI-I group. The low PPI-I group demonstrated an increase in electrodermal activity when viewing negative pictures compared with neutral but the high PPI-I group did not. Participants in the high PPI-I group had significantly lower levels of overall electrodermal activity than the low PPI-I group.

Justus & Finn (2007) also found that in a sample of healthy individuals, males with a high score on the PPI failed to demonstrate the typical increase in startle response when viewing negative material.

These findings are of interest as a number of studies that have found that a high score on the PCL-R is also associated with a reduced blink startle response to negative stimuli (Herpertz & Henning Sass, 2000; Levenston, Patrick, Bradley & Lang, 2000; Patrick, Bradley & Lang, 1993; Vanman, Mejia, Dawson, Schell & Raine, 2003). Vanman et al. (2003) also found that Factor 1 of the PCL-R is related to reduced blink startle when viewing negative pictures. Participants in this study were also healthy individuals rather than offenders. Patrick, Cuthbert & Lang (1994) also found that a high score on the PCL-R is associated with reduced electrodermal activity when participants were read fearful

sentences compared with neutral sentences. A high score on PPI-I of the PPI-R and Factor 1 of the PCL-R are both associated with reduced blink startle and electrodermal activity when viewing negative slides, which is a significant finding.

Verschuere, Crombez, De Clercq & Koster (2005) examined the relationship between PPI scores and electrodermal activity during a task called the concealed information test, in a sample of 40 male prisoners. During the concealed information test, participants are asked to provide the names of individuals who are important to them and then informed that they were taking part in a lie detection test during which they were required to attempt to conceal this information. Healthy individuals typically demonstrate an increase in electrodermal activity during this task because they are required to behave in a deceptive manner. Verschuere et al. (2005) only found a significant negative correlation between PPI-II and electrodermal response ($r = -.34$). Verschuere et al. (2005) concluded that reduced electrodermal activity during the concealed information test is related to PPI-II.

The results of Benning et al. (2005) and Verschuere et al. (2005) suggest that there is no clear relationship between the underlying factors of the PPI and physiological responsiveness during tasks with emotional components. Benning et al. (2005) found that a high score on PPI-I was related to reduced electrodermal activity when viewing negative slides. However, Verschuere et al.'s (2005) results are unexpected as they found that PPI-II of the PPI was related to reduced electrodermal activity during the concealed information task. The two tasks are clearly different as the concealed information task did

not actually require participants to respond to emotional material. However, the concealed information task required participants to act in a deliberately deceptive manner, which should also be related to PPI-I rather than PPI-II.

Del Gaizo & Falkenbach (2008) explored the relationship between the PPI and the ability to label emotions in facial expressions (The Diagnostic Analysis of Nonverbal Accuracy – Form 2, DANVA-2-AF; Nowicki & Carton, 1993) and the ability to detect emotion in spoken language (DANVA-2-AP; Nowicki & Carton, 1993). The DANVA-2-AF is a computerised task. Participants are presented with slides of facial expressions depicting happiness, sadness, fear and anger at two different levels of intensity. Low intensity is harder to identify and high intensity is easier. The DANVA-2-AP is a range of sentences, for example, “*I am going out of the room and I’ll be back later*” spoken in a happy, sad, angry or fearful manner at two different levels of intensity, hard and easy. Participants, who were 175 undergraduate students, were also asked to complete the Positive Affect Negative Affect Scales (PANAS; Watson, Clark & Tellegen, 1988). The PANAS is a self-report tool designed to measure participants’ experience of both positive affect (PA) and negative affect (NA). Participants are presented with 10 PA words (active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud and strong) and 10 NA words (afraid, ashamed, distressed, guilty, hostile, irritable, jittery, nervous, scared and upset). Participants are asked to report how often they generally experienced each of the 10 PA and NA emotional words.

Del Gaizo & Falkenbach (2008) found a significant negative correlation between PPI

total score ($r = -.18$) and PPI-I (Fearless Dominance) ($r = -.15$) and the recognition of fear measured by the DANVA-2-AF task. No relationship was found between PPI total score, PPI-I or PPI-II and the total number of errors in facial recognition. No relationship was found between the PPI and the DANVA-2-AF which measures emotion conveyed in spoken language.

The two underlying factors of the PPI demonstrated different patterns of results with PA (positive affect) and NA (negative affect). Significant positive correlations of small to moderate effect size were found between PPI-I and all 10 PA emotional words. Significant positive correlations were also found between PPI total score and two of the PA emotional words, active ($r = .15$) and strong ($r = .18$). PPI-II demonstrated a negative relationship with PA emotional words but only two of the correlations reached statistical significance, attentive ($r = -.16$) and interested ($r = -.19$).

In contrast PPI-I demonstrated a negative relationship with NA emotional words (six reached statistical significance). PPI-II demonstrated a pattern of significant positive correlations of weak to moderate effect size with eight out of the ten NA emotional words. Only correlations with the words nervous and distressed failed to reach statistical significance.

These results suggest that PPI total score and PPI-I are both associated with poorer recognition of fear in facial expressions. PPI-I and PPI-II demonstrated different relationships with positive and negative emotional words. PPI-I was positively associated

with PA whereas PPI-II demonstrated a negative pattern. PPI-I demonstrated an overall negative relationship with NA emotional words and PPI-II demonstrated a positive.

2.6 PPI conclusions

In conclusion, it appears that the PPI(-R) has many appealing properties. It appears to have good reliability, reasonable concurrent validity (with the PCL) and some indication of construct validity in that it is predictive of some neuropsychological findings thought to underpin the concept of psychopathy.

3. SELF-REPORT PSYCHOPATHY SCALE SRP, SRP-II AND SRP-III

3.1 Development of the SRP

Hare (1985) created the original Self-Report Psychopathy Scale (SRP), which consisted of 29 items. The SRP was revised and became the SRP-II. An additional 31 items were added in an attempt to capture the core features of psychopathy, so the SRP-II was a 60 item measure (Hare, Harpur & Hemphill, 1989). However, a 31 item version of the SRP-II is also used.

Williams & Paulhus (2004) identified two problems with the structure of the SRP-II. They believed that there was an excess of anxiety related items and they questioned the usefulness of items that had been included to capture antisocial behaviour. The SRP was originally designed to be used in non-forensic samples and there were only a few items that captured antisocial behaviour. The authors appear to have underestimated the prevalence of antisocial behaviour in individuals in the community who do not have

convictions for committing offences. However, the results of a study by Williams, McAndrew, Learn, Harms & Paulhus (2001) found evidence of misconduct in a sample of college students, which was higher than originally anticipated. As a result, additional antisocial items were added to the SRP-II, such as "*I have cheated during a school test.*" The SRP-II was not published and only distributed informally amongst a handful of researchers, which limited its use and development (Williams & Paulhus, 2003).

Williams, Nathanson & Paulhus (2003) state that the SRP-III was developed in an attempt to mirror the four Facet structure of the PCL-R. Nine extra items were added to the 31 item version of the SRP-II to create a 40 item measure the SRP-III (Williams et al., 2003). The SRP-III has four subscales, each with 10 items that resembles the PCL-R; Interpersonal Manipulation (resembles Facet 1), Cold Affect (resembles Facet 2), Impulsive Thrill Seeking (resembles Facet 3) and Antisocial Behaviour (resembles Facet 4).

3.2 Factor structure of the SRP

Hare (1991) created a two factor structure in the SRP-II in order to mirror the two factor structure of the PCL-R. Williams & Paulhus (2004) refer to personal communication with Hare who informed them that 31 items were assigned to either a personality or behavioural subscale to reflect Factor 1 and Factor 2 of the PCL-R. There are no further details about how items were selected and assigned to SRP-II subscales.

Williams & Paulhus (2004) examined the factor structure of SRP-II in a sample of 289

students. They identified a two and five factor solution. They suggest that both solutions were disappointing. Williams, Paulhus & Hare (2007) recommend that the two factors identified in the SRP-II should not be used as they were demonstrated to be separate (orthogonal) and do not overlap. Williams et al. (2007) state this is of concern as subscales usually contribute to an overall construct, in this case psychopathy.

Williams et al. (2007) state that the factor structure of the SRP-II does not accurately reflect the four factor structure of the PCL-R (Hare, 2003). They created a 77 item version of the SRP-III which they administered to 249 undergraduate students. They eventually identified a four factor solution; Factor 1 Interpersonal Manipulation (IPM), Factor 2 Criminal Tendencies (CT), Factor 3 Erratic Lifestyle (ELS) and Factor 4 Callous Affect (CA). Williams et al. (2007) also found support for the four factor structure of the SRP-III. They concluded that the SRP-III (77 item version) contained four distinct, but intercorrelated factors, which contribute to an overall total psychopathy score.

3.3 Psychometric properties of the SRP, SRP-II and SRP-III

There are a number of studies that report the psychometric properties of the SRP. However, these studies have used different versions of the SRP and with different populations. Hare (1985) reports a Cronbach alpha value of (.80) for the SRP in a sample of offenders. Lilienfeld & Penna (2001) report a Cronbach alpha value of (.90) in a sample of students using the SRP-II. They also reported Cronbach alpha values for Factor 1 of the SRP-II (.59) and Factor 2 of the SRP-II (.72). Paulhus & Williams (2002) report a Cronbach alpha value of (.79) for the SRP-III total score. Williams et al. (2007) report Cronbach alpha values for the SRP-III in a sample of 274 undergraduate students. They

report a value of (.88) for SRP-III total score. Thus the various versions appear to have acceptable internal reliability.

There do not appear to be any studies that have explored test-retest reliability for this measure.

3.4 SRP and PCL-R

Hare (1985) found that SRP correlated only modestly with the Psychopathy Checklist (Hare, 1991) ($r = .28$). Forth, Brown, Hart & Hare (1996) correlated the SRP-II with the PCL-R:SV (Hart, Cox & Hare, 1995) in a sample of 150 university students. Forth et al. (1996) found positive correlations of ($r = .62$) for male subjects and ($r = .55$) for females. A moderate correlation ($r = .35$) was also found between SRP-II and PCL:YV (Benning & Salekin, 2005).

There are no published studies that report correlations between the PCL-R and SRP-III (personal correspondence with Dr. Paulhus, 2006). However, Dr. Paulhus stated that SRP-III correlates strongly with PCL-R ($r = .67-.78$). He said that the difference between the two measures is that SRP-III has an improved factor structure.

3.5 SRP and emotional processing

There are a limited number of studies that have examined the relationship between SRP-II scores and performance on tasks, particularly where physiological measurement has been undertaken during task completion. Bare, Hopko & Armento (2004) assigned and

participants to groups based on their Factor 1 and 2 scores on the SRP-II. Physiological measurement, heart rate and electrodermal activity, were made while participants listened to four vignettes, neutral (peaceful walk through a forest), anxiety (delivering a speech to a group of classmates), minor rule violation (shoplifting, bumping into a stationary car on a car park) and major rule violation (stealing property from a neighbour's home). During the presentation of all four vignettes, participants in the SRP-II high Factor 1 group demonstrated lower levels of electrodermal activity. No significant results were obtained relating to SRP-II Factor 2 and physiological measurement. As previously stated, these results are consistent with the findings of Vanman et al. (2003) who found that Factor 1 of the PCL-R is related to reduced blink startle when viewing negative pictures.

Mahmut, Homewood & Stevenson (2008) explored the relationship between the SRP-III and the Emotional Empathy Questionnaire (EEQ; Mehrabian & Epstein, 1972). The EEQ was designed to measure emotional empathy, for example, an understanding of other people's feelings. One example of a question on the EEQ is "*seeing people cry upsets me.*" Mahmut et al. (2008) found that SRP-III total score was significantly negatively correlated with EEQ total score ($r = -.31$). This result means that participants with a high level of self-reported psychopathy demonstrated a poorer understanding of emotional empathy.

3.6 SRP conclusions

In conclusion, the SRP (III) has internal consistency, but its inter-rater reliability is not known. Its factor structure, whilst designed to mirror the four Facet structure of the PCL-

R is not well established and even its concurrent validity to the PCL-R is not well established. Whilst there is some preliminary evidence for construct validity, this again is not well-developed.

4. LEVENSON'S SELF-REPORT PSYCHOPATHY SCALE LSRP

4.1 Development and factor structure of the LSRP

Levenson's Self-Report Psychopathy Scale (LSRP) is a 26 item scale that was designed to measure what Levenson describes as primary and secondary psychopathy. Primary psychopathy (scale 1) taps selfish, callous, uncaring manipulation of others whereas secondary psychopathy (scale 2) taps impulsivity, reactivity and poor behaviour control. Levenson et al. (1995) believe that the LSRP measures two separate but related aspects of psychopathy.

4.2 Factor structure of the LSRP

The two factor structure of the LSRP, originally demonstrated by Levenson et al. (1995) has also been replicated (Brinkley, Schmitt, Smith & Newman, 2001; Lynam, Whiteside & Jones, 1999; McHoskey, Worzel & Szyarto, 1998; Ross & Rausch, 2001).

The results of a study by Epstein, Poythress & Brandon (2006) suggest that scales 1 and 2 of the LSRP may not mirror Factors 1 and 2 of the PCL-R. Epstein et al. (2006) found that LSRP total score and scales 1 and 2 correlated significantly with a measure of anxiety (State-Trait Anxiety Inventory, STAI-T; Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983). From Levenson et al.'s (1995) description of scale 1, which taps selfish,

callous, uncaring manipulation of others, it would not be expected to correlate with anxiety. In fact, Factor 1 of the PCL-R has been found to be negatively related to depression and anxiety disorders (Frick, Liliensfeld, Edens, Poythress, Ellis & McBurnett, 2000; Harpur, Hare & Hakstian, 1989; Patrick, Cuthbert & Lang, 1994).

4.3 Psychometric properties of the LSRP

There are studies that have investigated the psychometric properties of the LSRP (Falkenbach, Poythress, Falki & Manchak, 2007; Levenson et al., 1995; Lynam et al., 1999) Cronbach alpha values of (.82) for scale 1 and a lower value of (.63) for (scale 2). Lynam et al. (1999) reported a similar pattern of results to Levenson et al. (1995). For scale 1, a Cronbach alpha value of (.84) and for (scale 2) a lower value of (.68). More recently Falkenbach et al. (2007) have also investigated the psychometric properties of the LRSP. They report Cronbach alphas of (.82) for LSRP total score (.83) for LSRP scale 1 and (.71) for scale 2. The results of these studies (Falkenbach et al., 2007; Levenson et al., 1995; Lynam et al., 1999) suggest that scale 2 of the LSRP may not have adequate internal consistency. Overall, the internal reliability of the LSRP appears adequate.

There have been no reports on the test-retest reliability of the LSRP.

4.4 Relationship between the LSRP and PCL-R

Brinkley et al. (2001) concluded that, although significant, the magnitude of the correlation between LSRP and PCL-R was modest; PCL-R total and LSRP total ($r = .35$)

PCL-R Factor 1 and LSRP scale 1 ($r = .30$) and PCL-R Factor 2 and LSRP scale 2 ($r = .36$). Brinkley et al. (2001) do not believe that the two measures are tapping the same construct; they describe the LSRP as a weaker version of a similar or related construct. In a more recent study of 50 convicted male offenders and 60 men from the community, Book, Quinsey & Langford (2007) report the following relationships between the PCL-R and LSRP total and factor scores. LSRP and PCL-R total scores ($r = .35$), PCL-R Factor 1 and LSRP scale 1 ($r = .20$) and PCL-R Factor 2 and LSRP scale 2 ($r = .40$). The relationship between Factor 1 and LSRP scale 1 was not statistically significant. The magnitude of correlations reported by Book et al. (2007) is similar to the findings reported by Brinkley et al. (2001). However, Brinkley et al. (2001) did find a significant positive relationship between Factor 1 of the PCL-R and scale 1 of the LSRP.

4.5 LSRP and emotional processing

Book et al. (2007) examined participants' ability to correctly identify the emotion and the intensity of the emotion being displayed and perceptions of vulnerability. Participants were 50 convicted male offenders and 60 men from the community. Participants were presented with a number of slides of Caucasian faces (slides depicting people from other racial groups were excluded to control for the effects of race). Each slide was presented and then the participant was asked, "*What was the previous person feeling?*" Participants were presented with five different emotions from which to choose; happy, sad, angry, disgust and fear. Participants were also asked to rate the intensity of the emotion being displayed by the faces in the slides from 1-10 (a score of 10 being very intense). Book et al. (2007) measured the total number of errors in identifying fear, accuracy of intensity

for emotions other than fear and accuracy of fear intensity ratings. Psychopathy was assessed using the PCL-R for the offenders and both samples completed the LSRP.

Book et al. (2007) found no relationship between the LSRP and the total number of errors in identifying fear, accuracy of intensity for emotions other than fear and accuracy of fear intensity ratings. However, in contrast, Book et al. (2007) found that PCL-R total score was positively correlated with accuracy in identifying emotional intensity for all emotions ($r = .20$) and specifically for fearful faces ($r = .21$). Both these results just failed to reach statistical significance. The PCL-R and LSRP do not show a similar pattern of results with performance on a facial recognition task. Only PCL-R total score was related to performance on this task.

Book et al. (2007) recruited participants (referred to as target participants) and filmed them without their knowledge. The target individuals were then asked to complete the Rathus Assertiveness Scale (RAS; Rathus, 1973). A high score on the RAS is associated with high assertiveness and low vulnerability, a low score is associated with low levels of assertiveness and vulnerability to victimisation.

Participants (50 convicted male offenders and 60 men from the community) were then asked to view the video clips and rate how assertive the target individuals in the clips were by completing the RAS. The RAS ratings completed by the target individuals and participants were compared (target individuals' own ratings were subtracted from the participants' RAS rating).

Book et al. (2007) found no relationship between the LSRP and performance on this task. Only Factor 1 of the PCL-R was positively associated with the ability to accurately rate assertiveness in others measured by the RAS ($r = .21$). In other words, individuals with a high score on PCL-R Factor 1 were more able to accurately assess levels of assertiveness in target individuals. Book et al. (2007) concluded that individuals with high levels of psychopathic traits may be more skilled at judging vulnerability in others. Once again the LSRP and PCL-R do not show the same pattern of results with this task.

Ali, Amorim & Chamorro-Premuzic (2009) explored the relationship between self-reported psychopathy and performance on a task that measured participants' responses to happy, sad and neutral slides. The participants were 84 British undergraduates.

Psychopathy was measured using the LSRP scale, which produces a total score and scales 1 and 2. Scale 1 or primary psychopathy is characterised by malevolent, manipulative, callous, deceptive, remorseless treatment of others and lack of anxiety. Scale 2 or secondary psychopathy is characterised by anxiety, impulsivity and antisocial behaviour. When presented with a slide depicting either a happy, sad or neutral faces, participants were asked to rate the emotional valence of each slide using the Self Assessment Manikin (SAM; Bradley & Lang, 1994). For the purpose of this study Ali et al. (2009) used only the valence rating which reflects whether a stimulus is experienced as pleasant or unpleasant. Participants respond by rating pleasant/unpleasant on a scale. Ali et al. (2009) found that scale 1 of the LSRP or primary psychopathy was associated with positive affect or valence when looking at sad slides. Participants with a high score on scale 2 of

the LSRP were significantly more likely to report negative affect or valence when presented with neutral slides.

Ali et al. (2009) concluded that these results suggest that participants with high levels of primary psychopathy (scale 1) experienced positive emotion when presented with sad slides. In contrast, participants with high levels of secondary psychopathy (scale 2) experienced negative affect when presented with neutral slides.

4.6 LSRP conclusions

In conclusion, the LSRP has internal consistency, but its inter-rater reliability is not known. It has only a moderate correlation to the PCL-R and whilst its two factor structure appears well established, these factors do not seem to overlap with the two factors of the PCL-R. The LSRP does not demonstrate the same pattern of results as the PCL-R on emotional recognition and perception of vulnerability tasks. However, LSRP scale 1 or primary psychopathy has been demonstrated to be associated with an unusually positive response to sadness when viewing slides.

5. SUMMARY OF PPI(R), SRP(111) AND LSRP

The three self-report psychopathy measures that I have reviewed, PPI(-R), SRP(III) and LSRP, were all designed to assess psychopathy as conceptualised by Hare (Hare, 2003). The PPI-R has been found to have good internal consistency (Lilienfeld & Widows, 2005; Neumann et al., 2008; Sandler, 2004) and test-retest reliability (Chapman et al., 2003; Lilienfeld & Widows, 2005; Sandler, 2004). Two studies have also found support

for the two factor structure (Benning et al., 2003) in samples of offenders (Edens et al., 2008; Edens & McDermott, 2010; Patrick et al., 2006). Although Neumann et al. (2008) failed to find support for the two factor model in a much larger sample of offenders. A strong relationship has been demonstrated between the PPI and PCL-R (Poythress et al., 1998; Skeem & Lilienfeld, 2004). A recent study by Edens & McDermott (2010) found a significant positive correlation (albeit weaker than what might have been expected) between PCL-R and PPI-R in a forensic sample. High PPI-I scores have also been demonstrated to be associated with reduced blink startle and electrodermal activity in response to negative slides (Benning et al., 2005). Similar results have also been found for participants with high scores on the PCL-R (Levenston et al., 2000; Patrick et al., 1993, Patrick et al., 1994; Vanman et al., 2003).

The SRP and SRP-II total scores have been demonstrated to have good internal consistency (Hare, 1985; Lilienfeld & Penna, 2001; Paulhus & Williams, 2002; Williams et al., 2007). It appears that items have been added and removed to the SRP-II in an attempt to create a factor structure that mirrors the PCL-R four Facet model. In fact, as previously stated, Williams et al. (2007) state that the two factors identified in the SRP-II should not be used. The relationship between the PCL-R and SRP-II is also unclear because different versions have been used and data has been mainly collected from student samples (Andershed, Kerr, Stattin & Levander, 2002; Hicklin & Widiger, 2005; Williams, et al., 2003; Williams & Paulhus, 2004; Williams et al., 2007; Zagon & Jackson, 1994). There are also no published studies that report correlations between SRP-III and the PCL-R. Bare et al. (2004) found that participants with high scores on

Factor 1 of the SRP-II, demonstrated lower levels of electrodermal activity. So the SRP-II has been demonstrated to be linked to poor performance on emotional tasks.

There are fewer published studies that have investigated the use of the LSRP as a self-report measure of psychopathy. The results of a number of studies have indicated that scale 2 of the LSRP may not have good internal consistency (Falkenbach et al., 2007; Levenson et al., 1995; Lynam et al., 1999). It is of concern that Brinkley et al. (2001) do not believe that the LSRP and PCL-R are tapping the same construct which is supported by the findings of Book et al. (2007) who failed to find a significant relationship between PCL-R Factor 1 and LSRP scale 1.

6. SELECTION OF A SELF-REPORT PSYCHOPATHY MEASURE FOR USE IN THIS THESIS

The main aim of this thesis is to explore emotional processing in psychopathic offenders. The PCL-R will be used as one measure of psychopathy. Given the considerations put forward in this review, I deemed that the PPI-R was the best available self-report psychopathy measure. It has well documented factor structure, good internal consistency and good test-retest reliability. It also has the advantage of having been shown to be predictive of emotional deficits that may be central to psychopathy (Benning et al., 2005; Gordon et al., 2004). One of the disadvantages is that the PPI-R is longer than other measures. However, the PPI-R also has the advantage of having built in reliability scales to measure response style.

Patrick & Bernat (2009) state that the two factors of the PPI and PCL-R are not identical. They point out that the PCL-R was designed to measure a unitary construct of psychopathy whereas the PPI was designed to measure a range of psychopathic traits. They also state that PPI-I is different to PCL-R Factor 1 in that the former is more closely associated with features of psychological adjustment such as social dominance and resilience. Administering both the PPI-R and PCL-R will therefore allow further exploration of the relationship between these two measures of psychopathy and performance on emotional processing tasks.

CHAPTER 3 WHAT IS EMOTIONAL INTELLIGENCE AND HOW IS IT MEASURED?

1. WHAT IS EMOTIONAL INTELLIGENCE AND HOW IS IT MEASURED?

1.1 A brief history of emotional intelligence

In 1995 Goleman published his best-selling book which he entitled, '*Emotional Intelligence: Why it can matter more than IQ*' (Goleman, 1995). Stein & Book (2000) stated that the response to this book was, "... seismic. At long last the soft-skills that do so much to determine our success were rescued from the fringe and seriously considered by mainstream educators, business people and the media" (p.1).

Suddenly there was a widespread interest in the concept, particularly in occupational settings. Emotional intelligence was defined as the capacity to perceive and understand emotions and the ability to use this information as part of decision making and management of behaviour.

Matthews, Zeidner & Roberts (2002) outline why they believe emotional intelligence has become a popular concept. They state that the publication of *The Bell Curve*, Herrnstein & Murray (1994) argued for the importance of traditional intelligence in understanding social class in modern societies. Intelligence was touted as the best predictor of success in various spheres of life, including educational, occupational and social contexts. The authors implied that individuals who were born into economically and educationally advantaged family backgrounds also inherited higher intelligence when compared to their lower-class counterparts. Matthews et al. (2002) believe that there are a number of reasons why the idea of emotional intelligence became so attractive, firstly because it appears to focus on factors other than traditional

intelligence. Secondly, in contrast to traditional intelligence, the appeal of EI is that the competencies that underpin the construct can be learnt. Matthews et al. (2002) state, “*For the sceptical, however, it suggested a dumbed–down picture of the future, in which reasoning and critical thinking no longer mattered and people were sized-up by their emotional expressiveness*” (p.7). When Goleman (1995) therefore suggested that emotional intelligence might even be more important than traditional intelligence, not surprisingly, the concept triggered widespread interest from the public.

The first model of emotional intelligence (EI) was proposed by Mayer & Salovey (1997). It was called Four Branch Model of Emotional Intelligence; Perceiving Emotions (Branch 1), Facilitating Thought (Branch 2), Understanding Emotions (Branch 3) and Managing Emotions (Branch 4). This model identified the characteristics believed to underpin emotional intelligence (Mayer & Salovey, 1997). Mayer, Salovey & Caruso (1997) developed the Multifactor Emotional Intelligence Scale (MEIS) in order to measure EI, which was later updated and became the Mayer Salovey Caruso Emotional Intelligence Test (Mayer, Salovey & Caruso, 2002).

However, in parallel to these developments, Dr. Reuven BarOn claimed that the development of his measure of emotional intelligence (known as the Emotional Quotient Inventory; EQ-i) began in 1980s although there are no published records of this. The EQ-i was published in 1997 (BarOn, 1997).

Following these developments, an avalanche of new EI measures were published. Goleman (1998) revised his model in his book, *Working with Emotional Intelligence*. However, Matthews et al. (2002) concluded that there is little research related to

Goleman's model in the psychological literature and it is therefore difficult to evaluate.

Cooper & Sawaf (1997), Weisinger (1998), Higgs & Dulewicz (1999) and Sala (2002) all published models of EI, which are each a list of characteristics believed to underpin emotional intelligence but specifically within an organisational setting. The Emotional Competence Inventory (ECI; Boyatzis, Goleman & Rhee, 2000; Goleman, 1995; Sala, 2002) has also been mainly used in occupational settings and was designed to assess emotional competencies and positive social behaviours. Salovey, Mayer, Goldman, Turvey & Palfai (1995) also developed the Trait Meta-Mood Scale (TMMS) in order to measure the ability to reflect, monitor, evaluate and regulate feelings.

Petrides & Furnham (2001) proposed a fifteen facet, trait EI model which has now been updated to become the Trait Emotional Intelligence Questionnaire (TEIQue, Petrides & Furnham, 2001, 2003). The Schutte Self-Report Emotional Intelligence Scale (SSREI; Schutte, Malouff, Halle, Haggerty, Cooper, Golden, et al., 1998) was updated by Austin, Saklofske, Huang & McKenney (2004). This is not an exhaustive list of EI measures that have emerged during the past ten years. In fact, Petrides, Furnham & Mavroveli (2007) state that self-report EI measures continue to proliferate at a rate that has led to Matthews, Zeidner & Roberts (2007) to request a moratorium.

1.2 Early definitions of EI

Definitions of EI vary to some degree so it is worth considering what is meant by this term. Goleman (1995) described EI as, "*being able to motivate oneself and persist in*

the face of frustrations; to control impulse and delay gratification; to regulate one's mood and keep distress from swamping the ability to think; to empathise and to hope ” (p.34).

BarOn (1997) described EI as, “*an array of non-cognitive capabilities, competencies and skills that influence one's ability to succeed in coping with environmental demands and pressures. As such, one's emotional intelligence is an important factor in determining one's ability to succeed in life and directly influences one's general psychological well-being (i.e., one's present mental condition or overall degree of emotional health)*” (p.3). Thus, BarOn's (1997) definition suggests a link between EI, success in life and psychological well-being.

Mayer, Roberts & Barsade (2008) defined EI: “*Emotional intelligence concerns the ability to carry out accurate reasoning about emotions and the ability to use emotions and emotional knowledge to enhance thought* (p.511). They acknowledge that their earlier attempts to define emotional intelligence were based on the ability to monitor feelings and emotions in self and others, to discriminate between feelings and to use this information to guide thinking and actions. Salovey & Mayer's (1990) earliest definition of EI clearly omits thinking about feelings.

There is clearly no agreement about exactly what EI is. Attempts to define EI are often confused with real life applications of the construct. There is a lack of agreement about whether EI is a unique cognitive ability (e.g. separate from other cognitive abilities such those tapped by traditional IQ tests) and the extent to which it

overlaps with existing personality constructs. When using the term EI, it therefore appears important to be clear about exactly whose definition of the term is being used.

1.3 Uses of EI

There has been an explosion of research into the uses of EI which Matthews et al. (2007) believe has occurred because of claims that EI can predict educational, occupational and clinical outcomes more accurately than traditional intelligence. For example, in educational settings researchers have explored the relationship between academic success and EI (Zins, Weissberg, Wang & Walberg, 2004). In organisational settings, researchers have explored the relationship between job satisfaction, work performance and leadership (Daus & Ashkanasy, 2005; Mayer & Salovey, 1997; Zeidner, Matthews & Roberts, 2004). Other studies have explored the relationship between EI, physical and mental health (Schutte, Malouff, Thorsteinsson, Bhullar & Rooke, 2007; Martins, Ramalho & Morin, 2010). A detailed review of these studies is beyond the scope of this thesis.

Despite these claims of the utility of EI in predicting various aspects of performance, others suggest that evidence to support these claims is weak. Matthews et al. (2007) state that EI only modestly predicts outcome in either occupational (Daus & Ashkanasy, 2005) or educational (Zins et al., 2004) settings. A meta-analysis (Schutte et al., 2007) of 44 studies to investigate the relationship between EI and health found weak to modest, significant correlations between EI and mental health ($r = .29$), physical health ($r = .31$), and psychosomatic health ($r = .22$). The main problem in evaluating the usefulness of EI in real life settings is that researchers have used a number of different measures of EI. Matthews et al. (2007) point out that there

is still no agreement about exactly what EI is. Some researchers point out that EI may be just a fad that is currently fashionable in occupational and educational settings (Murphy & Sideman, 2006).

2. HOW IS EMOTIONAL INTELLIGENCE MEASURED?

2.1 Trait and ability EI

Petrides & Furnham (2001, 2003) proposed that an important distinction should be made between 'trait EI' and 'ability EI'. Petrides, Furnham & Mavroveli (2007) state that, "*Trait EI (or "trait emotional efficacy") concerns emotion-related dispositions and self-perceptions measured via self-report, whereas ability EI (or "cognitive emotional ability") concerns emotion-related cognitive abilities that ought to be measured via maximum-performance tests*" (p.151).

A number of studies support Petrides et al.'s (2007) view that trait and ability EI are conceptually different. Non-significant or weak correlations have been found between trait and ability EI measures (Engelberg & Sjoberg, 2004; O'Connor & Little, 2003; Warwick & Nettlebeck, 2004). Petrides et al. (2007) state that there are a number of researchers who believe that ability and trait models of EI can co-exist (Tett, Fox & Wang, 2005). However, Matthews et al. (2002) have gone as far as saying that the two forms of the measurement should not both be referred to as EI. Petrides et al. (2007) state that the most important distinction between trait and ability EI measures is that they are measuring different constructs. They believe that trait EI is a personality trait and should therefore be linked to the field of personality psychology. Petrides et al. (2007) believe ability EI best fits within the field of human cognitive

ability. *“Nevertheless, our prediction is that this construct will eventually find its place along the ever-growing number of pseudo-intelligences”* (p.153).

2.2 Characteristics of trait EI

Petrides et al. (2007) believe that EI should be conceptualised as a personality trait and measured by self-report questionnaires. They state that it is not distinct from other personality constructs for example the ‘big 5’; (Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism, NEO PI-R; Costa & McCrae, 1992) but part of them (De Raad, 2005). They believe that conceptualising EI as an ability is difficult because of the subjective nature of emotions.

The idea of performance (the term maximum performance is also used) tests means that there are correct responses to questions. Petrides et al. (2007) use the following example of a question that would measure an individual’s awareness of emotional experiences, *“I am aware of my emotions as I experience them.”* They go on to say that the experience of emotions is subjective and cannot therefore be measured by a correct or incorrect answer.

2.3 Characteristics of ability EI

In contrast to trait EI, ability EI is conceptualised as a cognitive ability and is measured by a performance test which has correct answers. Mayer et al. (2002) state that one of the main obstacles associated with developing an ability EI measure is how to score a ‘correct’ answer. There are a number of possible methods. The first is called “general consensus” which is when an answer is considered correct by the majority of participants in a standardised sample. The second method is called “expert

consensus” which is when a sample of experts are invited to identify a correct answer. Mayer, Salovey, Caruso & Sitarenios (2003) found a very strong relationship between expert and general consensus scores for MSCEIT total score ($r = .98$) and subscales ($r = .93-.98$).

3. TRAIT EI MEASURES

A review of all trait EI measures is beyond the scope of this thesis due to the very large number that have appeared. I will therefore review the most popular measures that have been widely used in published research. I will not focus on trait EI measures that have been developed for use in occupational settings as this is not relevant to this thesis. The most widely used trait EI measures are;

- BarOn Emotional Quotient Inventory (EQ-i; BarOn, 1997)
- Trait Meta-Mood Scale (TMMS; Salovey et al., 1995)
- Trait Emotional Intelligence Questionnaire (TEIQue; Petrides & Furnham, 2001; Petrides & Furnham, 2003)
- Schutte Self-Report Emotional Intelligence Scale (SSREI; Schutte et al., 1998)

The aim of this review is to identify EI measures for use in this thesis. The factor that is most important when selecting an EI tool is what it measures and not what it predicts because the main aim of this thesis is to assess emotional processing in psychopathic offenders. An EI measure will be administered to participants with different levels of psychopathic traits. The extent to which an EI tool measures the ability to perceive, understand and respond to emotional material is therefore the most important factor to consider.

For each EI measure, I will review its psychometric properties including reliability and validity. Reliability or internal consistency is the extent to which an item in a scale correlates with remaining items and subscales correlate with each other to contribute to an overall score, in this case EI. Cronbach alpha is a measurement of internal consistency and a score of 0.70 or higher is generally believed to indicate that a set of items can be considered a scale (Cohen, 1992). Test-retest reliability is the extent to which a score remains stable over time, when the measure is administered on subsequent occasions.

I will also review the extent to which each EI measure relates to personality and traditional or cognitive intelligence. Schutte et al. (2003) state that in order for EI to have value as an independent construct it will need to be established that it is distinct both from personality characteristics and cognitive intelligence. Matthews et al. (2007) also stated that EI measures need to demonstrate that they are not simply “*repackaged personality traits.*”

3.1 Baron Emotional Quotient Inventory (EQ-i)

The EQ-i (BarOn, 1997) is a hierarchical model of emotional intelligence. An overarching general EI factor is underpinned by five second order factors; Intrapersonal Emotional Intelligence (RAeq), Interpersonal Emotional Intelligence (EReq), Adaptability Emotional Intelligence (ADEq), Stress Management Emotional Intelligence (SMeq) and General Mood Emotional Intelligence (GMeq). The five, second ordered factors are underpinned by 15 primary factors; Emotional Self-Awareness (ES), Assertiveness (AS), Self-Regard (SR), Self-Actualisation (SA), Independence (IN), Empathy (EM), Interpersonal Relationship (IR), Social

Responsibility (RE), Problem Solving (PS), Reality Testing (RT), Flexibility (FL), Stress Tolerance (ST), Impulse Control (IC), Happiness (HA) and Optimism (OP).

The EQ-i Technical Manual provides more detail about the 15 components of BarOn's model (BarOn, 1997). The EQ-i is a 133 item, self-report measure.

Participants are asked to indicate the degree to which each statement reflects the way that they typically think, feel and act. Responses are recorded via a five point Likert scale.

3.1.1 Psychometric properties of the EQ-i

BarOn (1997) reports alpha co-efficient for seven populations; North American, Argentinean, German, South African, Nigerian, Israeli and Indian. All Cronbach alphas were within the high to average range. The EQ-i Technical Manual has test-retest reliabilities for one and four month periods. Correlations ranged from ($r = .78-.92$) for the one month period and ($r = .55-.82$) for the four month period. BarOn (1997) concluded that the EQ-i has good internal consistency and test-retest reliability.

A number of studies have investigated the factor structure of the EQ-i. Petrides & Furnham (2001) state that there is evidence for the presence of an overall EI factor with fifteen underlying factors. They stated that the second order factors of the EQ-i constitutes a redundant layer in the structure. Palmer, Manocha, Gignac & Stough (2003) found a general EI factor and six primary factors. Palmer et al. (2003) noted that some of the 15 components such as Happiness, Optimism, Empathy and Social Responsibility are conceptually similar. Dawda & Hart (2000) also recommended

against use of the five second order components. Thus this research does not provide a clear picture of the underlying factor structure of the EQ-i.

3.1.2 Relationship to other measures of personality and IQ

A number of studies have explored the relationship between the EQ-i and other personality traits such as the 'big 5'; Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism assessed using the NEO PI-R (Costa & McCrae, 1992). The results of these studies have found significant overlap between the 'big 5' personality traits and the EQ-i (Dawda & Hart, 2000; Mayer et al., 2002; Newsome, Day & Catono, 2000). BarOn (1997) comments on the relationship between the EQ-i and other personality measures, "*The correlations with other measures are high enough to firmly support that the EQ-i subscales are measuring the constructs that they were intended to measure and yet the correlations are not too high to suggest that the EQ-i is a duplication of existing inventories*" (p.71). BarOn (1997) does not provide any further details about exactly what constructs the EQ-i measures that are not accounted for by the 'big 5'. It is difficult to see how the EQ-i is separate from existing personality measures.

There are also a number of studies that have explored the relationship between EI and cognitive intelligence. BarOn (1997) found a small relationship ($r = .12$) between EI and cognitive intelligence measured with the Wechsler Adult Intelligence Scale (WAIS, Wechsler, 1981). Derksen, Kramer & Katzo (2002) used the General Adult Mental Ability Scale (GAMA) and found a non-significant relationship with the EQ-i. Hemmati, Mills & Kroner (2004) used the Multidimensional Aptitude Battery-II (MAB, Jackson, 1998) as their measure of aptitude and cognitive intelligence but also

found no significant relationship with the EQ-i. Thus the EQ-i appears to have little relationship to cognitive intelligence measures.

Although BarOn's EQ-i is a published commercial test and is a widely used measure of trait EI, his original research on which the tool is based (1988 doctoral thesis and 1992 manuscript) were never published. Although BarOn provides a definition of EI and lists the characteristics that the EQ-i assesses, Matthews et al. (2002) point out that he fails to provide detail of the development of any model of EI. Concerns have also been expressed about the underlying subscales of the EQ-i and the second order factors of the EQ-i are believed to constitute a redundant layer (Dawda & Hart, 2000; Petrides & Furnham, 2001).

3.2 Trait meta-mood scale (TMMS)

The TMMS (Salovey et. al., 1995) was developed in order to measure what Mayer & Gaschke (1988) referred to as "meta mood experience" or the ability to reflect, monitor, evaluate and regulate feelings. Salovey, Stroud, Woolery & Epel (2002) state that the TMMS scales measure self-reported or perceived emotional intelligence.

The TMMS has three subscales, (1) Attention to emotion, (2), Emotional Clarity and (3) Emotion Repair. The TMMS is a 48 item self-report measure. However, Salovey et al. (1995) also developed a 30 item shorter version of the original measure.

Koven, Roth, Garlinghouse, Flashman & Saykin (2010) have found that two subscales of the TMMS, Attention to emotion and Mood Repair are associated with activity in parts of the brain linked to self-reflection and cognitive control. Koven et al. (2010) found that a low score on the Attention to emotion scale was associated with lower

volume in the grey matter throughout the frontal lobe, particularly in the medial frontal gyrus. Koven et al. (2010) state that these areas of the brain are generally associated with the ability to direct attention to emotion, attention to reward associated stimuli and being able to evaluate stimuli that are of emotional significance. Koven et al. (2010) found that a low score on the Mood Repair scale was associated with reduced volume in the left dorsal cingulate cortex. They state that this area of the brain has been found to be associated with the appraisal of negative emotions and the suppression of sadness and sexual arousal. Koven et al. (2010) conclude that their results suggest that some aspects of trait EI are specifically related to the volume of particular areas of the brain which are known to be associated with the processing and regulation of emotion.

3.2.1 Psychometric properties of the TMMS

Salovey et al. (1995) state that the TMMS demonstrates high internal consistency. They report a Cronbach alpha value of (.82) for TMMS total score. Further, Davies, Stankov & Roberts (1998) also reported Cronbach alpha values for scales of the TMMS. Attention to Emotion (.82), Emotional Clarity (.82) and Emotional Repair (.73) all scales show high internal consistency. Extremera & Fernandez-Berrocal (2005) also found that each of the subscales had good internal consistency and report Cronbach alpha values all above (.85). Extremera & Fernandez-Berrocal (2005) also report four week test-retest reliabilities that ranged from ($r = .60-.83$).

Palmer, Gignac, Bates & Stough (2003) investigated the factor structure of the TMMS. Their results support the presence of the three factors; Attention, Clarity and Repair. Palmer et al. (2003) state that their results also indicate the presence of a

fourth factor, Emotional Management. Burns, Bastian & Nettlebeck (2007) have carried out the most recent investigation of the factor structure of the TMMS in a sample of 246 students. They also found support for the presence of the three subscales; Attention, Clarity and Repair.

3.2.2 Relationship to other measures of personality and IQ

Davies et al. (1998) found that the Repair scale of the TMMS correlated with all the 'big 5' personality traits ($r = .19-.48$) as did the Clarity scale ($r = .14-.48$). Matthews et al. (2002) state that Davies et al.'s (1998) results suggest that only the Attention scale is relatively distinct from the 'big 5'.

Burns et al. (2007) also investigated the relationship between the TMMS and the 'big 5'. They found that the Repair scale correlated with Neuroticism ($r = .44$) and Extraversion ($r = .28$). Both the Attention and Clarity scales of the TMMS only correlated with Openness ($r = .69$ and $.27$). Burns et al. (2007) also explored the relationship between the TMMS and cognitive intelligence using Ravens Advanced Progressive Matrices (APM, Raven, Court & Raven, 1993) and found no relationship between the TMMS and the APM.

There does appear to be support for the three factor structure of TMMS (Palmer et al., 2003), it appears to have good test-retest reliability and the subscales have adequate reliability (Extremera & Fernandez-Berrocal, 2005). It also appears to be independent of cognitive intelligence. A number of studies have, however, highlighted that there is significant overlap between the TMMS and the 'big 5' personality characteristics (Burns et al., 2007; Davies et al., 1998).

3.3. Trait Emotional Intelligence Questionnaire (TEIQue)

The TEIQue (Petrides & Furnham, 2003) is a self-report 144 item trait EI measure. It has 15 subscales; Adaptability, Assertiveness, Emotion Expression, Emotion Management (others), Emotion Perception, Emotion Regulation, Empathy, Happiness, Impulsiveness, Optimism, Relationship Skills, Self-Esteem, Self-Motivation, Social Competence and Stress Management. Items are responded to on a seven point Likert scale. There is also a short version of the TEIQue, which is a 30 item, self-report tool designed as a measure of global trait EI. Two items from each of the 15 subscales of the long version of the TEIQue (Petrides & Furnham, 2003) were included in this shortened version.

3.3.1 Psychometric properties of the TEIQue

Petrides, Frederickson & Furnham (2004) report that the internal consistencies for the subscales of the TEIQue are high, with Cronbach alpha values of (.76), with the exception of Emotional Regulation (.68) and Social Competence (.59). They suggest that the items of the Social Competence scale may be different to the rest of the scales within the measure.

3.3.2 Relationship to other measures of personality and IQ

Petrides & Furnham (2003) found a large number of significant correlations between the 'big 5' personality traits (Neo Five Factor Inventory Form, NEO-FFI; Costa & McCrae, 1992) and the TEIQue. It strongly negatively correlated with the scales of Neuroticism ($r = -.70$) and strongly positively correlated with Extraversion ($r = .68$),

moderately correlated with the scales of Openness ($r = .44$) and Conscientiousness ($r = .34$). Only the Agreeableness scale failed to correlate with the TEIQue.

There do not appear to be any published studies that have explored the relationship between the TEIQue and cognitive intelligence.

To conclude, there are a number of different versions of the TEIQue. Petrides et al. (2004) found that there may be a problem with the items in the Social Competence scale of the long version of the TEIQue. There is also significant overlap between the TEIQue and the 'big 5' personality characteristics.

3.4 Schutte Self-Report Emotional Intelligence Scale (SSREI)

The SSREI scale was developed by Schutte et al. (1998) and was a 33 item self-report measure. Schutte et al. (1998) initially identified a set of 62 items from Salovey & Mayer's (1990) four factor model of EI. Schutte et al. (1998) found a one factor solution based on the 62 items, which they believed was uninterpretable. The original 62 items were reduced to 33 items. Concern was expressed that the 33 item scale did not contain sufficient reverse key items (Petrides & Furnham, 2000; Saklofske, Austin & Minski, 2003). Austin et al. (2004) therefore revised this measure by changing the wording of 9 of the 30 forward key items. Austin et al. (2004) also added a further 9 items. The final version of the EI scale is a 41 item scale with 20 forward key items and 21 reverse key items.

Both the 33 and 41 item versions of this measure have been used in a number of different studies. I will therefore report the factor structures, psychometric properties

and the extent to which they overlap with existing measures of personality and cognitive intelligence for the 33 item and 41 item versions separately.

For the 33 item version, Petrides & Furnham (2000) identified a four factor structure which they labelled as Optimism/Mood Regulation, Appraisal of Emotions, Social Skills and Utilization of Emotion. Saklofske et al. (2003) also found evidence of a four factor structure. However, more recently Burns et al. (2007) identified a two factor structure which they described as Competency/Management and Recognition. Austin et al. (2004) found evidence for a three factor structure in the 41 item version. They did not find the Social Skills factor. There therefore does not appear to be a consensus about the factor structure of the EI scale. Qualter, Ireland & Gardner (2010) failed to find evidence of a four factor structure in the SSREI in a sample of offenders. They concluded that there may be differences between offenders and non-offenders in terms of how social encounters and context trigger emotions. They suggest that there may be a need to develop an EI measure specific to the needs of offenders.

3.4.1 Psychometric properties of the SSREI scale

Schutte et al. (1998) report a Cronbach alpha score of (.82) for the 33 item version. Austin et al. (2004) report the internal consistencies of the 33 and 41 item SSREI scale. They report Cronbach alphas of (.84) for 33 items and (.85) for 41 items. They concluded that adding 9 extra items to the 33 item version did not improve the measure's internal consistency. Schutte et al. (1998) report a test-retest reliability of ($r = .78$) over a two week period.

3.4.2 Relationship to other measures of personality and IQ

Schutte et al. (1998) found only one significant relationship between the 'big 5' personality traits and the 33 item version EI scale. A strong relationship was found between the Openness scale and total SSREI score ($r = .54$). Saklofske et al. (2003) found a number of significant correlations between the 33 item version of the EI scale and the 'big 5' personality traits (Neo Five Factor Inventory Form, NEO-FF, Costa & McCrae, 1992) Neuroticism ($r = -.37$), Extraversion ($r = .51$), Openness ($r = .27$), Agreeableness ($r = .18$) and Conscientiousness ($r = .38$). Burns et al. (2007) also investigated the relationship between the SSREI and the 'big 5' personality characteristics assessed using the NEO PI-R. They found that the SSREI only loaded on one of the 'big 5', Openness ($r = .28$). I am not aware of any studies that have explored the relationship between the 44 item measure and existing personality measures.

Burns et al. (2007) explored the relationship between the 33 item version and cognitive intelligence using Ravens Advanced Progressive Matrices (APM; Raven et al., 1993). They found no relationship.

A number of concerns have been raised about the number of reverse key questions in the 33 item measure (Petrides & Furnham, 2000; Saklofske et al., 2003). There are now two different versions of this measure and it appears that items have been added and removed in an attempt to improve the factor structure. A number of studies have

also found significant overlap between the 33 item version and the 'big 5' personality traits (Burns et al., 2007; Saklofske et al., 2003).

4. ABILITY EI MEASURES

4.1 The MSCEIT version 2

The most prominent ability measure of EI is the MSCEIT version 2 (Mayer et al., 2002). This is the second updated version of the MEIS (Mayer et al., 1997) which was originally developed to test the four factor model of EI. The four factors (often referred to as branches) are; Perceiving Emotions (Branch 1), Facilitating Thought (Branch 2), Understanding Emotions (Branch 3) and Managing Emotions (Branch 4) (Mayer & Salovey, 1997). Mayer et al. (2002) state that one limitation of the MEIS was that it was too long as it had 402 items and it was hoped that the development of the MSCEIT would provide an opportunity for improved measurement of the second branch. A number of tests from the MEIS were not included in the MSCEIT version 1 music, stories, relativity (scenarios depicting social encounters for example, fictional people often in conflict, the participant is asked to judge how the characters are feeling) and feeling biases. Both Branch 4 subtests were also omitted. Mayer et al. (2000) do not provide an explanation of why these subtests were omitted. The MSCEIT version 2, unlike the MEIS and MSCEIT version 1, employs both consensus and expert scoring. The MSCEIT version 2 is simply referred to as the MSCEIT, so from this point onwards any reference to the MSCEIT will be the second version.

Mayer et al. (2003) evaluated the factor structure of the MSCEIT. In this study, they tested the one, two and four factor models of the MSCEIT and found support for the four factor model. Reanalysis of the factor structure by Gignac (2005) reached

different conclusions to Mayer et al. (2003). Gignac (2005) proposed that a three factor solution that combined Branches 1 and 2 was a better fit. Mayer, Panter, Salovey, Caruso & Sitarenios (2005) responded to Gignac by stating that it is encouraging that his re-analysis of Mayer et al.'s data (2003) still supported the idea of a hierarchical model with a unitary construct of EI. They concluded that the issue of whether a three or four factor solution is the best fit is unlikely to be resolved in the near future (Mayer et al., 2005).

Palmer, Gignac, Manocha & Stough (2005) evaluated the factor structure of the MSCEIT and found only partial support for the four factor model. They believe that a model with a general first order factor of EI and a three, first order Branch level factors was determined to be the best fitting model. They found no evidence to support the presence of the Facilitation branch. However, the most recent investigation of the factor structure of the MSCEIT (Burns et al., 2007) did find support for the four factor model.

STRUCTURE OF THE MSCEIT

| Overall Scale | Two areas of MSCEIT | Four Branches | Eight Tasks | Section in test booklet | |
|------------------------------|--|---------------------------------|---|----------------------------|--|
| Emotional Intelligence (EIQ) | Experiential Emotional Intelligence (EEIQ) | Perceiving Emotions Branch 1 | Faces Pictures | (Section A) (Section E) | |
| | | Facilitating Thought Branch 2 | Facilitation Sensations | (Section B) (Section F) | |
| | | Understanding Emotions Branch 3 | Changes Blends | (Section C) (Section G) | |
| | | Managing Emotions Branch 4 | Emotional Management Emotional Relations | (Section D) (Section H) | |
| | Strategic Emotional Intelligence (SEIQ) | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

4.1.1 Psychometric properties of the MSCEIT

Conte (2005) highlights the differences between MEIS and MSCEIT and advises against making inferences about the psychometric properties of the MSCEIT based on MEIS data. Only studies reporting results of the MSCEIT will therefore be reviewed. Mayer et al. (2002) report Cronbach alpha values of (.91) for the MSCEIT total score and also good reliability for area scores experiential (.90) and strategic (.86).

Brackett & Mayer (2003) found good test-retest reliability ($r = .86$) for the MSCEIT total score and for the four branch scores ($r = .74-.89$). Palmer et al. (2005) reported comparable reliabilities to Brackett & Mayer (2003).

Overall, there are a significant number of studies examining the factor structure of the MSCEIT. Most of the studies support the presence of an overarching construct called emotional intelligence underpinned by either three or four other factors.

4.1.2 Relationship to other measures of personality and IQ

Rivers, Brackett, Salovey & Mayer (2007) report the combined results of five studies in which the relationship between the MSCEIT and the 'big 5' personality characteristics assessed using the NEO PI-R (Costa & McCrae, 1992) has been explored (Gil-Orlarte Marquez, Palomera Martin & Brackett, 2006; Lopes, Salovey & Straus, 2003; Mayer, Salovey & Caruso, 2004; Van Rooy, Viswesvaran & Pluta, 2005). Across five studies, MSCEIT total score correlated positively, though weakly, with Agreeableness ($r = .21$) and Openness ($r = .17$). Rivers et al. (2007) state these results are not surprising because individuals who are high on emotional related abilities tend to be open to experience, agreeable and conform to societal norms.

Mayer et al. (1999) found correlations of ($r = .36$ and $r = .38$) in samples of 503 and 239 participants between the MSCEIT and the Army Alpha Vocabulary scale (this a measurement of verbal IQ used in the selection of new recruits by the USA military). Lopes et al. (2003) found that the WAIS-III verbal IQ subscale correlated modestly with the Understanding Emotion branch of the MSCEIT ($r = .39$). Verbal IQ was not found to correlate with MSCEIT total score or the other three branches. Van Rooy et

al. (2005) carried out a meta analysis of the MSCEIT and different measures of verbal and spatial ability and found a modest correlation of ($r = .34$). Burns et al. (2007) also explored the relationship between the MSCEIT and cognitive intelligence using Ravens Advanced Progressive Matrices (APM, Raven et al., 1993). They found no relationship between the MSCEIT and APM. Burns et al. (2007) do point out that this result needs to be viewed cautiously because of the limitations of the APM as a measurement of cognitive intelligence.

The MSCEIT has been demonstrated to have good internal consistency and test-retest reliability. There has also been some support for the four factor model (Burns et al., 2007; Mayer et al., 2003) although others support the three factor model (Gignac, 2005). The MSCEIT has been demonstrated to be relatively independent from existing personality traits. There is a clear relationship between cognitive intelligence and the MSCEIT, with several studies reporting correlations of a moderate size (Burns et al., 2007; Lopes et al., 2003). The MSCEIT cannot therefore be regarded as completely orthogonal to cognitive intelligence though the moderate size of the correlation between the MSCEIT and cognitive intelligence measures would seem to suggest that they also have independent elements. Mayer & Salovey (1997) also provide details about the development of their original model and how the MSCEIT was designed to measure the four different branches of EI.

4.1.3 The underlying neural basis of EI measured by the MSCEIT

A study by Krueger, Barbey, McCabe, Strenziok, Zamboni, Solomon et al., (2009) attempted to explore if there was a relationship between performance on the MSCEIT and the nature of brain injury in a sample of brain-injured war veterans. Krueger et al.

(2009) state that it is well established that the ventromedial area of the pre frontal cortex of the brain (vmPFC) is associated with the ability to understand and manage emotional information. Krueger et al. (2009) state that the dorsolateral pre frontal cortex (dlPFC) is involved in the perception and use of emotional information.

Krueger et al. (2009) explored the damage to participants' brains using CT scans.

Participants were required to complete the MSCEIT. Krueger et al. (2009) found that participants with damage to the vmPFC were significantly impaired in Strategic EI (defined as the ability to understand emotional information and to use it for future planning and self management in the MSCEIT manual). They also found that participants with damage to the dlPFC were significantly impaired in Experiential EI (defined as a measure of an individual's ability to perceive emotional information and to relate it to other sensations such as colour or taste and use this information to facilitate thought). Krueger et al. (2009) concluded that their results suggest that two areas of the brain the vmPFC and the dlPFC are associated with two key competencies of EI.

5. PSYCHOPATHY AND EI

When I started this research there were few studies that had explored EI in forensic populations. One of the first studies (Puglia, Stough, Carter & Joseph, 2005) explored whether there were any differences in EI between sex offenders, non-sexual offenders and controls. EI was measured using the three branch version of the MSCEIT. They found no differences between the three groups on two of the three branches of the MSCEIT; Assimilation and Management. They found that sex offenders had a significantly higher score on the Perception scale compared to non-sexual offenders.

No differences were found between the sex offenders and controls on the Perception scale. Puglia et al. (2005) state that sex offenders have previously been found to have deficits in empathy, emotional perception, emotional management and interpersonal functioning. It might therefore be expected that they would have low levels of EI. However, Puglia et al. (2005) state that high levels of EI may not be used for altruistic purposes and may actually be used for malevolent purposes as part of offending. Hemmati, Mills & Croner (2004) administered the EQ-i to a sample of offenders. They found that this sample had higher scores than the norms quoted in the Technical Manual (BarOn, 1997).

Malterer, Glass & Newman (2008) published one of the first studies that explored the relationship between psychopathy assessed using the PCL-R and EI using the TMMS. A significant but weak negative relationship was found between Factor 1 of the PCL-R and the Attention scale of the TMMS ($r = -.10$). A significant but weak negative relationship was also found between Factor 2 of the PCL-R and the Repair scale of the TMMS ($r = -.15$). These results suggest that individuals high on Factor 1 of the PCL-R, which captures the emotional component of psychopathy, may not be responsive to their own emotional state. Individuals with a high score on Factor 2, which is associated with antisocial behaviour, may be less able to regulate or manage their emotional state.

Pham, Ducro & Luminet (2010) investigated the relationship between the PCL-R and the long version (153 items) of the Trait Emotional Intelligence Questionnaire (TEIQue; Petrides & Furnham, 2003) in a small sample of 30 patients from a secure psychiatric hospital. The TEIQue yields a total EI score and contains four subscales;

Emotional Perception, Emotional Expression, Emotional Regulation and Emotional Management. Pham et al. (2010) found that only Facet 2 of the PCL-R (Affective) was significantly correlated with EI total score ($r = .36$). A number of significant correlations of small to moderate effect size were found between the Emotional Perception Scale and PCL-R total score, Factor 1, Factor 2 and Facets 2 and 3. These results mean that a high level of psychopathic traits is associated with participants rating themselves as being more emotionally perceptive. Significant positive correlations were also found between PCL-R total score, Factor 1 and Facets 1 and 2 and Emotional Regulation. Again these results means that a high level of psychopathic traits is associated with participants rating themselves as being more able to regulate their emotions.

There are also a number of studies that have explored the relationship between a different self-report psychopathy measures and EI in a sample of 84 undergraduate students. Ali, Amorim & Chamorro-Premuzic (2009) explored the relationship between self-reported psychopathy using Levenson's Self-Report Psychopathy Scale (LSRP; Levenson, Kiehl & Fitzpatrick, 1995) and the short version (30 items) of the Trait Emotional Intelligence Questionnaire (TEIQue; Petrides & Furnham, 2006). Ali et al. (2009) found a non significant negative correlation between scale 1 of the LSRP and total EI score ($r = -.17$) and a significant negative correlation with scale 2 ($r = -.48$). This means that participants with a high score on scale 2 had lower total EI scores.

In a sample of 73 Australian undergraduate students, Grieve & Mahar (2010) explored the relationship between EI measured using the 33 item version of the

Schutte Self-Report Emotional Intelligence Scale (SSREI; Schutte et al., 1998) and self-reported psychopathy using Levenson's Self-Report Psychopathy Scale (LSRP; Levenson et al., 1995). Scale 1, or primary psychopathy, is characterised by malevolent, manipulative, callous, deceptive, remorseless treatment of others and lack of anxiety. Scale 2, or secondary psychopathy, is characterised by anxiety, impulsivity and antisocial behaviour. Grieve & Mahar (2010) found a non significant negative correlation between scale 1 of the LSRP and total EI score ($r = -.12$) and a significant negative correlation with scale 2 ($r = -.26$). Therefore participants with high EI were more likely to have low levels of anxiety and impulsivity captured by scale 2 of the LSRP. Grieve & Mahar (2010) do not report the relationship between total EI and psychopathy scores.

Grieve & Mahar (2010) found a similar pattern of results to Ali et al. (2009) despite the fact that the two studies used different trait EI measures (SSREI and the TEIQue). Both studies found significant negative relationships between scale 2 of the LSRP and EI.

In 2007, Ortony, Revelle & Zinbarg stated that psychopathic individuals appear to experience significant difficulty perceiving, understanding and responding to emotional material and that emotional difficulties are believed to be central to the concept of psychopathy. Ortony et al. (2007) believe that there is a clear rationale for administering the MSCEIT to psychopathic individuals. Vidal, Skeem & Camp (2010) investigated the relationship between psychopathy, assessed using the PPI-R, and EI, assessed using the MSCEIT, in a sample of 188 male undergraduates. Vidal et al. (2010) found non-significant negative relationships between PPI-R, PPI-I and the

Coldheartedness scale and MSCEIT total scores. Only PPI-II demonstrated a significant negative relationship with MSCEIT total score ($r = -.30$).

In terms of the relationship between the PPI-R and the four Branches of the MSCEIT, only the relationship between PPI-R total score and Branch 4 (Managing Emotions) was significant ($r = -.24$). PPI-I only demonstrated a significant relationship with Branch 2 (Facilitating Thoughts) ($r = .19$). PPI-II demonstrated significant negative relationships with Branch 2 (Facilitating Thoughts) ($r = -.17$), Branch 3 (Understanding Emotions) ($r = -.23$) and Branch 4 (Managing Emotions) ($r = -.38$). No significant relationships were found between the Coldheartedness scale and any of the four Branches of the MSCEIT.

It is difficult to reach any conclusions about the relationship between psychopathy and EI because studies have used different measures of EI and psychopathy and are often based on samples of undergraduate students (Ali et al., 2009; Grieve & Mahar, 2010; Vidal et al., 2010). There are still few published studies that have explored the relationship between different measures of EI and psychopathy in forensic samples (Hemmati et al., 2004; Malterer et al., 2008; Pham et al., 2010; Puglia et al., 2005) which indicates that further research in this area is necessary.

6. SELECTION OF A TRAIT AND ABILITY EI MEASURES TO BE USED IN THIS RESEARCH

The purpose of this review of EI measures is to identify an ability and trait EI measure to be used in this thesis. The identification of an ability EI measure is straight forward. The MSCEIT is the only published, ability measure of EI, it has good psychometric properties and has been found to be separate from existing personality measures.

The selection of a trait EI measure is more complex. The EQ-i (BarOn, 1997) is the only trait EI measure that has a published user manual and is the trait EI measure that has been most widely used in published studies. However, Matthews et al. (2002) point out that BarOn did not provide detail of the development of his model of EI and concerns have also been expressed about the underlying subscales of the EQ-i (Petrides & Furnham, 2001; Dawda & Hart, 2000). A number of studies have also found significant overlap between the 'big 5' personality traits and the EQ-i (Dawda & Hart, 2000; Mayer et al., 2002; Newsome et al., 2000).

The TEIQue was also reviewed as a trait EI measure. There are a number of different versions of the TEIQue and Petrides et al. (2004) have found that there may be a problem with the items in the Social Competence scale of the long version of the TEIQue. There is also significant overlap between the TEIQue and the 'big 5' personality characteristics (Petrides & Furnham, 2003).

A number of concerns have also been raised about the factor structure of the SSREI scale (Austin et al., 2004). There are two versions of this measure; 33 and 41 item

scales. Like the TEIQue, the EI scale has been found to overlap with the ‘big 5’ personality traits (Saklofske et al., 2003). Qualter et al. (2010) do not believe that the SSREI is an appropriate measure of EI in forensic populations.

The final trait EI measure that I reviewed was the TMMS (Salovey et al., 1995). This trait EI measure was developed by the same group of researchers as the MSCEIT and both are based on Mayer & Salovey’s (1997) four branch model of EI. On balance, after reviewing the SSREI scale, TEIQue and TMMS, I believe that the fact that the TMMS is shorter, was developed by the same group of researchers as the MSCEIT and has been found to be separate from the MSCEIT are important factors to consider. The TMMS will therefore be used as the trait EI measure in this thesis.

CHAPTER 4 METHOD

1. INTRODUCTION

Many studies have suggested that an emotional deficit may underpin some of the features of psychopathy. The aim of this thesis is to explore the relationship between emotional processing and psychopathic traits. Two measures of psychopathy were administered, the Hare Psychopathy Checklist (PCL-R; Hare 2003) and the Psychopathic Personality Inventory Revised (PPI-R; Lilienfeld & Widows, 2005). The concept of emotional intelligence (see chapter 3) involves the capacity to perceive emotions, understand those emotions and manage them. Therefore it appeared that the tools developed to measure emotional intelligence would be ideal to examine the emotional deficit hypothesised to underpin psychopathy and that deficits in emotional intelligence would be manifest in those with high scores on measures of psychopathy. Two different emotional intelligence tests, the MSCEIT (ability EI) and the Trait Meta-Mood Scale (TMMS) (trait EI) were therefore administered to participants. Participants also completed two emotional processing tasks; the Detection of Emotional Faces Task (DEFT) and an Emotional Priming Task (EPT) both designed by Professors Snowden & Gray from Cardiff University. I assisted with the development of the EPT. Participants also completed the Wechsler Abbreviated Scale of Intelligence (WASI). The relationship between psychopathy, emotional processing and IQ will therefore also be explored.

2. PARTICIPANTS

Participants were 57 convicted, male offenders located at 3 different prisons. In terms of location, 23 were located at HMP Long Lartin which is a high security prison, 26

of the participants were located at HMP Leyhill which is an open prison and 8 of the participants were located at the Westgate Unit at HMP Frankland which is a specialist unit for offenders who meet the criteria for Dangerous and Severe Personality Disorder (DSPD). Although HMP Leyhill is an open prison, approximately 120 of the offenders located there have been assessed as high risk sexual and violent offenders. Most of the participants at HMP Leyhill were in the final stage of their life sentence but would typically have started their sentences in a high security prison such as HMP Frankland or HMP Long Lartin.

Most of the total sample (81%), were serving life sentences and only 19% determinate sentences. Of the total sample, 68% were convicted of a violent offence (39 out of the total sample) and 32% of a sexual offence. (I have classified sexual murder as a sexual offence rather than violent offence because the motive was sexual, even though these offenders may only have been convicted of murder). All 23 of the participants based at HMP Long Lartin were convicted of violent offences. At HMP Frankland, 4 offenders were convicted of sexual offences (all sexual murders) and 4 convicted of violent offences. At HMP Leyhill, 12 were convicted of violent offences and 14 were convicted of sexual offences. At HMP Frankland and HMP Leyhill, participants were convicted of both sexual and violent offences. However, all participants located at HMP Long Lartin were convicted of violent offences.

The mean age of the sample was 38 years old (S.D. = 10.0, range 22-66 years). Most of the sample, (77%) were of Caucasian origin, 18% of Black Caribbean or Black African origin and 5% were of Asian origin. Participants' ethnic origin was identified from the Prison Service database that lists offenders' personal and sentence details.

Table 4.1 Summary of participants' demographic information and scores on the PCL-R, PPI-R and WASI

| | Frankland (FL) Mean score | Long Lartin (LL) Mean score | Leyhill (LH) Mean score | P values | Post hoc analyses |
|-----------------------------------|------------------------------|--------------------------------|----------------------------|----------|---|
| Age ^b | 39.75 | 33.78 | 42.00 | .01** | <.01** (LH>FL) <.01** (FL>LL) <.01** (LH>LL) |
| Criminal Versatility ^a | 5.25 | 5.47 | 3.53 | .01** | Mann-Whitney Test <.55 LL & FL <.00** LL > LH <.07 FL & LH |
| IQ ^b | 94.57 | 97.60 | 103.13 | .14 | |
| PCL-R total Score ^a | 31.81 | 18.72 | 17.23 | .000** | Mann-Whitney Test <.00** FL > LL <.45 LL & LH <.00 FL > LH |
| PPI-R total Score ^b | 297.71 | 281.80 | 255.01 | .02* | No significant differences |

* $p < .05$, ** $p < .01$

^aKruskall Wallis Test

^bOne way analysis of variance

Table 4.1 summarises participants' details according to which of the three prisons they were located in. As might be expected, participants located at HMP Leyhill were significantly older than participants located at either HMP Long Lartin or HMP Frankland. The participants at HMP Frankland were also significantly older than the participants at HMP Long Lartin.

Differences also exist between participants at the three different prisons in terms of how criminally versatile they are. Criminal versatility was based on item 20 of the

PCL-R which reflects how many different categories of offences an individual has committed. As might be expected, participants from HMP Frankland and HMP Long Lartin were more criminally versatile than those located at HMP Leyhill. No differences existed between participants at the three prisons in relation to their total IQ measured by the WASI.

The aim of this thesis was to explore the relationship between psychopathy and emotional processing. I therefore aimed to identify participants with a range of PCL-R scores and this is why I targeted the DSPD unit at HMP Frankland as I was aware that offenders located on this unit would have high PCL-R scores. Although PCL-R total score was normally distributed (see chapter 5), Levene's test was significant which means that one of the assumptions for use of ANOVA was violated, as a result these data were analysed using the Kruskal Wallis test. As might be expected, participants located at HMP Frankland had higher PCL-R scores compared to those located at HMP Long Lartin and HMP Leyhill. No difference was found between participants' PCL-R scores located at HMP Long Lartin and HMP Leyhill. Although, I found a difference in PPI-R scores between participants located at the three prisons, post hoc analysis did not reveal any significant differences.

To summarise, it is clear that differences do exist between participants located at the three different prisons. Participants at HMP Leyhill were older, less criminally versatile and participants at HMP Long Lartin were all convicted of violent offences. However, as stated previously, the aim of my thesis is to explore psychopathy and emotional processing and as a result of targeting offenders at different prisons, I have ensured that I have a range of PCL-R scores.

3. IDENTIFICATION OF PARTICIPANTS TO TAKE PART IN THIS RESEARCH

Potential participants were identified for this study by staff from the psychology departments at HMPs Long Lartin, Frankland and Leyhill who identified offenders who had both completed PCL-R and WASI assessments. Members of staff from these three psychology departments then approached offenders and asked if they would be prepared to meet with myself to discuss the research. All participants completed a consent form and gave permission for their PCL-R and WASI scores to be disclosed. At the time of starting this research, I was Head of Psychology at HMP Long Lartin. This is why I did not approach participants directly, as they may have felt pressurised into agreeing to take part in the study, fearing that failure to do so might have negative consequences for them.

Although only 57 participants agreed to take part in this research, I actually approached about 250 offenders¹ across the three different prisons during the time when I was collecting data. Therefore approximately only 1:5 participants agreed to take part in the research. At HMP Long Lartin, participants would often agree to take part in the research and then be transferred out or end up being segregated because of poor institutional behaviour before taking part in the research. At HMP Long Lartin, the research was conducted in a room in the Programmes Department, which is located away from the main prison. I was not given permission to take my laptop computer onto the residential units, therefore the research was conducted in the Programmes Unit which made it more difficult to have access to potential participants.

¹ Unfortunately it is not possible to get exact figures on this matter. The psychologists would report which people had agreed to take part but did not give details about people who had not agreed to take part in the research.



Arrangements therefore had to be made for these participants to be permitted to go to the Programmes Department. On a number of occasions, participants simply declined to go to the Programmes Department without giving any explanation. At HMP Frankland, data collection was limited to the length of my stay at the DSPD unit. Whilst at HMP Frankland, I did not have keys and had to be escorted on the unit, which was time consuming for the member of staff escorting me. I visited HMP Frankland on two occasions. At the DSPD unit, offenders have their own individualised programme and attend group work and individual sessions. They also take part in other activities such as horticulture. It was therefore difficult to identify time when participants were not involved in other activities for them to take part in this research. Collecting data at HMP Leyhill presented a different range of challenges. Many offenders at HMP Leyhill are involved in completing a range of unsupervised activities in the community, in fact, many work full time. Offenders at HMP Leyhill also take periods of resettlement leave at hostels in the community for a maximum of 5 days. Although a number of participants initially agreed to take part in my research, it was difficult to identify a date when they were in the prison when they would actually be able to complete the research. I joined the psychology department at HMP Leyhill in October 2007, so it became easier to arrange appointments for participants to take part in my research. Due to a potential conflict of interests, I did not ask any offenders who were on my caseload at HMP Leyhill to take part in the research.

It is clear that only a small proportion of those approached (estimated to be around 20-25%) actually completed the research. Differences may therefore exist between the participants who agreed to take part in the research and those who declined, or who

failed to attend appointments. On a number of occasions there may have been a range of genuine reasons why participants failed to attend appointments to complete this research. However, it is also possible that a number of participants agreed to take part during the initial meeting because they may have felt pressurised to do so and then they failed to attend. It would have been interesting to compare those participants who took part in the research and those who did not. It is clearly possible that this self-selecting group who chose to take part in the research may differ in some ways from those that did not, and I would speculate that such a lack of willingness to volunteer might well be related to some aspects of psychopathy. However, the nature of the ethics of this research meant that I did not have permission to access such information for those that did not volunteer (and, indeed, I was ignorant of which inmates had refused and which had not been approached) and hence I am unable to explore this issue any further.

4. ETHICS

HMP Long Lartin and HMP Frankland are prisons that are both part of the Directorate of High Security Prisons (DHSP). HMP Leyhill is part of the South West region. Therefore it was necessary to obtain ethical approval from both DHSP and South West Region. Ethical approval for the study was provided by the Area Psychologists from both the DHSP and South West Region in line with Prison Service Order 7035, Research Applications and Ethics Panel. See Appendix 1 for a copy of my application for ethical approval which was sent to the Area Psychologist at DHSP and Heads of Psychology at HMP Frankland and HMP Leyhill, who acted on behalf of their governors.

It is important to note that the Area Psychologist from DHSP gave approval for the research to be conducted at HMP Long Lartin and HMP Frankland (DSPD unit). However, after ethical approval was given I approached the security department at HMP Long Lartin to seek permission to use equipment that would be needed to measure either galvanic skin response (GSR) or the blink startle response. Permission was not given for a number of reasons. Managers in the security department were concerned about use of cables and the close proximity to offenders when securing electrodes. Secondly liquids, creams and gels are not permitted into high security prisons unless their use is related to a medical condition. It is necessary to apply gel when applying electrodes in order to improve conductance. As it was not possible to measure GSR or blink startle, the EPT was developed which could be administered by using a laptop computer. Permission was given by the security department to use a laptop computer (without a wireless connection) in the Programmes Department, which is located a distance from residential units. The Area Psychologist from DHSP gave permission for me to use the EPT rather than measure GSR or the blink startle response. I informed all Heads of Psychology about the change to my research.

5. MEASURES

Participants had already completed both the PCL-R (Hare, 2003) and WASI (Wechsler, 1999) assessments for clinical purposes prior to taking part in this study. All procedures were explained to the participants via an information sheet and the participants then gave written informed consent to participate (see Appendix 1 for a copy of the consent form and details of instructions provided to participants).

Participants then completed the MSCEIT (Mayer, Caruso & Salovey, 2002), the PPI-R (Lilienfeld & Widows, 2005), TMMS (Salovey, Mayer, Goldman, Turvey & Palfai (1995), the EPT and the DEFT in this set order. Details of each of the measures and tasks will be provided in subsequent chapters.

6. PROCEDURE

Each participant was tested alone in a quiet, well lit room with the experimenter.

Participants were seated at a table. The computer based tasks were presented on a Toshiba Satellite Pro L10 laptop. The laptop was positioned on the table approximately 60-80cms away from the participant. Participants did move during the task so the distance was not exact.

Participants completed the five tasks in the same order; MSCEIT, PPI-R, TMMS, EPT and DEFT. For the MSCEIT, TMMS and PPI-R, standardised instructions were read out to each participant prior to completing each task. Instructions for the completion of the computer based tasks were presented on the computer screen. These instructions will be given in the relevant empirical chapter.

7. DATA ANALYSIS

In each chapter, I was faced with a problem that each of the measures has many subscales. For example, in chapter 5 when exploring the relationship between the PCL-R and PPI-R, the PCL-R can produce 7 scores (PCL-R total, Factors 1 and 2 and four Facets), whilst the PPI-R can produce 11 scores, (PPI-R total, 3 factors, including the Coldheartedness scale and 7 subscales). Hence, looking at all relationships would

produce 77 correlations and therefore a raised possibility of a type I error. The standard method of correction for such multiple comparisons is to decrease the level of probability that the test has to reach before being regarded as significant (e.g. Bonferroni correction). However, this would mean that any test would have to return a probability of $0.05/77=0.00065$ in order to be regarded as significant. Clearly, using such a stringent test would therefore lead to type II errors. In each chapter, in order to try and minimise both types of error, I have therefore tried to limit the number of correlations performed. I decided to examine the data using a hierarchical approach. Firstly, for each test, I chose what I regarded to be the variables needed to test the hypotheses in question. Significant correlations (using the standard $p < .05$) are then noted and then further analysis will be carried out to establish which of the four Facets of the PCL-R were contributing to the correlation. This problem of having multiple correlations occurs for all my experiments and this hierarchical approach is therefore used throughout the thesis.

In each chapter, prior to identifying a statistical test to analyse the data, it was firstly necessary to explore whether the data were normally distributed. The Kolmogorov-Smirnov (KS) test was used to assess whether the data was normally distributed. The KS test is recommended for sample sizes greater than 25 (Burdenski, 2000).

Tabachnick & Fidell (2007) point out that in larger sample sizes the standard error for both skewness and kurtosis decreases which means that the null hypothesis is more likely to be rejected when only minor deviations from normality occur. Tabachnick & Fidell (2007) therefore state that in order to avoid rejecting the null hypothesis p values of (.01 or .001) should be considered in small to moderate samples (pp. 80).

Tabachnick & Fidell (2007) suggest that a larger sample is greater than 100. My total

sample size is 57 and is therefore considered a moderate sample. I will therefore use a significance level of ($p < .001$) for the KS test. When data is normally distributed, I will use parametric statistics. On occasions when the KS is statistically significant I will attempt to transform data and when this is not possible I will use non-parametric statistics

A lot of past research in the field of psychopathy has attempted to define a group of individuals as psychopathic and then compare performance/behaviour of this group against a control group. This has often involved using scores on the PCL-R to create a “cut-off” score to define the groups. Most typically a score of 30 or over has defined the “psychopathic” group (as this is often used in clinical practice), however, it should be noted that there is nothing special about this score. One problem often encountered when using this cut-off score is that few participants, even in offender samples, reach this criterion and hence there is a dramatic loss of power when using this cut-off.

Indeed, many researchers have chosen to use lower scores in order to mitigate against this (25 is often used, but again this is completely arbitrary). Clearly whatever cut-off is used (let us consider a score of 30) we face the problem that someone just below the cut-off (e.g. with a score of 29) is regarded as exactly like someone with a score of 0 and is allocated to a different group from someone with a score of 30. The issue of dichotomization of quantitative variables has been carefully considered elsewhere.

MaCullum, Zhang, Preacher & Rucker (2002) provide a comprehensive critique of the practice and show that it (1) results in a dramatic loss of power, (2) can produce a spurious statistical significance and (3) may miss non-linear relationships. They conclude that the practice is “*rarely defensible and often will yield misleading results*” (p.19). One rare exception to this is where the quantitative variable aims to

define a taxon. In chapter 1 (1.4), I concluded that psychopathy is best conceptualised as a dimensional construct and not a taxon (Edens, Marcus, Lilienfeld & Poythress, 2006; Guay, Ruscio, Knight & Hare, 2007; Marcus, John & Edens, 2004; Walters, Gray, Jackson, Sewell, Rogers et al., 2007) and hence the approach of dichotomization of the PCL-R seems indefensible. Therefore my analyses of these data will use a correlational approach. This has the added attraction that it is in-line with other measures (such as the PPI-R – see below) that are dimensional and do not have any recognised cut-off scores.

The PPI-R is the second measure of psychopathy being used in this thesis. The PPI-R manual (Lilienfeld & Widows, 2005) recommends that PPI-R profiles with scores of 45 or over on the Inconsistent Responding Scale should be considered invalid. For all analysis related to the PPI-R, three participants' scores will therefore be excluded. As stated above, the PPI-R provides a dimensional score of psychopathy and so I will use a correlational approach to the data analysis.

CHAPTER 5 COMPARING TWO MEASURES OF PSYCHOPATHY THE PCL-R AND PPI-R

1. INTRODUCTION

Lilienfeld & Andrews (1996) identified two main reasons for the development of a self-report measure of psychopathy. The first is ease of administration, as completion of the PCL-R is a lengthy and resource intensive process that should involve interviewing the offender, access to file information and be completed by a trained assessor. The second reason for the development of a self-report measure of psychopathy is that it would allow assessment of the prevalence of psychopathy in the general population for whom there is an absence of file information. This inability to conduct PCL-R assessments in the general population has significantly hindered experimental research on psychopathy as it severely restricts the study of psychopathy to those in a forensic setting where problems exist in accessing such samples. It would also allow comparisons to be made between different populations, e.g. offenders and community samples.

Hare (1991) originally identified two underlying factors to the PCL-R; Factor 1 which reflects a combination of affective and interpersonal features and Factor 2 which reflects socially deviant behaviour. However, Hare (2003) identified a four Facet model in which Factor 1 is split into Facet 1, interpersonal and Facet 2, affective. Factor 2 is split into Facet 3, lifestyle and Facet 4, antisocial.

Like the PCL-R, the PPI has been found to have at least two underlying factors; Fearless Dominance or PPI-I and Self-Centred Impulsivity or PPI-II (Benning,

Patrick, Hicks, Blonigen & Krueger, 2003). Lilienfeld & Widows (2005) describe the PPI-R factors as follows, "*In general, high scores on Fearless Dominance reflect a tendency towards lack of anticipatory social and physical anxiety, low levels of tension and worry, low harm avoidance and high levels of interpersonal dominance. In general, high scores on Impulsive Antisociality reflect a tendency toward self-centeredness, ruthless use of others, brazen flouting of traditional values, propensity to attribute blame to others for one's mistakes and reckless impulsivity*" (p.22). As such these brief descriptions of the two Factors appear to compare reasonably well to the two Factors identified within the PCL-R.

The PPI-R contains a subscale called the Coldheartedness scale, which captures the absence of strong affective responses believed to be at the heart of psychopathy.

However, surprisingly, Benning et al. (2003) found that this scale did not load on PPI-I or PPI-II and it was therefore left as a stand alone item.

There are a number of studies that have examined the relationship between the PPI and the PCL-R. Poythress, Edens & Lilienfeld (1998) reported a strong correlation ($r = .54$) between PCL-R and PPI total scores. Kruh, Whittermore, Arnaut, Manley, Gage & Gagliardi (2005) also found a positive correlation between the PCL:SV (PCL-R Screening Version; Hart, Cox & Hare, 1995) and PPI ($r = .62$), in a sample of 'insanity acquittees'. Skeem & Lilienfeld (2004) found correlations between PCL-R Factor 1 ($r = .31$) and Factor 2 ($r = .48$) and PPI total score. These results suggest that there is a strong relationship between total PCL-R and PPI scores.

There are published studies that have explored the relationship between the four Facets of the PCL-R and the PPI (Edens, Poythress, Lilienfeld & Patrick, 2008) and PPI-R (Edens & McDermott, 2010). More recent studies have also explored the use of the PPI (Edens et al., 2008; Malterer, Lilienfeld, Neumann & Newman, 2010; Poythress, Lilienfeld, Skeem, Douglas, Edens, Epstein et al., 2010) and PPI-R (Edens & McDermott, 2010) in forensic populations.

In a sample of 876 adult male offenders located in either a high or low security prison, Malterer et al. (2010) found a significant moderate correlation ($r = .39$) between PCL:SV (Hart et al., 1995) and PPI total score. They also found a weak but significant relationship between PCL:SV Factor 1 and PPI-I ($r = .18$) and a significant relationship between PCL:SV Factor 2 and PPI-II ($r = .41$).

Using the PPI (in a sample of 46 young offenders), Edens et al. (2008) found that the PPI-I was not related to Facets 1 and 2 but they found significant positive correlations between PPI-II and Facet 1 ($r = .42$) and Facet 2 ($r = .40$) of the PCL-R. Edens et al. (2008) found significant positive correlations between PPI-II and all four Facets of the PCL-R. They found a strong relationship between PPI and PCL-R total scores ($r = .54$).

Poythress et al. (2010) explored the relationship between the PCL-R and PPI in a large sample of 1,603 offenders. They found a positive correlation of moderate effect size between PCL-R and PPI total scores ($r = .43$). They also investigated the relationship between the underlying factors of the two measures. They found a significant positive correlation between PCL-R Factor 1 and PPI-I of the PPI ($r = .25$).

A significant but stronger correlation was found between PCL-R Factor 2 and PPI-II of the PPI ($r = .39$).

In a sample of 200 forensic psychiatric in-patients, using the PPI-R, Edens & McDermott (2010) report a significant correlation of ($r = .17$) between PPI-R and PCL-R total scores. They found that PPI-I failed to demonstrate any relationship with any of the four Facets of the PCL-R. They also found that PPI-II was only significantly correlated with Facets 3 and 4 of the PCL-R.

Only Malterer et al. (2010) and Poythress et al. (2010) have therefore found a relationship between PPI-I of the PPI and Factor 1 of the PCL-R (and PCL:SV). The most recent study by Edens & McDermott (2010) using the PPI-R in a forensic population, failed to find a relationship between PPI-I and Facets 1 and 2 of the PCL-R.

Patrick & Bernat (2009) believe that the two Factors of the PPI and PCL-R are not identical. They point out that the PPI factors are independent of each other in comparison to the two PCL-R Factors which are moderately correlated. Patrick & Bernat (2009) believe that the design of the PPI and PCL-R are based on different assumptions. The PCL-R was designed to measure a unitary construct of psychopathy whereas Patrick & Bernat (2009) state the PPI was designed to measure a range of psychopathic traits. They also state that PPI-I is different to PCL-R Factor 1 in that the former is more closely associated with features of psychological adjustment such as social dominance and resilience. Patrick & Bernat (2009) conclude that, "*In sum, the two factors of the PPI index major components of the psychopathy construct in a*

more clearly differentiated way than the two correlated factors of the PCL-R” (pp. 1113).

Patrick (2010) has identified three components that he believes underpin the construct of psychopathy which he refers to as disinhibition, boldness and meanness. He defines disinhibition as, “*a general phenotypic propensity toward impulse control problems entailing a lack of planfulness and foresight, impaired regulation of affect and urges, insistence on immediate gratification and deficient behavioural restraint.*” Patrick (2010) describes boldness as, “*a phenotypic style entailing a capacity to remain calm and focused in situations involving pressure or threat, an ability to recover quickly from stressful events, high self-assurance and social efficacy, and a tolerance of unfamiliarity and danger.*” Patrick (2010) describes meanness as, “*a constellation of phenotypic attributes including deficient empathy, disdain for and lack of close attachments with others, rebelliousness, excitement seeking, exploitative, and empowerment through cruelty.*” Patrick (2010) goes on to say that meanness is related to Factor 1 of the PCL-R, whereas PPI-I captures boldness. Both Factor 2 of the PCL-R and PPI-II of the PPI-R are believed to capture disinhibition, which might account for the results of a number of studies which have found a significant positive relationship between these two Factors (Edens et al., 2008; Edens & McDermott, 2010; Malterer et al., 2010; Poythress et al., 2010).

Previous studies have explored the relationship between the PPI (and more recently PPI-R) and PCL-R. There do not appear to be any published studies that have examined the relationship between the PCL-R and the revised version of the PPI (PPI-R) in a UK forensic population. One aim of this study will be to compare the two

measures, including the underlying factor structures (and the Coldheartedness scale) in a UK forensic population.

2. HYPOTHESES

Prior to predicting the relationship between the PCL-R and PPI-R, I have considered all previous studies, but focused on the more recent work of Patrick & Bernat (2009) and Patrick (2010). Patrick & Bernat (2009) and Patrick (2010) have identified differences between these two measures and suggest that they are not tapping the same underlying constructs of psychopathy. They believe that the Factor 1 of the PCL-R is more similar to the Coldheartedness scale of the PPI-R than PPI-I. I have therefore identified hypotheses with this in mind. I therefore predict that;

- 1) A positive relationship will be found between PCL-R and PPI-R total scores
- 2) A positive relationship between PCL-R Factor 1 and the Coldheartedness scale of the PPI-R
- 3) A positive relationship between PCL-R Factor 2 and PPI-II of the PPI-R

3. PARTICIPANTS

See chapter 4 for details about participants.

4. MEASURES

4.1 The Hare Psychopathy Checklist Revised (PCL-R)

The PCL-R consists of 20 items that underpin the construct of psychopathy. The PCL-R provides a total score which is a global measurement of psychopathy, 2 Factors and 4 underlying Facets. Factor 1 is described as interpersonal and affective and consists of 8 items. Factor 2 is described as lifestyle/antisocial and consists of 10 items. Factor 1 is split into Facet 1, interpersonal and Facet 2, affective. Factor 2 is split into Facet 3, lifestyle and Facet 4, antisocial.

Facet 1 consists of the following items; item 1 glibness/superficial charm, item 2 grandiose sense of self worth, item 4 pathological lying and item 5 conning and manipulation. Facet 2 consists of item 6 lack of remorse or guilt, item 7 shallow affect, item 8 callous lack of empathy and item 16 failure to accept responsibility for own actions. Facet 3 consists of item 3 need for stimulation/proneness to boredom, item 9 parasitic lifestyle, item 13 lack of realistic long term goals, item 14 impulsivity and item 15 irresponsibility. Facet 4 consists of item 10 poor behavioural controls, item 12 early behavioural problems, item 18 juvenile delinquency, item 19 revocation of conditional release and item 20 criminal versatility. Two items of the PCL-R, item 11 promiscuous sexual behaviour and item 17 many short term marital relationships are known as non-loaders. Although these two items contribute to overall PCL-R score, they do not load on either the Factors or Facets.

It may not be possible to score all 20 PCL-R items as there may be gaps in information about an individual's life. It is possible to omit a total of five items with a

maximum of two items from both Factors 1 and 2. The PCL-R manual (Hare, 2003) rating procedures were followed.

The PCL-R can only be completed after a thorough review of all available file information in order to score each item. An interview is an important, although not necessary, part of the assessment process. For each item, there is a description and a set of guidelines for scoring. Each item is then scored as to whether the item is absent (score=0), partially present (score=1), or definitely present (score=2).

For all participants, PCL-R assessments were completed by either Trainee or Registered Forensic Psychologists. These assessments were completed in line with HM Prison Service guidelines for the administration of the PCL-R (Attrill, 2004). All PCL-R assessments were either completed and or supervised by psychologists who have successfully completed HM Prison Service PCL-R training and achieved inter-rater reliability through either the Darkstone or HM Prison Service certification process. Fifty four of the PCL-Rs were second scored, three of the PCL-R scores were obtained from the Sex Offender Treatment Programme (SOTP) database. I was informed that it was likely (based on the fact that these three assessments were completed by psychologists in prisons running the Sex Offender Treatment Programme) that these three PCL-Rs would have been second scored but I did not have the names of the psychologists who completed these assessments.

Of the 23 PCL-Rs completed at HMP Long Lartin, I second scored 20 of these assessments, I did not second score any PCL-Rs at HMP Frankland but second scored 10 out of the 26 PCL-Rs completed at HMP Leyhill.

4.2 Psychopathic Personality Inventory Revised (PPI-R)

The PPI-R is a 154 item self-report psychopathy measure. It has been standardised for use in adults 18 years and above. Normative data is available for a sample of offenders in the technical manual. The PPI-R has eight scales, 2 factors and yields an overall score of psychopathy.

4.2.1 Machiavellian Egocentricity (ME)

This is a 20 item scale which measures cynical attitudes and a willingness to manipulate others. This scale measures a tendency to view self as superior to others and willingness to break rules and take advantage of others for personal gain.

4.2.2 Rebellious Nonconformity (RN)

This is a 16 item scale which measures reckless defiance of social norms and a tendency to behave in an unconventional or anti-authority manner. An individual might view himself/herself as a “rebel without a cause.” This scale is also associated with proneness to boredom and a tendency to wander without plans.

4.2.3 Blame Externalization (BE)

This is a 15 item scale which measures a tendency to view the world as a hostile place and blame others. This scale measures a tendency to view self as a victim of circumstances, bad luck or the negative intentions of others.

4.2.4 Carefree Nonplanfulness (CN)

This is a 19 item scale which measures failure to carefully consider the consequences of actions and alternative solutions to problems. This scale also measures failure to learn from making mistakes, failure to plan and set long term goals.

4.2.5 Social Influence (SOI)

This is an 18 item scale which measures a tendency to be skilled at engaging, charming and influencing others. This scale measures a tendency to view self as being confident, eloquent, skilled at making a good first impression and lacking in anxiety in social situations.

4.2.6 Fearfulness (F)

This is a 14 item scale which measures a willingness to engage in risk taking behaviour and failure to consider possible risks. This scale measures a tendency to view self as a risk taker or daredevil.

4.2.7 Stress Immunity (STI)

This is a 13 item scale which measures a tendency to stay calm in anxiety provoking situations and to be free of nervous habits.

4.2.8 Coldheartedness (C)

This is a 16 item scale which measures lack of emotional depth in relationships with others, for example, an absence of guilt, empathy and loyalty. This scale measures failure to empathise with the suffering of others.

4.2.9 Fearless Dominance (PPI-I)

Fearless Dominance or PPI-I, is the sum of Social Influence, Fearlessness and Stress Immunity scales.

4.2.10 Self-Centred Impulsivity (PPI-II)

Self-Centred Impulsivity or PPI-II is the sum of the Machiavellian Egocentricity, Rebellious Nonconformity, Blame Externalization and Carefree Nonplanfulness scales.

4.2.11 PPI-R total score

This is the sum of all eight scales.

The PPI-R also has three validity scales, Virtuous Responding, Deviant Responding and Inconsistent Responding.

4.2.12 Virtuous Responding

An individual with a high score on this scale might view himself/herself favourably and be free of psychological flaws. The PPI-R manual (Lilienfeld & Widows, 2005) states that in some cases a high score may be associated with deliberate attempts to 'fake good'. The manual recommends that a high score on this scale should not be used to identify an invalid profile as this scale measures response style.

4.2.13 Deviant Responding

This scale is designed to measure responses that are random or careless or deliberate attempts to sabotage the test by providing bizarre responses. A high score on this

scale might be associated with attempting to ‘fake bad’. The PPI-R manual (Lilienfeld & Widows, 2005) states that a high score on this scale should not be used to identify an invalid profile.

4.2.14 Inconsistent Responding

This scale measures random or inconsistent responses or reading difficulty. The PPI-R manual (Lilienfeld & Widows, 2005) recommends that a score of 45 or over indicates that the profile is invalid.

4.3 Instructions for completing the PPI-R

The following instructions for the completion of the PPI-R are from the professional manual (Lilienfeld & Widows, 2005);

The items that you will be reading and answering describe many different ways that people can think and feel. There are no right or wrong answers, and by answering each item as honestly as you can, you will help us have a better understanding of your feelings and beliefs. These items have been answered by thousands of individuals and will help us get a better understanding of how you are the same as or different from other people. As you will see, the instructions ask you to read a list of items (hold up the booklet) and rate how true or false the description is for you. If you aren't sure whether an item is true or false for you, choose the answer that is closest to how you would describe yourself. Please answer all the items as best you can, even if some are difficult or don't seem to apply to you. If you have any questions or concerns please don't hesitate to ask.

5. PROCEDURE

See chapter 4 for details about how the measures were administered.

6. DATA ANALYSIS

The aim was to examine the relationship between the total and factor scores of each of the psychopathy measures. As in previous chapters, there are many possible correlations hence I used the same strategy to guard against Type I errors whilst trying to avoid Type II errors. The PCL-R and PPI-R data were checked for indications that they were normally distributed using the techniques outlined in chapter 4. PCL-R and PPI-R total scores and underlying factors were found to be normally distributed and hence parametric statistics were used for all analyses (See Figure 5.1 for distribution of PCL-R total scores and 5.2 for distribution of PPI-R scores).

As stated in the introduction, there is a relationship between Factors 1 and 2 of the PCL-R (Patrick & Bernat, 2009). Given the overlap between these Factors 1 and 2, I intend to carry out a second analysis using the partial correlation technique to control for the effects of the overlap between Factors 1 and 2 of the PCL-R.

Figure 5.1 highlights that there is an over prevalence of participants with a PCL-R score of around 30. It was my aim to ensure that this sample included a number of high PCL-R scores and this was the reason why I approached participants who were located at the Westgate Unit which is part of the Dangerous and Severe Personality Disorder (DSPD) service.

Figure 5.1 Distribution of PCL-R scores

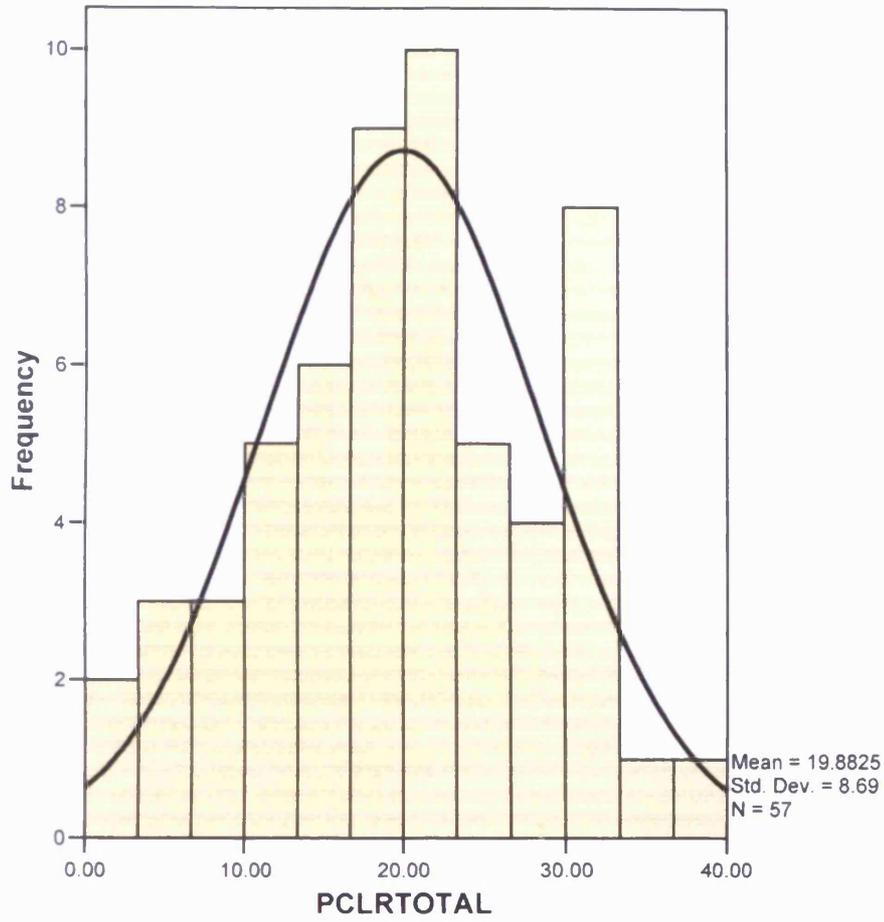
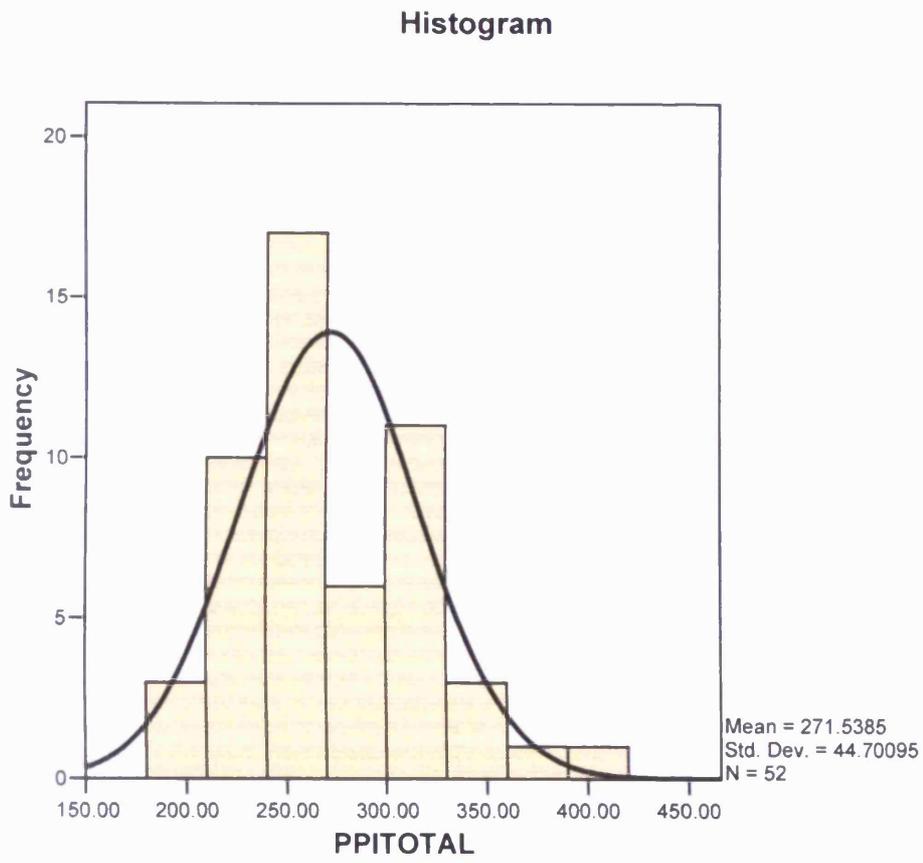


Figure 5.2 Distribution of PPI-R scores



7. RESULTS

7.1 The PCL-R and PPI-R

Table 5.1 Descriptive statistics for the PCL-R

| | Range | Mean | Standard deviation | Mean (PCL-R manual)* | Standard Deviation (PCL-R manual) |
|------------------------------|--------------|-------------|---------------------------|-------------------------------|---|
| PCL-R total | 0-37 | 19.88 | 8.69 | 16.80 | 7.50 |
| Factor 1 | 0-16 | 7.45 | 4.31 | 5.40 | 3.50 |
| Factor 2 | 0-18 | 10.18 | 4.92 | 9.70 | 4.80 |
| Facet 1 Interpersonal | 0-8 | 2.98 | 2.44 | 2.10 | 1.90 |
| Facet 2 Affective | 0-8 | 4.12 | 2.14 | 3.30 | 2.20 |
| Facet 3 Lifestyle | 0-9 | 4.70 | 2.61 | 5.20 | 2.40 |
| Facet 4 Antisocial | 0-10 | 6.20 | 2.93 | 4.40 | 3.00 |

*Sample from HM Prison Service, 669 male offenders

Table 5.1 summarises descriptive statistics for PCL-R scores. The mean PCL-R total score was 19.88, with a standard deviation of 8.69, which is slightly higher than the mean score of 16.80 from a sample of 669 male offenders from the UK (Hare, 2003). The mean PCL-R score from 15 samples of North American male offenders is 22.1. The mean score for this sample is therefore slightly lower than the North American mean. Eight participants in this study were located at the Westgate Dangerous and Severe Personality Disorder Unit (DSPD) as a result of being assessed as having high levels of psychopathic traits. This is likely to have inflated the overall mean PCL-R total score in this sample, relative to the UK mean. The mean Factor 1 score for this sample was 7.45 which is slightly higher than the UK mean of 5.40. The mean Factor 2 score in this sample was 10.18 which is roughly comparable to the UK mean score of 9.70. Both Factor 1 and 2 scores are therefore slightly higher than the UK mean.

The mean Facet scores were also similar to the sample of English offenders described in the PCL-R manual (Hare, 2003). It was my intention to target participants with a high score on the PCL-R in order to be able to explore the relationship between psychopathy and performance on emotional processing tasks.

Table 5.2 Descriptive and inferential statistics for the PPI-R. P-value refers to the results of a one-sample t-test (two-tailed)

| | Range | Mean | Standard deviation (SD) | Mean for offenders (PPI-R manual) | SD for offenders (PPI-R manual) | P Value |
|------------------------|--------------|-------------|--------------------------------|--|--|----------------|
| PPI-R Total | 199-410 | 269.16 | 44.47 | 283.86 | 28.99 | .025* |
| PPI-I | 65-168 | 110.04 | 18.63 | - | - | N/A |
| PPI-II | 78-218 | 127.02 | 33.20 | - | - | N/A |
| Coldheartedness | 9-60 | 32.08 | 9.33 | 33.02 | 8.39 | .48 |

* $p < .05$ ** $p < .01$

The PPI-R manual states that the mean score for PPI-R total score for a sample of North American offenders is 283.86 with a standard deviation of 28.99. Table 5.2 summarises descriptive statistics for PPI-R scores obtained from the present sample of offenders. The mean PPI-R total score for this sample was 269.16, with a standard deviation of 44.47. A one-sample t-test (two-tailed) comparing this sample to a score of 283.86 (the mean score for a sample of North American offenders) was statistically significant. The mean score was less than 283.86 ($t(48) = -2.3, p < .025$) indicating that this offender sample had a lower PPI-R total score than the sample of North American offenders described in the PPI-R manual. There is no normative data for PPI-I (Fearless Dominance) and PPI-II (Self-Centred Impulsivity) in the PPI-R manual.

The mean score for the Coldheartedness scale in this sample was 32.08, with a standard deviation of 9.33. A one-sample t-test (two-tailed) comparing this sample to a score of 33.02 (the mean score for a sample of North American offenders) was not statistically significant. The mean score was less than 33.02 ($t(48) = -.70, p < .48$) indicating that this offender sample did not have a statistically different score on the Coldheartedness scale to the sample of North American offenders described in the PPI-R manual.

I note that the mean PCL-R score (despite including participants from a DSPD unit) of this sample was also lower than the North American mean. The same appears to be true for the mean PPI-R score which is also lower than the North American mean.

7.2 Relationship between the PCL-R and PPI-R factors

Table 5.3 PCL-R and PPI-R total and factor scores

| | PCL-R Total | Factor 1 | Factor 2 |
|--|---------------------------|---------------------------|---------------------------|
| PPI-R Total | .52^{1***} | .49** | .46** |
| PPI-I Fearless Dominance | .25* | .25* | .24 |
| PPI-II Self-Centred Impulsivity | .48** | .46*** | .42^{1***} |
| Coldheartedness | .35** | .42^{1***} | .39*** |

* $p < .05$ ** $p < .01$ ***Bonferonni correction $p < .007$. Correlations of interest are

presented in bold. ¹ One tailed test

Table 5.3 summarises the correlation co-efficients for the PCL-R and PPI-R total and underlying factor scores.

7.2.1 Total PCL-R and PPI-R scores

The PPI-R total score was significantly correlated with PCL-R total score ($r = .52$) and this is regarded as a large effect size which survived Bonferroni correction. This figure appears in good agreement with previous studies (Edens et al., 2008; Malterer et al., 2010) that also show correlations of about the same magnitude as North American forensic populations using the PPI.

7.2.2 PCL-R factors and PPI-R factors

Examination of the relationships between the two factors of the PPI-R and the two factors of the PCL-R showed that there is no simple equivalency between these concepts. PPI-I (Fearless Dominance) showed a significant correlation with Factor 1 ($r = .25$). However, this failed to reach significance after Bonferroni correction. A non-significant correlation was also found with Factor 2 ($r = .24$). Partial correlations were also carried out to control for the overlap between Factors 1 and 2 of the PCL-R. After controlling for the effects of Factor 2, a non-significant relationship was found between Factor 1 and PPI-I ($r = .21$).

PPI-II (Self-Centred Impulsivity) of the PPI-R did produce a significant correlation with Factor 2 of the PCL-R, although the effect size was only moderate ($r = .42$). This relationship was significant after a Bonferroni correction. However, it also produced a significant correlation with Factor 1 of a similar magnitude ($r = .46$) which was also significant after a Bonferroni correction. A partial correlation, controlling for the effects of Factor 1 produced a non-significant relationship between PPI-II and Factor 2 ($r = .19$).

The Coldheartedness scale showed statistically significant correlations of moderate effect size with both Factor 1 ($r = .42$) and Factor 2 ($r = .39$) of the PCL-R. Both of these results were significant after a Bonferroni correction.

Table 5.4 PCL-R facet scores and PPI-R factors

| | Facet 1 Interpers'l | Facet 2 Affective | Facet 3 Lifestyle | Facet 4 Antisocial |
|--|---------------------------|---------------------------|--------------------------|-------------------------|
| PPI-R Total | .41** | .38* | .48** | .49** |
| PPI-I Fearless Dominance | .12¹ | -.04¹ | .29 | .39* |
| PPI-II Self Centred Impulsivity | .38* | .44** | .41^{1**} | .37^{1*} |
| Coldhear'd | .43^{1***} | .41^{1***} | .32* | .27 |

* $p < .05$ ** $p < .01$ *** Bonferonni correction $p < .008$. Correlations of interest are presented in bold. ¹ One tailed test

As there were significant correlations for both PPI-II and the Coldheartedness scale of the PPI-R, their relationship to the four Facets of the PCL-R was explored (see Table 5.4).

The PPI-II had significant relationships with all of the Facets of the PCL-R (moderate effect sizes) but the relationship with Facets 3 and 4 did not survive Bonferroni correction. The Coldheartedness scale showed moderate effect size correlations with Facets 1, 2 and 3 although a weaker non-significant relationship was found for Facet 4. The relationship between Facets 1 and 2 remained significant after a Bonferroni correction.

7.2.3 Relationship between PCL-R and PPI-R underlying factors

A significant positive correlation was found between Factor 1 and 2 of the PCL-R ($r = .48$) which is consistent with other studies (Hare, 2003). In contrast, a non-significant correlation was found between PPI-I and PPI-II of the PPI-R ($r = .17$) which is also consistent in magnitude with a previous study (Benning, Patrick, Blonigen, Hicks & Iacono, 2005).

8. DISCUSSION AND CONCLUSION

At the level of total score there appears to be a strong relationship between the PPI-R and the PCL-R ($r = .52$). This result of the relationship between the two measures appears consistent in magnitude with previous studies of the PPI and PCL-R in forensic samples (Edens et al., 2008; Malterer et al., 2010). I am only aware of one published study that has compared the relationship between PPI-R and PCL-R in a forensic sample and they found a significant, but surprisingly weak, relationship between the measures at the level of total score ($r = .17$) (Edens & McDermott, 2010). I note however, that their sample consisted of forensic psychiatric patients rather than offenders in prison.

Turning to the factors underpinning the PPI-R and the PCL-R, the results are clear that these are not equivalent concepts. These results are consistent with the findings of Edens et al. (2008) and Edens & McDermott (2010) who also failed to find a relationship between PPI-I and Facets 1 and 2 of the PCL-R. All recent studies that have explored the relationship between both the PPI and PPI-R have consistently found a relationship between PPI-II and Factor 2 and Facets 3 and 4 of the PCL-R. I

also found a significant relationship between PPI-II and Factor 2 of the PCL-R but the relationships with Facets 3 and 4 did not survive Bonferroni correction.

Consistent with earlier my predictions, I failed to find a significant relationship between Factor 1 of the PCL-R and PPI-I of the PPI-R which is consistent with a number of studies (Edens et al., 2008; Edens & McDermott, 2010). Patrick (2010) has used his triarchic conceptualisation of psychopathy to account for the difference between Factor 1 of the PCL-R and PPI-I of the PPI. He believes that PPI-I of the PPI taps boldness and is important for conceptualising psychopathy in non-violent and non-criminal samples. He believes that boldness is only partially tapped by Factor 1 of the PCL-R, including item one glib superficial charm and item two grandiose sense of self-worth. Patrick (2010) believes that Factor 1 of the PCL-R taps meanness rather than boldness. A number of items of the PCL-R tap meanness, including item eight, callous lack of empathy and item six, lack of remorse or guilt. Patrick (2010) states that one crucial difference between boldness and meanness is that the latter reflects a lack of social connectedness. Patrick's (2010) triarchic conceptualisation of psychopathy therefore appears to provide an explanation of how Factor 1 of the PCL-R and PPI-I of the PPI may be tapping different underlying traits.

I also found significant relationships (that survived Bonferroni correction) between Factor 1 and Facets 1 and 2 of the PCL-R and the Coldheartedness scale of the PPI-R. These results may suggest that the Coldheartedness scale, which was found to be distinct from PPI-I and PPI-II (Benning et al., 2003), may also be tapping meanness rather than boldness.

Copestake, Gray & Snowden (2011) have provided another explanation for why differences have been found between when PPI scores for offenders and community based samples. They point out that the PCL-R was developed from work with offenders, whilst the PPI and PPI-R were developed in community samples.

Copestake et al. (2011) refer to the findings of Malterer et al. (2010) who found a large difference in scores on the PCL:SV between a community sample of undergraduate students and offenders. The community based sample had an average PCL:SV score of 6.9 compared to the offenders whose average score was 13.9 (standard deviation for the PCL:SV is 5.0). However, a smaller difference was found between these two samples on the PPI. The community based sample had an average score of 380 compared with the sample of offenders whose average score was 387 (standard deviation of the PPI is 40).

Copestake et al. (2011) suggest that different populations may interpret the same question in a different manner depending on their point of reference. For example, when answering a question on the PPI-R such as “*A lot of times, I repeat the same bad decisions.*” Copestake et al. (2011) state that offenders tend to judge themselves against other offenders, whilst students might judge themselves against other students. When answering the previous question, an offender might compare himself to other offenders and conclude that his decision making is better than another offender and therefore rate this item as only being partially present.

Patrick (2010) has therefore attempted to account for why PPI-I has not been found to be related to PCL-R Factor 1 and Copestake et al. (2011) have provided an explanation for why differences might be found between PPI scores in community

based samples compared with offenders. It appears possible that the PPI-R and PCL-R are tapping different underlying constructs of psychopathy. Therefore, in this thesis I will look separately at how these two measures (the PCL-R and PPI-R) are related to emotional processing.

CHAPTER 6 PSYCHOPATHY AND INTELLIGENCE

1. INTRODUCTION

The origins of psychopathy can be traced back to the work of Cleckley (1941) who in his book *The Mask of Sanity* identified 16 traits which he believed characterised a syndrome known as psychopathy. Cleckley (1941) was the first to describe a possible link between psychopathic characteristics and intellectual ability. He identified superficial charm and good intelligence as one of the 16 characteristics of psychopathy. In the *Mask of Sanity*, Cleckley (1941) stated that psychopathic individuals are likely to be of high ability as measured by psychometric tests. Cleckley (1941) concluded that individuals with psychopathic characteristics may have “superior human qualities” and robust mental health.

Hare (1991) also identified glib, superficial charm as a characteristic of psychopathy. Unlike Cleckley (1941), Hare (1991) did not suggest that intelligence was linked to glib superficial charm.

1.1 PCL-R and intelligence

There are a number of published studies that have explored the relationship between psychopathy and a range of different psychometric tools that measure intellectual functioning (IQ). None of these early studies found a relationship between psychopathy and IQ (Brandt, Kennedy, Patrick & Curtin, 1997; Hart, Forth & Hare, 1990; Hart & Hare, 1989; Morrissey, 2003; Murphy, 2007; Pham, Vanderstukken, Philippot & Vanderlinden, 2003; Shine & Hobson, 1997; Walsh, Swogger & Kosson, 2004).

In a sample of 3,191 male and female offenders, Hare (2003) found no relationship between psychopathy and IQ and concluded that, "*There is thus good reason to believe that PCL scales are not associated with standard measures of intelligence*" (p.108). However, Hare (2003) unexpectedly found weak, negative correlations between Factor 2 and IQ in two different samples of female offenders ($r = -.19$ and $r = -.14$). He concluded that these results had not been replicated and further research was necessary.

There are now a number of more recent studies that have explored the relationship between the four Facets of the PCL-R and IQ. In a sample of 840 civil psychiatric patients (data from the MacArthur Risk Assessment study), Vitacco, Neumann & Jackson (2005) calculated IQ from a number of WAIS-R variables and measured psychopathy using the PCL:SV, which is a 12 item screening version of the PCL-R. Vitacco et al. (2005) report significant negative correlations between the estimated IQ and Facet 2 affective, ($r = -.24$), Facet 3 lifestyle, ($r = -.34$) and Facet 4 antisocial ($r = -.21$).

In a different sample of 100 male offenders, Vitacco, Neumann & Wodushek (2008) found a similar pattern of results to Vitacco et al. (2005). Vitacco et al. (2008) measured IQ with the Wechsler Abbreviated Intelligence Scale (WASI, Wechsler, 1999) and the PCL:SV to measure psychopathy. Using a structured equation model, Vitacco et al. (2008) found a strong, positive relationship between IQ and Facet 1 interpersonal ($r = .70$) and significant negative correlations between IQ and Facet 2 affective, ($r = -.72$), Facet 3 lifestyle, ($r = -.10$) and Facet 4 antisocial ($r = -.29$).

Weizmann-Henelius, Viemero & Eronen (2004) explored the relationship between psychopathy and IQ in a sample of female offenders from Norway. They used the Wechsler Adult Intelligence Scale Revised (WAIS-R, Wechsler, 1981) to measure IQ and the PCL-R to measure psychopathy. Weizmann-Henelius et al. (2004) found no significant relationship between PCL-R total score, Factors 1 and 2 and total and Performance IQ. However, they found significant negative relationships between Verbal IQ and PCL-R total score ($r = -.31$) and Facet 3 ($r = -.33$).

Salekin, Neumann, Leistico & Zalot (2004) explored the relationship two measures of intellectual functioning; Kaufman's Brief Intelligence Test (K-BIT, Kaufman & Kaufman, 1990) which is designed to estimate verbal and non-verbal intelligence and Sternberg's Triarchic Abilities test (STAT, Sternberg, 1993) and the Psychopathy Checklist – Youth Version (PCL:YV) in a sample of adolescents. Salekin et al. (2004) found that the arrogant and deceitful interpersonal style scale of the PCL:YV, (which is similar to Facet 1 of the PCL-R) correlated significantly with STAT total score ($r = .22$) and the K-BIT verbal subscales ($r = .22$ to $.25$). So, in a sample of adolescents, a positive relationship was found between the arrogant, interpersonal style components of the PCL:YV and IQ. This is consistent with the relationship between Facet 1 and IQ found in samples of adults. Both the earlier findings of Salekin et al. (2004) and Weizmann-Henelius et al. (2004) are also consistent with Vitacco et al.'s (2008) results.

Vitacco et al. (2008) concluded that exploring the relationship between a global measurement of psychopathy, PCL-R total score and IQ creates non-significant results because the underlying Facets of psychopathy cancel each other out.

Vitacco et al. (2008) believe that it is advantageous to explore the relationship between the four Facets of psychopathy and IQ. They believe that Facet 1 or the interpersonal component of psychopathy is positively related to IQ. Facet 1 captures the ability to exploit, manipulate and deceive others. In contrast, Vitacco et al. (2008) believe that Facet 2, or the affective component of psychopathy, is negatively related to intelligence.

There are a number of studies that have previously found that low IQ is related to impulsive behaviour (Harris, Rice & Lalumiere, 2001). Vitacco et al. (2008), therefore, believe that Facet 3 of the PCL-R is negatively related to intelligence. They go on to state that it is impulsive behaviour that is related to IQ and that antisocial behaviour is a consequence of poor impulse control. Facet 4 is therefore also believed to be negatively related to IQ but viewed as a consequence of impulsive behaviour by Vitacco et al. (2008).

However, despite Vitacco et al.'s (2008) claims that no relationship should be found between IQ and total PCL-R scores, Beggs & Grace (2008) found a significant negative relationship between PCL-R total score and IQ measured by the WASI (Wechsler, 1999) in a sample of 216 male offenders in a prison in New Zealand ($r = -.20$). However, I note that all offenders in this sample were convicted of sexual offences and that the average PCL-R score for this sample was 8.2, which is significantly lower than the mean score from 15 samples of North American male offenders which is 22.1 (Hare, 2003). I am not aware if published norms exist for

offenders from New Zealand. However, they did find a negative relationship between psychopathy and IQ.

1.2 PPI and intelligence

There only appears to be one published study that has explored the relationship between the PPI and intelligence. Benning, Patrick, Hicks, Blonigen & Krueger (2003) correlated PPI-I (Fearless Dominance) and PPI-II (Self-Centred Impulsivity) with the WAIS-R (Wechsler, 1981) vocabulary scale. Benning et al. (2003) found a weak, non-significant positive relationship between PPI-I and WAIS-R vocabulary scale ($r = .10$). However, they found a significant negative, albeit weak, relationship between PPI-II and the WAIS-R vocabulary scale ($r = -.15$). They found no relationship between the Coldheartedness scale and the WAIS-R vocabulary scale. Benning et al. (2003) believe that the fact that PPI-I had a positive relationship with intelligence and PPI-II had a negative relationship suggests that the two PPI factors have a different relationship with intelligence. Benning et al. (2003) do not report the results of PPI-R total score and IQ.

1.3 Conclusion

The issue of cognitive intelligence is of interest in this thesis due to its possible role in determining performance on tasks that purport to measure an individual's ability to use information relating to emotions. As discussed in chapter 3, the concept of emotional intelligence (EI) refers to a constellation of skills that hope to be unrelated to cognitive intelligence. However, for ability-based measures of EI this does not appear to be the case and studies have shown a strong relationship between EI and IQ (Burns, Bastian & Nettlebeck, 2007; Lopes, Salovey & Straus, 2003). It also seems

possible that IQ might have a strong influence on other emotional processing tasks, such as detecting the expression on a person's face. Unfortunately, there does not appear to be a literature on this matter and the studies that have looked at psychopathy in relation to such skills have not examined this possible confound. Therefore, I sought to examine the relationship between psychopathy and IQ in my sample so that any possible effects of IQ (if they exist) can be considered when examining the results of performance on emotional processing tasks.

My strategy throughout this thesis will be to explore the relationship between PCL-R total score and the underlying factors and IQ. As stated previously, my reason for exploring the relationship between psychopathy and IQ is to establish whether IQ might be a factor that I need to consider in later chapters. However, where significant relationships are found between PCL-R total and Factor scores, for the purpose of completeness and interest and to add to the literature in this area, I will conduct further analysis to examine which of the underlying Facets of psychopathy might be contributing to these results. Therefore, in this analysis of the relationship between psychopathy and IQ, I will examine all aspects of psychopathy (including the Facets) so that I have an understanding of what the role of IQ might be for each aspect of psychopathy.

2. PARTICIPANTS

See chapter 4 for details about participants.

3. MEASURES

See chapter 5 for details about the PCL-R and PPI-R. The Wechsler Abbreviated Scale of Intelligence (WASI) was used as a measurement of intelligence.

3.1 The Wechsler Abbreviated Scale of Intelligence (WASI, Wechsler, 1999)

The Wechsler Abbreviated Scale of Intelligence (WASI) was designed in response to the need for an easily administered measure of intelligence in educational, research and clinical settings. It yields a verbal, performance and full scale IQ and consists of four subtests; Similarities, Vocabulary, Matrix Reasoning and Block Design.

3.1.1 Similarities

This is a 26 item subtest that is part of the verbal scale. The participant is presented with two words, for example, *In what way are rough and smooth alike?* This subtest measures concept formation, abstract verbal reasoning and general intellectual ability.

3.1.2 Vocabulary

This is a 42 item subtest that is part of the verbal scale. Participants are asked to explain the meaning of words, for example, *Tell me what ruminant means?* This subtest measures expressive vocabulary and verbal knowledge.

3.1.3 Matrix Reasoning

This is a 35 item test that is part of the performance scale. Participants are presented with an incomplete picture and asked to identify one of five possible choices that would complete the picture. This subtest is a measure of non-verbal fluid reasoning and general intellectual ability.

3.1.4 Block Design

This test is also part of the performance scale. Participants are initially presented with 4 identical cubes which are red on 2 sides and white on 2 sides. The other 2 sides are half red and half white. Participants are required to make designs using the blocks.

There are 13 trials in total. During the first 6 trials the participants are required to use 4 blocks and in the final 4 trials they are required to use 9 blocks. This subtest measures spatial visualization, visual-motor co-ordination and abstract conceptualisation. It is a measure general intelligence and perceptual organisation.

The WASI manual (Wechsler, 1999) has instructions for each subtest that are read to participants. The subtests are administered in the following order, Vocabulary, Block Design, Similarities and Matrix Reasoning. The WASI manual also provides instructions for scoring responses and obtaining an overall IQ score (termed Full Scale IQ), as well as separate Verbal and Performance IQ scores.

All participants' WASI assessments were completed by Psychological Assistants, Trainee Forensic Psychologists or Registered Forensic Psychologists. I did not double score any of the WASI assessments. WASI assessments are routinely completed in HM Prison Service as an estimate of intellectual functioning prior to an offender being offered a place on an accredited offending behaviour programme.

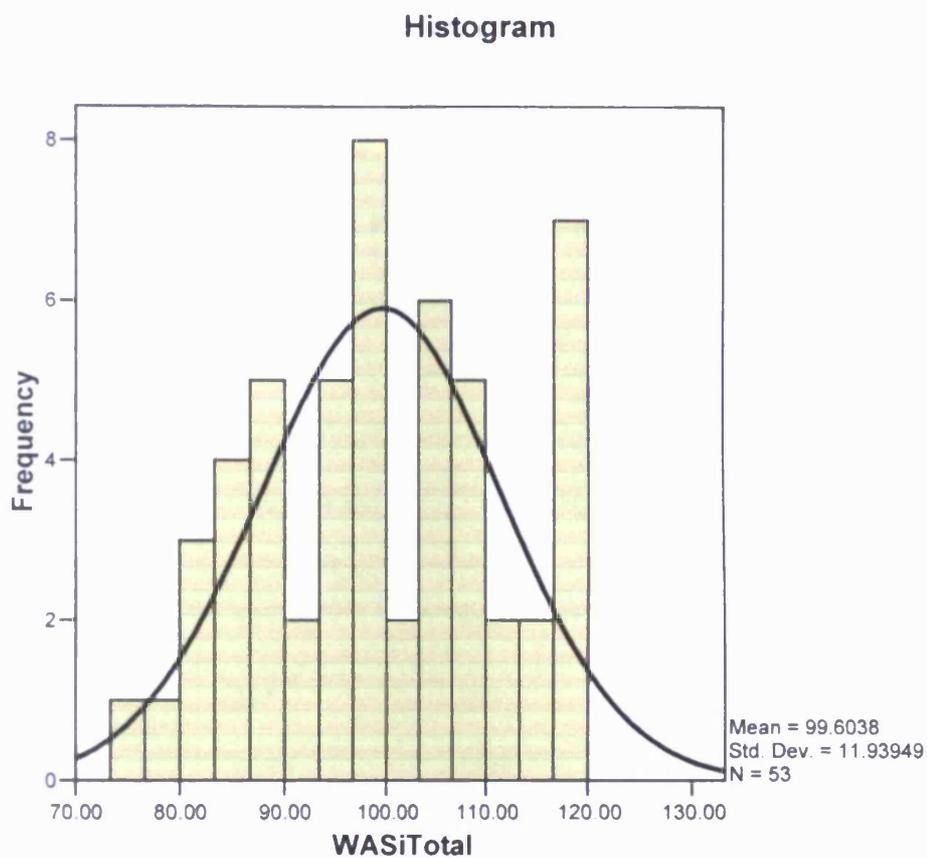
4. PROCEDURE

See chapter 4 for details about how the measures were administered.

5. DATA ANALYSIS

As in previous chapters, there are many possible correlations between the measures of psychopathy and intelligence hence I used the same strategy to guard against Type I errors whilst trying to avoid Type II errors. The WASI data were checked for indications that they were normally distributed using the techniques outlined in chapter 4. WASI total score was found to be normally distributed and hence parametric statistics were used for all analyses (See Figure 6.1 for distribution of WASI total scores).

Figure 6.1 Distribution of WASI scores



In other chapters, I used/will use Bonferroni correction to reduce type I errors due to the large number of correlations. However, on this occasion, I am only interested in the relationship between psychopathy and IQ total scores and will therefore not use a Bonferroni correction.

6. RESULTS

6.1 PCL-R and IQ

6.1.1 PCL-R and IQ results

The range of WASI scores was (74-118), with a mean score of 99.60 with a standard deviation of 11.93. This is consistent with the average IQ score in the normal population (Wechsler, 1999). PCL-R and PPI-R normative data is summarised in chapter 5.

Table 6.1 PCL-R total and factor scores and total, verbal and performance IQ

| | Total WASI score | Verbal IQ | Performance IQ |
|--------------------|-------------------------|------------------|-----------------------|
| PCL-R Total | -.33* | -.37* | -.21 |
| Factor 1 | -.28* | -.30 | -.19 |
| Factor 2 | -.45** | -.42** | -.30 |

* $p < .05$ ** $p < .01$

Table 6.1 summarises the correlation co-efficients between the PCL-R total score, Factor 1, Factor 2 and total, Verbal and Performance IQ. Significant negative correlations of moderate effect size were found between WASI total score and PCL-R total score ($r = -.33$), Factor 1 ($r = -.28$) and Factor 2 ($r = -.45$). Further analysis revealed that significant negative relationships were also found for WASI total score and Facet 2 ($r = -.33$), Facet 3 ($r = -.56$) and Facet 4 ($r = -.48$) (see Appendix 2 Table 6.4).

Significant negative correlations were also found for Verbal IQ and PCL-R total score ($r = -.37$) and Factor 2 ($r = .42$). The relationship with Factor 1 failed to reach

statistical significance. Further analysis revealed that significant negative relationships were also found for Verbal IQ and Facet 3 ($r = -.55$) and Facet 4 ($r = -.52$). No statistically significant relationships were found for Performance IQ and the PCL-R (See Appendix 2, Table 6.4 for all scores related to the Facets of the PCL-R and IQ).

6.1.2 Interim discussion

The relationship between PCL-R and IQ total scores was statistically significant ($r = -.33$), which is not in line with other studies. Only Beggs & Grace (2008) appear to have found a significant negative relationship between PCL-R total score and IQ measured by the WASI (Wechsler, 1999) ($r = -.20$). The possibility that these results might suggest that more intelligent offenders, particularly with high verbal ability, are able to 'fake good' and reduce their PCL-R scores cannot be ignored.

In order to explore whether more intelligent offenders were 'faking good' and reducing their PCL-R scores, further analysis was carried out. Out of the 20 PCL-R items, the following items were identified on the basis that they are scored from file information; item 12 early behavioural problems, item 18 juvenile delinquency, item 19 revocation of conditional discharge and item 20 criminal versatility.

Table 6.2 Statistically significant correlations between PCL-R items and total IQ

| PCL-R items | Item 12 Early Behavioural Problems | Item 18 Juvenile Delinquency | Item 19 Revocation of Conditional Discharge | Item 20 Criminal Versatility |
|---------------------|---|------------------------------------|---|------------------------------------|
| WASI total score | -.41* | -.25 | -.36* | -.38* |

* $p < .05$ ** $p < .01$

Table 6.2 summarises the correlations between these PCL-R items and WASI total score. Significant negative correlations were found for items 12, 19 and item 20. The items that showed significant negative relationships with WASI total score are all Factor 2 items of the PCL-R, which captures the criminal and antisocial lifestyle components of psychopathy.

Items 19 and 20 are scored only from file information (a list of previous convictions supplied by the police). Item 12, early behavioural problems should also be scored from school or social services reports and not on the basis of information provided by the offender. These items are therefore not susceptible to ‘faking good’.

After closer examination, it appears that the significant relationship between PCL-R and IQ may not be caused by intelligent offenders attempting to ‘fake good’.

However, before reaching any conclusions it is important to examine the relationship between the other measure of psychopathy, the PPI-R and IQ.

6.2 PPI-R and IQ

6.2.1 PPI-R and IQ results

Table 6.3 PPI-R total and factor scores and total, verbal and performance IQ scores

| | Total WASI Score | Verbal IQ | Performance IQ |
|---------------------------------------|---------------------|-----------|----------------|
| PPI-R Total | -.29* | -.32 | -.15 |
| PPI-I Fearless Dominance | -.02 | -.00 | .07 |
| PPI-II Self Centred Impulsivity | -.35** | -.40* | -.23 |
| Coldheartedness | -.22 | -.22 | -.20 |

* $p < .05$ ** $p < .01$ **

Table 6.3 summarises the correlation co-efficients between the PPI-R total and subscales and total, Verbal and Performance IQ score. Significant negative correlations of moderate effect size were found between WASI and PPI-R total scores ($r = -.29$) and PPI-II of the PPI-R ($r = -.35$). A significant negative correlation was also found between PPI-II of the PPI-R and Verbal IQ ($r = -.40$).

6.2.2 Interim discussion

There only appears to be one published study that has explored the relationship between the PPI and intelligence. Benning et al. (2003) correlated PPI-I and PPI-II with the WAIS-R (Wechsler, 1981) vocabulary scale. Benning et al. (2003) found a weak, non-significant positive relationship between PPI-I (Fearless Dominance) and WAIS-R vocabulary scale ($r = .10$). However, they found a significant negative, albeit weak, relationship between PPI-II (Self-Centred Impulsivity) and the WAIS-R

vocabulary scale ($r = -.15$). Benning et al. (2003) believe that the fact that PPI-I had a positive relationship with intelligence and PPI-II had a negative relationship suggests that the two PPI factors each have a different relationship with intelligence. The present results are in broad agreement showing that IQ has no relationship to PPI-I and a negative relationship to PPI-II though the magnitude of the correlation appears greater in the present study.

7. DISCUSSION

7.1 PCL-R and IQ

Although early studies failed to find a significant relationship between psychopathy and IQ, the results of more recent studies indicate that the four Facets of the PCL-R may have different relationships with IQ. A significant negative relationship of moderate effect size was found between PCL-R total score and IQ. However, I note that another study has also found a relationship between psychopathy and IQ. Beggs & Grace (2008) found a significant negative relationship between PCL-R total score and IQ measured by the WASI (Wechsler, 1999) ($r = -.20$).

The fact that I found a significant negative relationship between psychopathy and IQ is at odds with claims made by Vitacco et al. (2008). They concluded that exploring the relationship between a global measurement of psychopathy, PCL-R total score, and IQ creates a non-significant result because the underlying Facets of psychopathy cancel each other out. This clearly was not the case for these results. Consistent with earlier predictions, significant negative correlations were, however, found between Facets 2, 3 and 4 and IQ which is consistent with the findings of Vitacco et al. (2005).

I also tested whether the relationship between PCL-R total score might have been the results of more intelligent offenders 'faking good' and providing information during the PCL-R assessment to deliberately lower their PCL-R score. However, I established that this was not the case by exploring the relationship between IQ and four items of the PCL-R (12, 18, 19 and 20) that are scored only on the basis of file information and not information provided by the offender. These results therefore suggest that there is a relationship between psychopathy and intelligence measured by the PCL-R.

There is another point worthy of consideration. The PCL-R had already been completed prior to participants taking part in this study. For most participants the PCL-R assessment had been completed as part of battery of psychometric tests administered prior to an offender being offered a place on an accredited offending behaviour programme. Offenders, particularly those serving life sentences, have become increasingly fearful about the possible consequences of being assessed as having a high score on the PCL-R and not being offered a place on an offending behaviour programme. Offenders are aware that PCL-R results have potential implications for their progress and management in prison. Offenders might therefore be motivated to present themselves favourably in an attempt to be assessed as having a lower PCL-R score.

However, the PPI-R was completed only for this research. Participants were aware that their PPI-R results would only be used for research purposes and not used to make any decisions about their future management or progression through the Prison Service. There would therefore appear to be no reason for participants to attempt to

'fake good'. The fact that both PCL-R and PPI-R total scores had a similar relationship with total IQ score is evidence against the 'faking good' possibility.

Previous studies have not found a relationship between Factor 1 of the PCL-R and WASI total score. However, the fact that I found a significant negative relationship between Factor 1 and WASI total score was unexpected. Vitacco et al. (2008) found that Facet 1 has a positive relationship with IQ and Facet 2 has a negative relationship. These two Facets would therefore cancel each other out so that no relationship would be found between Factor 1 and IQ. My results are however, consistent with the findings of Vitacco et al.'s earlier study (2005) as they also failed to find a relationship between Facet 1 and IQ.

My results are also consistent with Weizmann-Henelius et al. (2004) who found significant negative relationships between Verbal IQ and PCL-R total score ($r = -.31$) and Facet 3 ($r = -.33$). I also found a similar pattern of results, but in addition found that Facet 4 also demonstrated a strong relationship with Verbal IQ ($r = -.52$). These results therefore suggest that there is a negative relationship between some aspects of psychopathy and Verbal IQ.

7.2 PPI-R and IQ

Turning to the PPI-R, a significant negative correlation was found between PPI-R total score and IQ and the strength and direction of this correlation was similar to the relationship between PCL-R total score and IQ. In line with previous work (Benning et al., 2003), who tested only the WAIS-R vocabulary scale, I found no significant relationship between PPI-I (Fearless Dominance) and IQ score but a significant

negative relationship between IQ and PPI-II (Self-Centred Impulsivity) score. I also replicated the lack of any significant findings related to the Coldheartedness scale. The findings of differential correlations with respect to PPI-R factor scores would seem to support the notion that these factors do indeed measure some different aspects of psychopathy and that merely looking at global psychopathy (total score) may miss important features as the correlations for the subfactors might obscure or even cancel each other out.

7.3 Further work

Hall & Benning (2006) describe the idea of the 'successful psychopath', who they believe has core psychopathic traits but may refrain from serious antisocial behaviour. They believe that intelligence may be a significant factor in determining how psychopathic traits are expressed. For example, an individual may have psychopathic traits but high intelligence which may increase awareness about the consequences of antisocial behaviour. As a result, the individual may pursue a profession such as business or politics where such characteristics may be viewed as valuable. Clearly further research to explore the relationship between psychopathy and intelligence is important to establish whether intelligence may be a factor that is important in terms of the expression of psychopathic traits. It would be interesting to explore whether high intelligence is a factor that sets a 'successful psychopath' who might pursue a career in politics, from an 'unsuccessful psychopath' who commits crime and ends up in prison.

8. CONCLUSION

The present results have demonstrated a negative relationship between psychopathy and intelligence. On the whole these results were such that the antisocial and impulsive characteristics of psychopathy appear linked to poorer intelligence and in particular verbal skills. It will therefore be necessary to consider the link between intelligence and emotional processing in the remaining chapters of this thesis.

CHAPTER 7 PSYCHOPATHY AND AN ABILITY EI MEASURE (MSCEIT)

1. INTRODUCTION

The concept of emotional intelligence involves the capacity to perceive emotions, understand those emotions and manage them. Therefore it would seem that the tools developed to measure emotional intelligence would be ideal to examine the emotional deficit hypothesised to underpin psychopathy and that deficits in emotional intelligence would be manifest in those with high scores on measures of psychopathy (Ortony, Revelle & Zinbarg, 2007).

When I started this research there were few studies that had explored EI in forensic populations. One of the first studies (Puglia, Stough, Carter & Joseph, 2005) explored whether there were any differences in EI between sex offenders, non-sexual offenders and controls. EI was measured using the three branch version of the MSCEIT. They found no differences between the three groups on two of the three branches of the MSCEIT, Assimilation and Management. They found that sex offenders had a significantly higher score on the Perception scale compared to non-sexual offenders. No differences were found between the sex offenders and controls on the Perception scale. Puglia et al. (2005) state that sex offenders have previously been found to have deficits in empathy, emotional perception, emotional management and interpersonal functioning. It might therefore be expected that they would have low levels of EI. However, Puglia et al. (2005) state that high levels of EI may not be used for altruistic purposes and may actually be used for malevolent purposes as part of offending.

Hemmati, Mills & Croner (2004) administered the EQ-i to a sample of offenders.

They found that this sample had higher scores than the norms quoted in the Technical Manual (BarOn, 1997).

Malterer, Glass & Newman (2008) published one of the first studies that explored the relationship between psychopathy assessed using the PCL-R and EI using the TMMS. A significant but weak negative relationship was found between Factor 1 of the PCL-R and the Attention scale of the TMMS ($r = -.10$). A significant but weak negative relationship was also found between Factor 2 of the PCL-R and the Repair scale of the TMMS ($r = -.15$). These results suggest that individuals high on Factor 1 of the PCL-R, which captures the emotional component of psychopathy, may not be responsive to their own emotional state. Individuals with a high score on Factor 2, which is associated with antisocial behaviour, may be less able to regulate or manage their emotional state.

Pham, Ducro & Luminet (2010) investigated the relationship between the PCL-R and the long version (153 items) of the Trait Emotional Intelligence Questionnaire (TEIQue; Petrides & Furnham, 2003) in a small sample of 30 patients from a secure psychiatric hospital. The TEIQue yields a total EI score and contains four subscales; Emotional Perception, Emotional Expression, Emotional Regulation and Emotional Management. Pham et al. (2010) found that only Facet 2 of the PCL-R (Affective) was significantly correlated with EI total score ($r = .36$). A number of significant correlations of small to moderate effect size were found between the Emotional Perception Scale and PCL-R total score, Factor 1, Factor 2 and Facets 2 and 3. These results mean that a high level of psychopathic traits is associated with participants

rating themselves as being more emotionally perceptive. Significant positive correlations were also found between PCL-R total score, Factor 1 and Facets 1 and 2 and Emotional Regulation. Again these results suggest that a high level of psychopathic traits is associated with participants rating themselves as being more able to regulate their emotions.

There are also a number of studies that have explored the relationship between a different self-report psychopathy measure and EI in a sample of 84 undergraduate students. Ali, Amorim & Chamorro-Premuzic (2009) explored the relationship between self-reported psychopathy using Levenson's Self-Report Psychopathy Scale (LSRP; Levenson, Kiehl & Fitzpatrick, 1995) and the short version (30 items) of the Trait Emotional Intelligence Questionnaire (TEIQue; Petrides & Furnham, 2006). Ali et al. (2009) found a non significant negative correlation between scale 1 of the LSRP and total EI score ($r = -.17$) and a significant negative correlation with scale 2 ($r = -.48$). This means that participants with a high score on scale 2 had lower total EI scores.

In a sample of 73 Australian undergraduate students, Grieve & Mahar (2010) explored the relationship between EI measured using the 33 item version of the Schutte Self-Report Emotional Intelligence Scale (SSREI; Schutte, Malouff, Halle, Haggerty, Cooper, Golden et al., 1998) and self-reported psychopathy using Levenson's Self-Report Psychopathy Scale (LSRP; Levenson et al., 1995). Scale 1, or primary psychopathy, is characterised by malevolent, manipulative, callous, deceptive, remorseless treatment of others and lack of anxiety. Scale 2, or secondary psychopathy, is characterised by anxiety, impulsivity and antisocial behaviour. Grieve

& Mahar (2010) found a non-significant negative correlation between scale 1 of the LSRP and total EI score ($r = -.12$) and a significant negative correlation with scale 2 ($r = -.26$). Therefore participants with high EI were more likely to have low levels of anxiety and impulsivity captured by scale 2 of the LSRP. Grieve & Mahar (2010) do not report the relationship between total EI and psychopathy scores.

Grieve & Mahar (2010) found a similar pattern of results to Ali et al. (2009) despite the fact that the two studies used different trait EI measures (SSREI and the TEIQue). Both studies found significant negative relationships between scale 2 of the LSRP and EI. However, crucially all these studies used a self-report measure of EI. As discussed in chapter 3, these measures appear to tap a dimension of personality rather than an ability measure. Hence, in this chapter I aimed to look at an ability measure of EI as a function of psychopathic traits.

In 2007, Ortony, Revelle & Zinbarg stated that psychopathic individuals appear to experience significant difficulty perceiving, understanding and responding to emotional material and that emotional difficulties are believed to be central to the concept of psychopathy. Ortony et al. (2007) believe that there is a clear rationale for administering the MSCEIT to psychopathic individuals. Vidal, Skeem & Camp (2010) investigated the relationship between psychopathy, assessed using the PPI-R, and EI, assessed using the MSCEIT, in a sample of 188 male undergraduates. Vidal et al. (2010) found non-significant negative relationships between PPI-R, PPI-I and the Coldheartedness scale and MSCEIT total scores. Only PPI-II demonstrated a significant negative relationship with MSCEIT total score ($r = -.30$).

In terms of the relationship between the PPI-R and the four Branches of the MSCEIT, only the relationship between PPI-R total score and Branch 4 (Managing Emotions) was significant ($r = -.24$). PPI-I demonstrated a significant positive relationship with Branch 2 (Facilitating Thoughts) ($r = .19$). PPI-II demonstrated significant negative relationships with Branch 2 (Facilitating Thoughts) ($r = -.17$), Branch 3 (Understanding Emotions) ($r = -.23$) and Branch 4 (Managing Emotions) ($r = -.38$). No significant relationships were found between the Coldheartedness scale and any of the four Branches of the MSCEIT.

Vidal et al. (2010) believe that psychopathy is negatively related to emotional intelligence but only when anxiety is controlled for. Vidal et al. (2010) also explored the relationship between primary and secondary psychopathy and EI based on Karpman's (1941) conceptualisation of psychopathy. According to Karpman (1941) primary psychopaths are born with the affective and interpersonal characteristics of psychopathy whereas secondary psychopathy is believed to develop in response to adverse childhood experiences such as abuse or parental neglect. Vidal et al. (2010) state that primary psychopathy should therefore be considered an emotional deficit and secondary psychopathy an emotional disturbance. Using the PPI-R, Vidal et al. (2010) created an emotionally stable primary psychopathy group and an emotionally disturbed secondary psychopathy group. Vidal et al. (2010) subtracted the Stress Immunity (which is one of the subscales of the PPI-R) score from total PPI-R score and created what they referred to as a modified PPI-R score. They found a significant negative relationship between the modified PPI-R total score and MSCEIT total score ($r = -.21$), Branch 3 (Understanding Emotions) ($r = -.19$) and Branch 4 (Managing Emotions) ($r = -.30$). They then created a median split on the Stress Immunity scale to

create low and high anxiety groups. Vidal et al. (2010) found that the high anxiety or secondary psychopathy group had significantly lower MSCEIT total scores than the low anxiety and non-psychopathic control groups.

Vidal et al. (2010) concluded that psychopathy is negatively related to emotional intelligence but only when anxiety (in this case measured by the Stress Immunity scale) is excluded from the PPI-R total score. Vidal et al. (2010) concluded that a high score on PPI-I predicts skill in facilitating thought. They also concluded that PPI-II is related to an impaired ability to recognise emotions and show empathic concern.

It is difficult to reach any conclusions about the relationship between psychopathy and EI because studies have used different measures of EI and psychopathy. There are still few published studies that have explored the relationship between different measures of EI and psychopathy in forensic samples (Hemmati et al., 2004; Malterer et al., 2008; Pham et al., 2010; Puglia et al., 2005) which indicates that further research in this area is necessary. There do not appear to be any published studies that have explored the relationship between the MSCEIT and psychopathy in a forensic sample.

2. HYPOTHESES

2.1 Hypotheses for the PCL-R and MSCEIT

There are a number of previous studies that have found that psychopathic individuals experience difficulty processing emotional material and fail to use the emotional significance of words and phrases (Hare, Williamson & Harpur, 1988) and that Factor 1 of the PCL-R is related to poor performance on emotional tasks (Levenston, Patrick, Bradley & Lang, 2000; Patrick, Bradley & Lang, 1993; Vanman, Mejia, Dawson,

Schell & Raine, 2003). However Blair, Mitchell & Blair (2005) believe that this is a specific difficulty related to recognising sadness and or fear. Kosson, Suchy, Mayer & Libby (2002) have a different view which is that psychopathic individuals do not appear to experience difficulty recognising and labelling fear but they may not experience appropriate physiological responses to fear. In fact, Kosson et al. (2002) suggest that psychopathic individuals may demonstrate a superior ability to 'decode anger'.

I will therefore identify general hypotheses related to the relationship between psychopathy and the MSCEIT and specific hypotheses which will allow further exploration of Blair et al. (2005) and Kosson et al.'s (2002) theories.

Branch 1 of the MSCEIT is Perceiving Emotions and is based on two tasks which measure the ability to firstly identify emotion in facial expressions and secondly emotion conveyed in pictures and patterns such as a tree in a barren desert. These tasks contain stimuli related to a range of emotions which includes anger, sadness and fear.

- 1) A negative correlation will be found between PCL-R total score and Factor 1 and MSCEIT total score
- 2) Blair et al.'s (2005) theory predicts that a negative relationship will be found between PCL-R total score and Factor 1 of the PCL-R and Branch 1 of the MSCEIT
- 3) Kosson et al.'s (2003) theory does not predict a relationship between PCL-R total score or Factor 1 and Branch 1 of the MSCEIT

2.2 Hypotheses for the PPI-R and MSCEIT

There are a number of studies that have explored the relationship between the PPI and emotional processing (Benning, Patrick & Iacono, 2005; Gordon, Baird & End, 2004; Verschuere, Crombez, De Clerc & Koster; 2005). The results of these studies suggest that there is no clear relationship between the underlying factors of the PPI and physiological responsiveness during tasks with emotional components. Benning et al. (2005) found that a high score on PPI-I was related to reduced electrodermal activity when viewing negative slides. However, Verschuere et al.'s (2005) results are unexpected as they found that PPI-II of the PPI was related to reduced electrodermal activity during a task that required participants to conceal information.

Gordon et al. (2004) found that during the completion of an emotional task, participants with a high score on PPI-I of the PPI demonstrated a different pattern of brain activation to participants with a low score on PPI-I. Only the low PPI group showed activity in the inferior frontal, medial prefrontal and amygdala, which are the parts of the brain believed to be responsible for processing information of an emotional nature.

Del Gaizo & Falkenbach (2008) found that PPI total score and PPI-I are both associated with poorer recognition of fear in facial expressions. PPI-I and PPI-II demonstrated different relationships with positive and negative emotional words. PPI-I was positively associated with positive affect words (PA) whereas PPI-II demonstrated a negative pattern. PPI-I demonstrated an overall negative relationship with negative affect words (NA) and PPI-II demonstrated a positive. Vidal et al. (2010) concluded that a high score on PPI-I scores predicts skill (or is positively

associated with) in facilitating thought. They also concluded that PPI-II is related to an impaired ability to recognise emotions and show empathic concern and therefore negatively related to EI. In previous chapters I have referred to the findings of Patrick (2010) and Patrick & Bernat (2009) who believe that the Coldheartedness is more conceptually similar to Factor 1 of the PCL-R than PPI-I. I therefore predict;

- 1) A negative relationship will be found between PPI-R total score and the Coldheartedness scale and MSCEIT total score
- 2) A positive relationship will be found between PPI-I and MSCEIT total score
- 3) Blair et al.'s (2005) theory predicts that there will be a negative relationship between PPI-R total score and Branch 1 of the MSCEIT
- 4) Kosson et al.'s (2003) theory does not predict a relationship between PPI-R total score, PPI-I and the Coldheartedness scale and Branch 1 of the MSCEIT

3. PARTICIPANTS

See chapter 4 for details about participants.

4. MEASURES

4.1 The MSCEIT

The MSCEIT is a 141 item emotional intelligence test recommended for use in adults 17 years and above. The test booklet is divided into eight sections A-H. Each of the sections corresponds to one of the eight MSCEIT tasks, described below. The MSCEIT provides an overall Emotional Intelligence score (EQI), two Area scores, four Branch scores and eight task scores.

The structure of the MSCEIT is shown below.

| Overall Scale | Two areas of MSCEIT | Four Branches | Eight Tasks | Section in test booklet | |
|------------------------------|--|---------------------------------|---|--------------------------------|--|
| Emotional Intelligence (EIQ) | Experiential Emotional Intelligence (EEIQ) | Perceiving Emotions Branch 1 | Faces Pictures | (Section A) (Section E) | |
| | | Facilitating Thought Branch 2 | Facilitation Sensations | (Section B) (Section F) | |
| | | Understanding Emotions Branch 3 | Changes Blends | (Section C) (Section G) | |
| | | Managing Emotions Branch 4 | Emotional Management Emotional Relations | (Section D) (Section H) | |
| | Strategic Emotional Intelligence (SEIQ) | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

4.1.1 MSCEIT tasks

Faces Task (Section A of MSCEIT test booklet). The respondent is presented with a series of pictures of different people and asked to rate how the individual in the picture is feeling. Each picture is followed by four different emotions for example, happiness, fear, surprise, disgust and excitement. The respondent has to assess how much of each of the four different emotions is displayed by the individual in the picture on a 5-point likert scale, for example, 1 equals no happiness and 5 equals extreme happiness.

Pictures Task (Section E of MSCEIT test booklet). This task measures whether an individual is able to perceive emotions that are conveyed in music, art and the environment. The respondent is presented with a series of pictures, for example, pebbles on a beach and a solitary sun scorched tree in a desert setting. Some of the other pictures are more abstract and convey shapes and colours, for example, different rectangular shapes of shades of grey. Each picture is followed by five different emotions for example, happiness, fear, surprise, anger, disgust and excitement. The respondent has to assess how much of each of the five different emotions is expressed by the picture on a 5-point Likert scale.

Sensations Task (Section F of MSCEIT test booklet). This task measures whether an individual can compare different emotions to sensations such as colour, light and temperature. The following is an example. *“Imagine feeling guilty that you forgot to visit a close friend who has a serious illness. In the middle of the day, you realise you completely forgot to visit your friend at the hospital. How much is the feeling of guilt like the following?”* The respondent is presented with descriptive words; cold, blue

and sweet and asked to rate each descriptive word on a 5-point Likert scale; 1 equals not alike to 5 equals very much alike.

Facilitation Task (Section B of MSCEIT test booklet). This task measures an understanding of how different moods interact and support thinking and reasoning. The following is an example. “*What mood(s) might be helpful to feel when creating new exciting decorations for a birthday party?*” The respondent is presented with three options, annoyance, boredom and joy and asked to rate each on a 5-point Likert scale 1 equals not useful and 5 equals very useful.

Blends Task (Section G of MSCEIT test booklet). This task measures an individual’s ability to blend emotions and to assemble simple emotions into complex feelings. The following is an example. “*A feeling of concern most closely combines the emotions of.....*” The respondent is asked to select the best alternative from the following five alternatives;

1. love, anxiety, surprise, anger
2. surprise, pride, anger, fear
3. acceptance, anxiety, fear, anticipation
4. fear, joy, surprise, embarrassment
5. anxiety, caring, anticipation

Changes Task (Section C of MSCEIT test booklet). This task measures an individual’s knowledge of emotional chains, for example, how anger might change to rage. The following is an example. “*A middle aged woman was happy and shortly thereafter felt*

disapproving. What most likely happened in between?" The respondent is asked to select the best alternative from the following;

1. her son injured himself slightly at work
2. she realized that she had hurt a close friend's feelings
3. her daughter-in-law was late for a family dinner
4. her husband criticized her
5. she lost a book that was important to her.

Emotion Management Task (Section D of MSCEIT test booklet). This task measures an individual's ability to incorporate his/her emotions into decision making. This task requires the respondent to evaluate the effectiveness of a number of options in a situation where a hypothetical individual is required to regulate emotions. The following is an example. *"Marie woke up feeling pretty well. She has slept well, felt rested and had no particular cares or concerns. How well would each action help her preserve her mood?"*

Action 1 She got up and enjoyed the rest of the day

Action 2 Marie enjoyed the feeling and decided to think about and appreciate all the things that were going well for her

Action 3 She decided to ignore the feeling since it wouldn't last long anyway

Action 4 She used the positive feeling to call her mother who had been depressed and try to cheer her up

The respondent is asked to rate each of the four possible actions using the following 5-point Likert scale; a) very ineffective b) somewhat ineffective c) neutral d) somewhat effective e) very effective

Emotional Relations Task (Section H of MSCEIT test booklet). This task measures an individual's ability to incorporate his/her emotions into decision making that involves others. The structure of this task is similar to the question described above in the Emotion Management Task, however, in this task the respondent is asked to evaluate a number of actions that involve other people.

4.1.2 MSCEIT branches

Perceiving Emotions (Branch 1). This score is a measure of whether an individual can identify emotion in self and others and when conveyed in music, art and the environment.

Facilitating Thought (Branch 2). This score is a measure of whether an individual can use his or her emotions to facilitate thinking and decision making. For example, excessive anxiety or fear may impair decision making. Facilitating thought measures the extent to which an individual can recognise (and are able to use) the link between emotion/mood and thinking.

Understanding Emotions (Branch 3). This score is a measure of how well an individual understands the complexities of emotion and how different emotions may change and combine over time. For example, annoyance and irritation may lead to rage.

Emotional Management (Branch 4). This score is a measure of how well an individual is able to manage emotion in self and others. This branch measures the ability to

express emotion in an effective manner, for example, not acting on anger which may have negative consequences. This branch measures how knowledge and experience of emotions may be used as part of problem solving when evaluating possible outcomes.

4.1.3 MSCEIT total score

Emotional Intelligence Score (EQI). This is a total score that reflects an individual's overall emotional intelligence.

5. PROCEDURE

The following instructions for the completion of the MSCEIT are from the item booklet. *The MSCEIT contains eight different sections. Each section has its own instructions. Try to answer every question. If you are unsure of the answer make your best guess. Please record your answers on the separate MSCEIT answer sheet.*

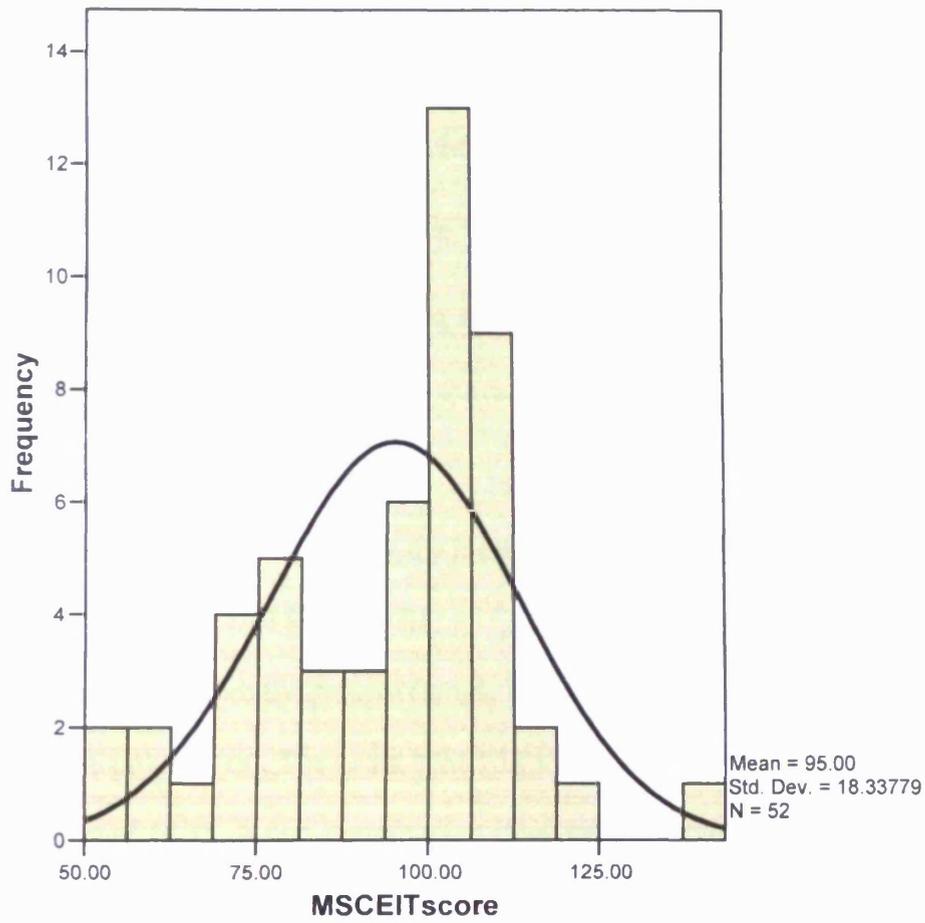
6. DATA ANALYSIS

The aim was to examine the relationship between two measures of psychopathy, the PCL-R and a self-report psychopathy measure the PPI-R and participants' performance on an ability measure of emotional intelligence, the MSCEIT. The MSCEIT is made up of eight tasks; Faces (A), Pictures (E), Facilitation (B), Sensations (F), Changes (C), Blends (G), Emotional Management (D) and Emotional Relations (H). The MSCEIT also produces four branch scores; Branch 1 Perceiving Emotions (tasks A and E), Branch 2 Facilitating Thought (tasks B and F), Branch 3 Understanding Emotion (tasks C and G) and Branch 4 Managing Emotion (tasks D and H). The MSCEIT also produces two area scores; Experiential EI (made up of Branches 1 and 2) and Strategic Emotional EI (made up of Branches 3 and 4). The

MSCEIT also produces a total EI score which is the sum of all eight tasks. The MSCEIT user manual advises against use of the eight tasks because of low reliability scores. I have therefore decided to use MSCEIT total score as an overall measurement of EI and the four branch scores. I have decided against using the two area scores as these are simply a combination of different branch scores.

As in previous chapters, there are many possible correlations between the measures of psychopathy and emotional intelligence hence I used the same strategy to guard against Type I errors whilst trying to avoid Type II errors. The MSCEIT data were checked for indications that they were normally distributed using the techniques outlined in chapter 4. MSCEIT total score and subscales were found to be normally distributed and hence parametric statistics will be used for all analyses (See Figure 7.1 for distribution of MSCEIT total scores).

Figure 7.1 Distribution of MSCEIT scores.



7. RESULTS

7.1 MSCEIT scores

Table 7.1 Descriptive and inferential statistics for the MSCEIT total and branch scores. P-value refers to the results of a one-sample t-test (two-tailed)

| | Mean | Standard deviation | Range | P- value |
|--|--------|--------------------|----------|----------|
| MSCEIT Total | 95.00 | 18.33 | 55 – 141 | .055 |
| Branch 1 Perceiving Emotions | 105.98 | 15.50 | 65 – 135 | .008 ** |
| Branch 2 Facilitating Thought | 96.07 | 17.06 | 60 – 133 | .10 |
| Branch 3 Understanding Emotions | 91.86 | 16.36 | 56 – 124 | .001 ** |
| Branch 4 Managing Emotions | 90.53 | 16.75 | 52 – 123 | .001 ** |

* $p < .05$ ** $p < .01$.

The MSCEIT manual states that the mean score for all MSCEIT scales is 100 with a standard deviation of 15. Table 7.1

scores obtained from the present sample of offenders (see Appendix 3 Table 7.7 for MSCEIT task scores). The mean MSCEIT total score was 95.00, with a standard deviation of 18.33. A one-sample t-test (two-tailed) comparing this sample to a score of 100, the mean of the general population in the normative sample (Lilienfeld & Widows, 2005) failed to reach significance. Thus, whilst the mean score for this offender population is a little lower than those from a general population, it would appear that the scores are not very different and that a good spread of scores was obtained (see also figure 7.1). Unfortunately, there is no normative data available for offender populations with which to compare these data.

Examination of the branch scores shows that all had standard deviations of around 15 (range 15-19), indicating a good spread of scores from the offender population. The mean scores, however, showed some interesting variations.

For Branch 1 (Perceiving Emotions) the mean score was greater than 100 ($t(51) = 2.78, p < .008$) indicating that this offender sample were better at recognising emotions than the normative sample. For Branch 2 (Facilitating Thought) the mean score was not significantly different to the normative sample. For Branch 3 (Understanding Emotions) the mean score was less than 100 ($t(51) = -3.59, p < .001$) indicating that this offender sample were worse at understanding emotions. For Branch 4 (Managing Emotion) the mean score was also less than 100 ($t(51) = -4.07, p < .001$) indicating that this offender sample were worse at managing emotions.

7.2 Intelligence and the MSCEIT

As discussed earlier (see Introduction) there has been considerable debate as to the relationship between emotional intelligence and intelligence (as measured by standard IQ tests). In order to understand the relationship between EI as defined by the MSCEIT and IQ, I examined the correlations between the total and all four branch scores against the WASI IQ score (including both the Verbal and Performance scales) see Table 7.2.

Table 7.2 IQ measured by the WASI total, verbal and performance IQ scores and MSCEIT total and branch scores

| | WASI total score | Verbal IQ | Performance IQ |
|--|-------------------------|------------------|-----------------------|
| MSCEIT total | .48** | .61** | .36* |
| Branch 1 Perceiving Emotions | .10 | .23 | -.08 |
| Branch 2 Facilitating Thought | .29* | .43** | .13 |
| Branch 3 Understanding Emotions | .61** | .71** | .61** |
| Branch 4 Managing Emotions | .51** | .54** | .39* |

* $p < .05$ ** $p < .01$.

A strong statistical relationship was found between WASI total score and MSCEIT total score ($r = .48$). Significant relationships were found between WASI total score and Branch 2 (Facilitating Thought) ($r = .29$), Branch 3 (Understanding Emotions) ($r = .61$) and Branch 4 (Managing Emotions) ($r = .51$).

Verbal IQ was also strongly correlated with total MSCEIT score ($r = .61$). Positive correlations were also found between Verbal IQ and Branch 2 (Facilitating Thought) ($r = .43$), Branch 3 (Understanding Emotions) ($r = .71$) and Branch 4 (Managing Emotions) ($r = .54$).

Significant positive correlations were also found between Performance IQ and MSCEIT total score ($r = .36$), Branch 3 (Understanding Emotions) ($r = .61$) and Branch 4 (Managing Emotions) ($r = .39$). It is of interest that there appears to be no relationship between Branch 1 and IQ.

These results suggest that intelligence, particularly Verbal IQ, is strongly related to performance on the MSCEIT. Hence IQ score may well affect the relationship between the MSCEIT and psychopathy. Therefore all analyses relating to psychopathy and MSCEIT will be performed twice. First, the ‘raw’ correlations between psychopathy and MSCEIT will be calculated and then calculated again whilst controlling for IQ scores (using the partial correlation technique).

7.3 The relationship between psychopathy and emotional intelligence

7.3.1 PCL-R and MSCEIT

Table 7.3 PCL-R total and factors and MSCEIT total and branch scores

| | PCL-R Total | Factor 1 | Factor 2 |
|---------------------------------------|------------------------|-------------------------|----------|
| MSCEIT Total | .03¹ | -.07¹ | .18 |
| Branch 1 Perceiving Emotions | .18¹ | .00¹ | .30* |
| Branch 2 Facilitating Thought | -.12 | -.25 | .20 |
| Branch 3 Understanding Emotion | -.12 | -.13 | -.10 |
| Branch 4 Managing Emotion | -.01 | -.04 | .04 |

* $p < .05$ ** $p < .01$ ***Significant after Bonferroni correction $p < .01$. The correlations of interest are indicated in bold. ¹ One tailed tests

The correlations between EI as measured by the MSCEIT and psychopathy as measured by the PCL-R are shown in table 7.3 (see Appendix 3, Table 7.8 for all results relating to PCL-R Factors and Facets and all MSCEIT scales). There was no sign of a relationship between PCL-R total and Factor scores and MSCEIT total score.

A positive, significant correlation of moderate effect size was found between Factor 2 of the PCL-R and Branch 1 (Perceiving Emotions) of the MSCEIT ($r = .30$). However, the relationships between Facet 3 ($r = .10$) and Facet 4 ($r = .24$) failed to reach statistical significance.

Table 7.4 PCL-R total and factors and MSCEIT total and branch scores after partialling out IQ score

| | PCL-R Total | Factor 1 | Factor 2 |
|--|-------------------------|------------------------|-----------------|
| MSCEIT Total | .20¹ | .02¹ | .49** |
| Branch 1 Perceiving Emotions | .33^{1*} | .08¹ | .52** |
| Branch 2 Facilitating Thought | .00 | -.19 | .31 |
| Branch 3 Understanding Emotions | .11 | -.04 | .28 |
| Branch 4 Managing Emotions | .20 | .05 | .32 |

* $p < .05$ ** $p < .01$ ***Significant after Bonferroni correction $p < .01$. The

correlations of interest are indicated in bold. ¹ One tailed tests

Table 7.4 summarises partial correlation co-efficient for the PCL-R and MSCEIT when controlling for IQ. A significant positive relationship was also found between Factor 2 of the PCL-R and the MSCEIT total score ($r = .49$). The correlation between MSCEIT total score and Facet 4 of the PCL-R was significant ($r = .33$) (see Appendix 3, Table 7.9 for all partial correlations relating to PCL-R Factors and Facets and all MSCEIT scales).

Branch 1 of the MSCEIT showed a significant positive relationship with PCL-R total score ($r = .33$) and Factor 2 ($r = .52$). Significant positive correlations were also found between both Facet 3 ($r = .34$) and Facet 4 ($r = .35$) of the PCL-R and Branch 1 of the MSCEIT.

7.3.2 PPI-R and MSCEIT

Table 7.5 PPI-R total and factors and MSCEIT subscales

| | PPI-R Total | PPI-I Fearless Dominance | PPI-II Self Centred Impulsivity | Coldheartedness |
|---------------------------------------|-------------------------|--------------------------|---------------------------------|-------------------------|
| MSCEIT Total | -.12¹ | .23¹ | -.26¹ | -.14¹ |
| Branch 1 Perceiving Emotion | -.04¹ | .20 | -.16¹ | -.01¹ |
| Branch 2 Facilitating Thought | -.16 | .15 | -.26 | -.09 |
| Branch 3 Understanding Emotion | -.07 | .28 | -.22 | -.16 |
| Branch 4 Managing Emotion | -.18 | .16 | -.33* | -.04 |

* $p < .05$ ** $p < .01$ ***Significant after Bonferroni correction $p < .01$. The

correlations of interest are indicated in bold. ¹ One tailed tests

The correlations between EI as measured by the MSCEIT and psychopathy as measured by the PPI-R are shown in table 7.5 (see Appendix 3, Table 7.10 for all results relating to PPI-R and all MSCEIT scales). No relationship was found between PPI-R total score and the underlying subscales and MSCEIT total score. The only significant relationship found was between PPI-II of the PPI-R and Branch 4 of the MSCEIT ($r = -.33$).

Table 7.6 PPI-R total and factors and MSCEIT total and subscales after partialling out IQ score

| | PPI-R Total | PPI-I Fearless Dominance | PPI-II Self Centred Impulsivity | Coldh'd |
|--------------------------------|------------------------|--------------------------|---------------------------------|------------------------|
| MSCEIT Total | .05¹ | .31¹ | -.11 | .06¹ |
| Branch 1 Perceiving Emotion | .04¹ | .20 | -.06 | .08¹ |
| Branch 2 Facilitating Thought | -.07 | .15 | -.16 | -.10 |
| Branch 3 Understanding Emotion | .12 | .34* | -.02 | .03 |
| Branch 4 Managing Emotion | -.02 | .18 | -.17 | .13 |

* $p < .05$ ** $p < .01$ ***Significant after Bonferroni correction $p < .01$. The

correlations of main interest are presented in bold. ¹ One tailed tests

Table 7.6 summarises partial correlation co-efficient for the PPI-R and MSCEIT when controlling for IQ. The pattern of results is not greatly changed by partialling out the effects of IQ. A significant correlation was found between PPI-I of the PPI-R and Branch 3 of the MSCEIT ($r = .34$) (see Appendix 3, Table 7.11 for all results relating to PPI-R and all MSCEIT scales with partial correlations controlling for IQ).

8. DISCUSSION

Many studies have suggested that an emotional deficit may underpin some of the features of psychopathy (for a review see Blair et al., 2005). Blair et al. (2005) believe that this is a specific difficulty related to recognising sadness and or fear. However, Kosson et al. (2002) have a different view which is that psychopathic individuals do

not appear to experience difficulty recognising and labelling fear but they may not experience appropriate physiological responses to such stimuli. In fact, Kosson et al. (2002) suggest that psychopathic individuals may demonstrate a superior ability to 'decode anger'.

The concept of emotional intelligence involves the capacity to perceive emotions, understand those emotions and manage them. Therefore it appeared that the tools developed to measure emotional intelligence would be ideal to examine the emotional deficit hypothesised to underpin psychopathy and that deficits in emotional intelligence would be manifest in those with high scores on measures of psychopathy (Ortony et al., 2007). There are currently no such studies that have explored the relationship between the MSCEIT and psychopathy in a forensic sample. Therefore I measured psychopathy using both the PCL-R and a self-report measure PPI-R and an ability EI measure, the MSCEIT.

Despite the prediction of a negative correlation between PCL-R total score and Factor 1 and MSCEIT total score, no statistically significant relationships were found. Due to the fact that I found a relationship between IQ and performance on the MSCEIT ($r = .48$), I repeated this analysis using a partial correlation to control for the effects of IQ. After controlling for the effects of IQ, contrary to earlier predictions, I found a significant positive relationship between MSCEIT total score and Factor 2 of the PCL-R ($r = .49$).

Turning to Branch 1 (Perceiving Emotions) of the MSCEIT, I focused on this scale because it would allow further testing of Blair et al.'s (2005) theory of psychopathy.

Based on Blair et al.'s (2005) theory, I predicted that a significant negative relationship would be found between PCL-R total score and Factor 1 of the PCL-R and Branch 1 of the MSCEIT. No relationship was found between PCL-R total score or Factor 1 and Branch 1 of the MSCEIT. After carrying out partial correlations to control for the effects of IQ, the relationship between Factor 2 and MSCEIT total scores became significant and I found a stronger relationship between Factor 2 of the PCL-R and Branch 1. Both Facet 3 ($r = .34$) and Facet 4 ($r = .35$) demonstrated a significant positive relationship with Branch 1 of the MSCEIT.

These results suggest that there is a positive relationship between Factor 2 of the PCL-R and MSCEIT total score and Branch 1 of the MSCEIT, which relates to perceiving emotions. This means that participants with a high score on Factor 2, which captures the antisocial lifestyle and impulsive component of psychopathy, demonstrate better performance on the MSCEIT and are better at perceiving emotions.

Turning to the PPI-R, I predicted that significant negative relationships would be found between PPI-R total score and the Coldheartedness scale and MSCEIT total score. I also predicted that a significant positive relationship would be found between PPI-I and MSCEIT total score. I found no evidence to support these predictions.

Based on Blair et al.'s (2005) theory, I also predicted that a significant, negative relationship would be found between PPI-R total score and Branch 1 of the MSCEIT. Once again, I found no evidence to support this prediction either before or after controlling for the effects of IQ.

Prior to controlling for IQ, my results were similar to Vidal et al. (2010) who found a significant relationship between PPI-II and MSCEIT total score ($r = -.30$). Although I found a correlation of similar magnitude ($r = -.26$), this failed to reach statistical significance. Vidal et al. (2010) also found that PPI-II was negatively related to Branches 2, 3 and 4. Prior to controlling for IQ, I also found a significant negative relationship between PPI-II and Branch 4 ($r = -.33$) but the relationship with Branches 2 and 3 failed to reach statistical significance.

In terms of what these results tell us about the construct of psychopathy, I note that the PPI-R and the PCL-R demonstrated a different relationship with the MSCEIT. A strong positive relationship was found between Factor 2 of the PCL-R and MSCEIT total score, whereas in contrast, a non-significant but negative relationship was found with PPI-II. These results suggest that the subscales of the PCL-R and PPI-R might be tapping different underlying constructs of psychopathy.

The results from the PCL-R suggest that there is a positive relationship between Factor 2 and MSCEIT total score and the ability to perceive emotions (Branch 1). These results are more consistent with Kosson et al.'s (2002) theory that psychopathic individuals may not be deficient in the perception of emotions and may even be more successful at decoding specific emotions such as anger. However, what is more unexpected was that I found a relationship between the MSCEIT and Factor 2. There is another study which has also found that Factor 2, or more specifically Facets 3 and 4, are related to performance on a facial recognition task. Hansen, Johnsen, Hart, Waage & Thayer (2008) found strong, significant positive relationships between Facet 3 ($r = .45$) and Facet 4 ($r = .53$) and the accurate identification of disgust in

facial expressions. Participants with a high score on Facets 3 and 4 were better at identifying disgust in facial expressions.

There is often debate between researchers and clinicians about the relationship between Factors 1 and 2 of the PCL-R and other variables. One recent example is the relationship between the factors of the PCL-R and violence. I am aware that this is not related to understanding emotional processing in psychopathic offenders but it highlights how thinking about the relationship between the factors of the PCL-R and other variables can change over time. Hare & Neumann (2010) state that they believe that the affective component of psychopathy is related to the risk of future violence (Kennealy, Hicks & Patrick, 2007; Parks & Bard, 2006; Vitacco, Neumann & Jackson, 2005). However, a more recent meta-analysis by Min Yang, Wong & Coid (2010) concluded that Factor 2 has a stronger relationship with future violence than Factor 1. Hare & Neumann's (2010) conclusions were based on the results of a number of studies with good sample sizes. However, Min Yang et al. (2010) reached a different conclusion based on the results of a larger number of studies and more data.

9. CONCLUSION

Emotional deficits are believed to be central to the concept of psychopathy. However, these results provide no evidence that individuals with psychopathic traits demonstrate poorer performance on aspects of emotional intelligence, as might have been predicted. Instead I found that some aspects of psychopathy are related to improved EI in this sample of offenders.

CHAPTER 8 PSYCHOPATHY AND A TRAIT EI MEASURE (TRAIT META-MOOD SCALE TMMS)

1. INTRODUCTION

Petrides & Furnham (2001, 2003) make a distinction between 'trait EI' and 'ability EI'. Trait EI is an individual's own perception or self assessment of his/her ability to recognise, understand and manage emotional states. Trait EI is measured via self-report questionnaires, an example of a trait EI question might be, *sometimes I can't tell what my feelings are*. Individuals are asked to rate how much such statements apply to them. The TMMS was selected as a trait EI measure to be used in this thesis (see chapter 3).

There only appears to be one published study that has explored the relationship between the TMMS and psychopathy as measured by the PCL-R. Malterer, Glass & Newman (2008) explored the relationship between the two factors of the PCL-R and TMMS. A significant but weak negative relationship was found between Factor 1 of the PCL-R and the Attention scale of the TMMS ($r = -.10$). A significant but weak negative relationship was also found between Factor 2 of the PCL-R and the Repair scale of the TMMS ($r = -.15$). These results suggest that participants high on Factor 1 of the PCL-R, which captures the emotional component of psychopathy, may not be responsive to their own emotions. These results also suggest that participants with a high score on Factor 2, which is associated with antisocial behaviour, may be less able to regulate or manage their emotions.

Although Malterer et al. (2008) explored the relationship between psychopathy measured by the PCL-R and the TMMS subscales, they did not report the relationship between PCL-R and TMMS total score.

2. HYPOTHESES

One of the aims of this thesis is to explore the theories of Blair, Mitchell & Blair (2005) and Kosson, Suchy, Mayer & Libby (2002). However, performance on the TMMS may reflect an individual's understanding of emotion in self and others. This is not related to the theories of Blair et al. (2005) and Kosson et al. (2002). Therefore I will not identify any specific hypotheses for the TMMS related to these theories.

2.1 Hypotheses for the PCL-R and TMMS

Factor 1 is the affective and interpersonal component of psychopathy. Individuals with a high score on Factor 1 of the PCL-R may attempt to con and manipulate others and present themselves favourably. Therefore I make the following predictions about the relationship between the PCL-R and the TMMS;

- 1) There will be a positive relationship between PCL-R and TMMS total scores
- 2) There will be a positive relationship between PCL-R Factor 1 and TMMS total score

2.2 Hypotheses for the PPI-R and TMMS

There are no published studies that have explored the relationship between self-reported psychopathy and the ability to understand emotion in self and others. Like the PCL-R, the PPI-R also has a scale which captures skill at engaging, charming and influencing others (Social Influence). The Social Influence scale is part of PPI-I. In terms of the relationship between the underlying factors of the PPI-R, I have focused on the recent work of Patrick & Bernat (2009) and Patrick (2010). Patrick & Bernat (2009) and Patrick (2010) believe that the Factor 1 (interpersonal and affective component of psychopathy) of the PCL-R is more similar to the Coldheartedness scale of the PPI-R than PPI-I. I therefore predict that;

- 1) There will be a positive relationship between PPI-R and TMMS total scores
- 2) There will be a positive relationship between PPI-I and the Coldheartedness scale of the PPI-R and TMMS total score

3. PARTICIPANTS

See chapter 4 for details of participants.

4. MEASURES

4.1 Trait Meta-Mood Scale (TMMS)

The TMMS was developed in order to measure what Mayer & Gaschke (1988) referred to as “meta mood experience” or the ability to reflect, monitor, evaluate and regulate feelings. Salovey, Stroud, Woolery & Epel (2002) state that the TMMS scales measures self-reported or perceived emotional intelligence. I administered the

30 item version of the TMMS. Participants are asked to read each statement and rate the extent to which they agree with it using a 5 point Likert scale (1= strongly disagree, 2= somewhat disagree, 3= neither agree nor disagree, 4 =somewhat agree and 5= strongly agree).

The TMMS has three subscales,

1. Attention to emotion (Attention)
2. Clarity of emotions (Clarity)
3. Repair of emotions (Repair)

The Attention subscale contains statements such as, *“I don’t usually care much about what I am feeling, people would be better off if they felt less and thought more, I believe in acting from the heart.”* Examples of Clarity items are, *“Sometimes I can’t tell what my feelings are, I am rarely confused about how I feel, I feel at ease about my emotions.”* Examples of Repair items are, *“I try to think good thoughts no matter how badly I feel, when I become upset I remind myself of all the pleasures in life, although I am sometimes sad, I have a mostly optimistic outlook.”*

4.2 Instructions for completing the TMMS

The following instructions for the completion of the TMMS appear at the top of the questionnaire,

Please read each statement and decide whether or not you agree with it. Place a number in the blank line next to each statement using the following scale:

5=strongly agree

4=somewhat agree

3=neither agree nor disagree

2=somewhat disagree

1=strongly disagree

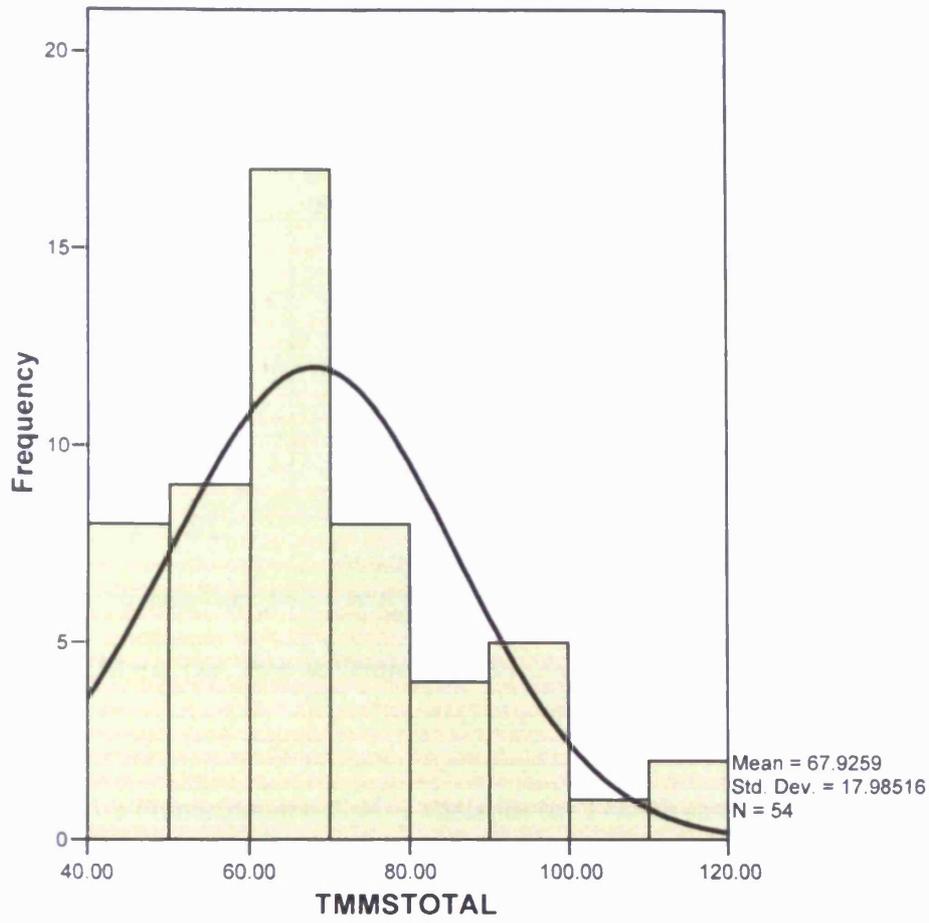
5. PROCEDURE

See chapter 4 for details about how the measures were administered.

6. DATA ANALYSIS

The aim was to examine the relationship between two measures of psychopathy, the PCL-R and a self-report psychopathy measure the PPI-R and participants' performance on a trait measure of emotional intelligence, the TMMS. The TMMS provides a total EI score and has three subscales; Attention to emotion (Attention) Clarity of emotions (Clarity) and Repair of emotions (Repair). As in previous chapters, there are many possible correlations between the measures of psychopathy and emotional intelligence hence I used the same strategy to guard against Type I errors whilst trying to avoid Type II errors. The TMMS data were checked for indications that they were normally distributed using the techniques outlined in chapter 4. TMMS total score and subscales were found to be normally distributed and hence parametric statistics were used for all analyses (See Figure 8.1 for distribution of TMMS total scores).

Figure 8.1 Distribution of TMMS scores.



7. RESULTS

7.1 TMMS scores

Table 8.1 Descriptive statistics for the TMMS

| | Mean | Standard Deviation (SD) | Range | Mean Normal Population ¹ | SD Normal Population ¹ | P-Value |
|-----------------------|-------|-------------------------|--------------|-------------------------------------|-----------------------------------|---------|
| TMMS Total | 67.92 | 17.98 | 42.00-118.00 | 114.83 | 14.68 | <.000** |
| TMMS Repair | 13.18 | 4.29 | 6.00-27.00 | 22.20 | 4.51 | <.000** |
| TMMS Clarity | 24.94 | 9.51 | 12.00-48.00 | 40.82 | 7.13 | <.000** |
| TMMS Attention | 29.83 | 7.97 | 3.00-48.00 | 51.81 | 7.74 | <.000** |

* $p < .05$ ** $p < .01$.

¹Normative data based on a sample of 219 students using the 30 item version of the TMMS (Mara, DeCicco & Stroink, 2010).

Table 8.1 summarises descriptive statistics for TMMS scores obtained from the present sample of offenders. The mean TMMS total score was 67.92, with a standard deviation of 17.98. Examination of the subscales of the TMMS showed that the standard deviations were similar to the normative sample.

A number of one-sample t-tests (two-tailed) were completed to compare this sample of offenders to a normative sample (Mara et al., 2010). For TMMS total score, the mean score was lower than 114.83 ($t(53) = -19.16$, $p < .000$) which indicates that this sample had significantly lower TMMS total scores than the normative sample. For the Mood Repair scale, the mean score was lower than 22.20 ($t(53) = -15.42$, $p < .000$) which indicates that this offender sample was poorer at mood repair than the normative sample. For the Attention scale, the mean score was lower than 51.81 (t

(53) = -20.26, $p < .000$) which indicates that this offender sample was poorer at paying attention to emotions than the normative sample. For the Clarity scale, the mean was lower than 40.82 ($t(53) = -12.26, p < .000$) which indicates that this sample was poorer at understanding their own emotions than the normative sample. Overall, the participants in this sample demonstrated poorer performance on all aspects of EI measured by the TMMS compared to a normal sample of healthy individuals.

7.2 Intelligence and the TMMS

As discussed earlier (see Introduction) there has been considerable debate about the relationship between emotional intelligence and intelligence (as measured by standard IQ tests). I have previously found that the MSCEIT (ability EI measure) is strongly related to intelligence (see chapter 7).

Table 8.2 IQ measured by the WASI total, verbal and performance IQ scores and TMMS total and subscales

| | WASI total score | Verbal IQ | Performance IQ |
|-----------------------|------------------|-----------|----------------|
| TMMS Total | -.22 | -.19 | -.25 |
| TMMS Repair | -.04 | -.02 | .04 |
| TMMS Clarity | -.33* | -.46** | -.32* |
| TMMS Attention | -.07 | .13 | -.17 |

* $p < .05$ ** $p < .01$.

The correlations between trait EI as measured by the TMMS and intelligence measured by the WASI are shown in Table 8.2. No significant relationship was found between TMMS total score and WASI total score, Verbal or Performance IQ. The Clarity scale of the TMMS demonstrated statistically significant negative

relationships with WASI total score ($r = -.33$), Verbal IQ ($r = -.46$) and Performance IQ ($r = -.32$). Overall, I felt that there was enough evidence to be concerned that IQ might influence performance on the TMMS and therefore, consideration of the possible effects of IQ will be undertaken when analysing the TMMS data with respect to psychopathic traits.

7.3 The relationship between psychopathy and emotional intelligence

7.3.1 PCL-R and TMMS

Table 8.3 PCL-R total and factors and TMMS subscales

| | PCL-R Total | Factor 1 | Factor 2 |
|----------------|-------------------------|------------------------|-------------|
| TMMS Total | .26^{1*} | .18¹ | .26 |
| TMMS Repair | .25 | .12 | .20 |
| TMMS Clarity | .35** | .29* | .32* |
| TMMS Attention | .05 | -.01 | .11 |

* $p < .05$ ** $p < .01$ ***Significant after Bonferroni correction $p < .02$. Correlations of interest are presented in bold. ¹ One tailed tests

The correlations between EI as measured by the TMMS and psychopathy as measured by the PCL-R are shown in Table 8.3. A significant positive correlation of moderate effect size was found between PCL-R total and TMMS total score ($r = .26$). The relationship between PCL-R and TMMS total scores did not survive Bonferroni correction. A significant positive correlation of moderate effect size was found between PCL-R total score and the Clarity scale ($r = .35$). Both Factor 1 and Factor 2 of the PCL-R also demonstrated significant positive correlations with the Clarity scale of the TMMS. Further analysis revealed that significant positive correlations of moderate effect size were found for the Clarity scale and Facet 2 ($r = .32$), Facet 3

($r = .37$) and Facet 4 ($r = .32$) (See Appendix 4, Table 8.7 for all results relating to PCL-R Facets and TMMS subscales).

Table 8.4 PCL-R total and factors and TMMS subscales after partialling out IQ score

| | PCL-R Total | Factor 1 | Factor 2 |
|-----------------------|------------------------|------------------------|-----------------|
| TMMS Total | .22¹ | .16¹ | .17 |
| TMMS Repair | .22 | .13 | .23 |
| TMMS Clarity | .29 | .23 | .24 |
| TMMS Attention | .04 | .01 | -.00 |

* $p < .05$, ** $p < .01$ ***Significant after Bonferroni correction $p < .02$. Correlations of interest are presented in bold. ¹ One tailed tests

Table 8.4 summarises partial correlation co-efficient for the PCL-R and TMMS when controlling for IQ. After controlling for IQ, there was no sign of a significant relationship between PCL-R total and factor scores and TMMS total score. No correlation with total TMMS score reached conventional levels of significance ($p < .05$). (See Appendix 4, Table 8.8 for all results relating to PCL-R Facets and TMMS subscales after controlling for IQ).

7.3.2 PPI-R and TMMS

Table 8.5 PPI-R total and factors scores and TMMS subscales

| | PPI-R Total | PPI-I Fearless Dominance | PPI-II Self Centred Impulsivity | Coldheartedness |
|---------------------------|-------------------------|---|--|------------------------|
| TMMS Total | .30¹* | -.10¹ | .39** | .19¹ |
| TMMS Repair | .34* | -.00 | .40** | .15 |
| TMMS Clarity | .25 | -.06 | .33* | .11 |
| TMMS Attention | .21 | -.15 | .29* | .23 |

* $p < .05$ ** $p < .01$ ***Bonferroni correction $p < .01$. Correlations of interest are

presented in bold. ¹One tailed tests

The correlations between EI as measured by the TMMS and psychopathy as measured by the PPI-R are shown in Table 8.5. PPI-R total score demonstrated a significant positive relationship with TMMS total score ($r = .30$) and TMMS Repair scale ($r = .34$). However, the relationship between PPI-R total and TMMS total scores did not survive Bonferroni correction. Significant positive correlations of moderate effect size was found between PPI-II and TMMS total score and all subscales.

Table 8.6 PPI-R total and factors scores and TMMS subscales after partialling out IQ score

| | PPI-R Total | PPI-I Fearless Dominance | PPI-II Self Centred Impulsivity | Coldheartedness |
|---------------------------|------------------------|---|--|------------------------|
| TMMS Total | .21¹ | -.18¹ | .32* | .18¹ |
| TMMS Repair | .31* | -.01 | .37** | .12 |
| TMMS Clarity | .19 | -.08 | .27 | .06 |
| TMMS Attention | .20 | -.15 | .28 | .20 |

* $p < .05$, ** $p < .01$ ***Bonferroni correction $p < .01$.

Table 8.6 summarises partial correlation co-efficient for the PPI-R and TMMS when controlling for IQ. Controlling for IQ did not greatly alter the pattern of results. After controlling for IQ, a significant positive correlation of moderate effect size was found between PPI-R total score and the Repair scale ($r = .31$). Significant positive correlations of moderate effect size were also found between PPI-II and TMMS total score ($r = .32$) and the Repair scale ($r = .37$). However, after controlling for IQ the relationship between PPI-II and the Clarity and Attention scales were no longer significant.

8. DISCUSSION

Although a statistically significant relationship was found between PCL-R and TMMS total scores before controlling for IQ, this result did not survive Bonferroni correction. Contrary to earlier predictions, a statistically significant positive relationship was not found between Factor 1 of the PCL-R and TMMS total score. Only a significant positive relationship was found between PCL-R total score and the Clarity scale of the TMMS ($r = .35$). Factors 1 and 2 of the PCL-R also demonstrated significant positive correlations with the Clarity scale of the TMMS. Further analysis revealed that significant positive correlations of moderate effect size were found for the Clarity scale and Facet 2 ($r = .32$), Facet 3 ($r = .37$) and Facet 4 ($r = .32$). The Clarity subscale contains questions such as, “*Sometimes I can’t tell what my feelings are, I am rarely confused about how I feel, I feel at ease about my emotions.*” This scale therefore focuses on an individual’s understanding of his/her own emotions. The pattern of results suggests that participants who were assessed as having a high level of psychopathic traits were more likely to self-report a good understanding of their own emotions.

A possible explanation for these results might be that participants assessed as having a high level of psychopathic traits, may have poor insight into their own experiences of emotion.

There is a study that has attempted to explore how psychopathic individuals rate their ability to accurately identify emotions. Pham & Philipott (2010) administered a facial recognition task to a sample of 43 offenders in a high security prison and 25 male healthy individuals. The offenders were allocated to high psychopathy or low psychopathy groups on the basis of their PCL-R scores. After being asked to identify the emotion being displayed (sadness, fear, disgust, anger, surprise, shame and contempt) participants were asked to rate how difficult they found it to rate the emotion being displayed. Each emotion was presented at different levels of intensity; 0%, 30%, 70% and 100%. Pham & Philipott (2010) found that at 100% intensity, the high psychopathy group reported less difficulty in accurately identifying the correct emotion being presented. This result was statistically significant. Pham & Philipott (2010) concluded that the high psychopathy group reported less difficulty in accurately identifying emotion than either the low psychopathy or control group of healthy individuals. They suggest that this result means that the psychopathic individuals did not perceive themselves to experience any difficulty accurately decoding facial expressions. Pham & Philipott (2010) stated that their results suggest that psychopathic individuals over-estimated their performance. The results of this study suggest that psychopathic individuals may lack insight into the difficulties they experience in accurately identifying emotion.

Malterer et al. (2008) found a significant but weak negative relationship between Factor 1 of the PCL-R and the Attention scale of the TMMS ($r = -.10$). A significant but weak negative relationship was also found between Factor 2 of the PCL-R and the Repair scale of the TMMS ($r = -.15$). Malterer et al. (2008) suggested that a high score on Factor 1 was associated with being unresponsive to one's own emotions and a high score on Factor 2 was associated with difficulty regulating or managing emotions. I did not find a significant relationship between Factor 1 and the Attention scale of the TMMS. Although I found a non-significant relationship between Factor 2 and the Repair scale of the TMMS ($r = .20$), the direction of the correlation was positive whereas Malterer et al. (2008) found a negative relationship.

Turning to the PPI-R, although I found a significant positive correlation between PPI-R total score and TMMS total score, this result did not survive Bonferroni correction. A significant positive correlation was found between PPI-R total score and TMMS Mood Repair scale ($r = .34$). This result means that participants with a high self-report psychopathy score rated themselves as being skilled at mood repair.

Significant positive correlations of moderate effect size were found between PPI-II and TMMS total score and all subscales. This means that participants with a high score on PPI-II, which measures self-centeredness, ruthless use of others, brazen flouting of traditional values, propensity to attribute blame to others for one's mistakes and reckless impulsivity, self-reported that they had a good understanding of emotion in self and others. Controlling for IQ did not greatly alter the pattern of results although the relationship between PPI-II and the Clarity and Attention scales were no longer significant.

I note that correlations of moderate effect size and similar magnitude were found between both PCL-R and PPI-R total scores and TMMS total score (before controlling for IQ), in fact both results were significant at ($p < .05$) but did not survive Bonferroni correction. It is possible that in a larger sample, a statistically significant result may have been found between the both the PCL-R and PPI-R and TMMS. However, even given the limitation of the small sample size, relationships were found between both measures of psychopathy and different scales of the TMMS, so some relationship does exist between psychopathy and self-reported EI.

In chapter 5, I previously concluded that Factor 1 of the PCL-R and PPI-I of the PPI-R may be tapping different underlying constructs of psychopathy; meanness and boldness (Patrick, 2010). These results provide some support for Patrick's (2010) triarchic conceptualisation of psychopathy. Neither PPI-I or Factor 1 demonstrated any significant relationship with TMMS total score. However, Factor 1 demonstrated a positive pattern of results with the TMMS and PPI-I a negative relationship. The Coldheartedness scale demonstrated a similar pattern of positive relationships to the TMMS as Factor 1. Both Factor 2 of the PCL-R and PPI-II demonstrated a positive pattern of results with the TMMS but only the relationship with PPI-II was statistically significant.

9. CONCLUSION

Significant positive relationships were therefore found between both measures of psychopathy and different scales of the TMMS. These results indicate that participants with a high level of psychopathic traits (either assessed or self-reported) are more likely to believe that they are skilled at understanding their own emotions.

These results may also suggest that participants with high levels of psychopathic traits might have been attempting to present themselves favourably. However, participants were aware that they were completing the TMMS purely for research purposes and this would have no bearing on decisions that could be made about them in custody. There would seem to be no reason to attempt to present themselves favourably. These results therefore raise interesting questions about how psychopathic individuals understand their emotions. It is possible that these results might suggest that psychopathic individuals lack insight into the difficulties they actually experience in accurately identifying emotion which is consistent with the findings of Pham & Philipott (2010).

These results also provide some support for Patrick's (2010) triarchic conceptualisation of psychopathy and the idea that Factor 1 of the PCL-R and PPI-I of the PPI-R might be tapping different underlying constructs of psychopathy.

CHAPTER 9 PSYCHOPATHY AND THE DETECTION OF EMOTIONAL FACES TASK

1. INTRODUCTION

1.1 Is psychopathy related to a specific emotional deficit?

Central to Blair, Mitchell & Blair's (2005) neurocognitive theory of psychopathy is the idea that psychopathic individuals experience specific difficulty identifying fear and sadness in others (Blair, Jones, Clark & Smith, 1997; Blair, Mitchell, Richell, Kelly, Leonard, Newman, et al., 2002; Blair, Mitchell, Peschardt, Colledge, Leonard, Shine et al., 2004; Dolan & Fullam; 2006; Hastings, Tangney & Stuewig, 2008). I note that Del Gaizo & Falkenbach (2008) found that a self-report measure of psychopathy (PPI) was also associated with poor recognition of fear in facial expressions.

There are a number of studies that have shown that psychopathic individuals demonstrate reduced physiological responsiveness to the distress of others (Aniskiewicz, 1979; Blair et al., 1997; House & Milligan, 1976). There are also studies that have found that children assessed as having psychopathic and antisocial traits demonstrate difficulty recognising fearful expressions in others (Blair & Coles, 2000; Bowen & Dixon, 2010; Stevens, Charman & Blair, 2001).

Blair et al. (2005) believe that the amygdala is central to the development of emotional learning and that there is a genetic contribution to the development of psychopathy which disrupts the functioning of the amygdala.

Psychopathic individuals demonstrate impaired aversive conditioning (Flor, Birbaumer, Hermann & Patrick, 2002; Hare, 1970; Lykken, 1957), which means that they fail to learn the relationship between a stimulus which is associated with a negative consequence, for example, a shock or a noxious odour. Reduced levels of amygdala activity have been demonstrated during a neuro-imaging study with individuals assessed as having high levels of psychopathic traits (Veit, Flor, Erb, Hermann, Lotze, Grodd et al., 2002).

In terms of emotional learning, psychopathic individuals have also been found to not demonstrate blink startle modulation when viewing negative slides, which is typically observed in healthy individuals (Levenston, Patrick, Bradley & Lang, 2000; Patrick, Bradley & Lang, 1993; Vanman, Mejia, Dawson, Schell & Raine, 2003). There are a number of studies that have found that the amygdala is involved in the modulation of the blink startle response (Angrilli, Mauri, Palomba, Flor, Birbaumer, Sartori, et al., 1996; Davis, 2000).

Studies have also found that the amygdala is involved in the recognition of fearful and sad facial expressions (Adolphs & Tranel, 2004; Adolphs, Tranel & Damasio, 1998; Morris, Frith, Perrett, Rowland, Young & Calder, et al., 1996).

However, there are studies that have failed to demonstrate that psychopathic participants demonstrate difficulty recognising sadness and fear (Book, Quinsey & Langford, 2007; Day & Wong, 1996; Deeley, Daly, Surguladze, Tunstall, Mezey, Beer et al., 2006; Glass & Newman, 2006; Habel, Kuhn, Salloum, Devos &

Schneider, 2002; Hansen, Johnsen, Hart, Wagge & Thayer, 2008; Kosson, Suchy, Mayer & Libby, 2002; Pham & Philipott, 2010).

Pham & Philipott (2010) attempted to directly test Blair et al.'s (2005) theory. They asked participants, who were 43 offenders located in a high security prison in Belgium, to complete a facial recognition test. Participants were presented with slides of faces displaying the following emotions; sad, fear, happy, anger and disgust. Pham & Philipott (2010) added together participants' responses to sad and fearful stimuli and created a category called amygdalian emotion. They also added together participants' responses to happy, angry and disgust slides and created a category called nonamygdalian emotion.

Pham & Philipott (2010) used the PCL-R to assess psychopathy. They created a high psychopathy group where participants had PCL-R scores between 25-32 and a low psychopathy group whose scores ranged from 4-20. Pham & Philipott (2010) explored whether there were any differences between the high and low psychopathy groups' accuracy rates in detecting amygdalian and nonamygdalian emotion. No differences were found between the psychopathic group's responses to amygdalian and nonamygdalian emotion. However, a significant difference was found between the low psychopathy group's responses to amygdalian compared with nonamygdalian emotion. The low psychopathy group was significantly less accurate at identifying amygdalian emotion. Pham & Philipott (2010) concluded that their results are at odds with Blair et al.'s (2005) theory.

The results of some studies suggest that psychopathic individuals might even be skilled at reading facial expressions. Kosson et al. (2002) found that 44% of the psychopathic participants (from prison and hospital treatment facilities) and 42% of healthy individuals (community based volunteers) accurately identified 100% of sad faces and Habel et al. (2002) found that psychopathic participants' accuracy rate was significantly higher than the healthy individuals.

Book et al. (2007) found that participants with a high level of psychopathic traits were more able to accurately identify the emotional intensity of facial expressions and specifically fearful facial expressions.

Kosson et al. (2002) have made an interesting distinction between being able to recognise/label and demonstrate appropriate physiological responsiveness to emotional material. Kosson et al. (2002) concluded that psychopathic individuals do not appear to experience difficulty recognising and labelling fear but they may not experience appropriate physiological responses to such stimuli. This would also fit with the clinical profile of psychopathy. Not only does the PCL-R measure lack of remorse and empathy (Facet 2 of the PCL-R), it also captures an exploitative interpersonal style measured by Facet 1. The PCL-R items that make up Facet 1 are; glib superficial charm (impression management) and most importantly conning and manipulation. The ability to con, manipulate and exploit others often depends on being able to target individuals who may be vulnerable. It would therefore appear that psychopathic individuals may be skilled at reading facial expressions and non-verbal cues in others, such as sadness and fear, in order to be able to target and exploit their

victims. In fact, Kosson et al. (2002) propose that psychopathic individuals may demonstrate a superior ability to 'decode anger'.

1.2 Critique of facial recognition tasks

Data from tasks that require observers to recognise facial expressions have been highly influential in the development of the emotional deficit model of psychopathy. However, the results from these studies are actually quite inconsistent. There are a number of studies that have failed to demonstrate that psychopathic participants demonstrate difficulty recognising sadness and fear cues (Book et al., 2007; Day & Wong, 1996; Deeley et al., 2006; Glass & Newman, 2006; Habel et al., 2002; Hansen et al., 2008; Kosson et al., 2002).

It is difficult to reach conclusions from these studies for three main reasons. The first reason is that differences exist between studies in terms of how participants were either assigned to non-psychopathic or psychopathic groups on the basis of their total PCL-R score. The PCL-R manual (Hare, 2003) identifies a PCL-R score of 30 or over as the cut-off point for psychopathy. However, differences exist between the studies in terms of the PCL-R score used to define the psychopathic group. A number of studies have used a score of >30 to define the psychopathic group and <20 to define the non-psychopathic group (Blair et al., 2004; Day & Wong, 1996; Glass & Newman, 2006; Kosson et al., 2002). However, Habel et al. (2002) assigned participants to the psychopathic group on the basis of a PCL-R total score of >20 and a diagnosis of antisocial personality disorder. Hastings et al. (2008) assessed psychopathy using the screening version of the PCL-R (PCL:SV). Other studies have used healthy individuals as a control group (Deeley et al., 2006; Dolan & Fullam,

2006; Iria & Barbosa, 2009). It is more likely that a statistically significant difference will be found between offenders with high psychopathic traits and healthy individuals than comparing the former to a group of offenders with lower levels of psychopathic traits. Healthy individuals are likely to perform better than offenders on emotional processing tasks.

The second reason is that few studies have considered the effects of IQ on these tasks. It seems likely that there could be influences of cognitive ability on the ability to detect or recognise facial expressions and yet few studies have considered this issue. Given the evidence that certain traits of psychopathy are associated with lower IQ (see chapter 6) this might account for some of the deficits shown on such tasks and may also underpin some of the differences found between these studies.

The third problem with facial recognition studies is that different methods to measure facial recognition have been used. I will firstly examine the facial recognition tasks that have demonstrated that psychopathic individuals may experience difficulty recognising sad and fearful facial expressions.

- Blair et al., (2004) presented participants with facial expressions that gradually morphed into one of the six basic emotions (sad, fear, happy, disgust, surprise and anger). The participants were presented with a neutral face that morphed through 20 stages into one of the six basic emotions. The participants were told that they would see a neutral face that would gradually change into one of six emotions and that they should say out loud which emotion was being

presented. The number of stages before the correct emotion was identified was calculated for each emotion.

- Dolan & Fullam (2006) also presented a facial recognition task to participants based on the six basic emotions. The faces were morphed to vary the intensity of emotion expressed (25%, 50%, 75% and 100%). Each of the six emotions was presented at four different levels of intensity (25%, 50%, 75% and 100%). Dolan & Fullam (2006) calculated how many emotions were correctly identified at the four different levels of intensity. Participants' reaction times were also recorded. Detail about how participants' identified emotions was not clear.
- Hastings et al. (2008) presented participants with six emotions (happy, anger, sad, shame, surprise and fear) at two different levels of intensity (60% and 100%). Participants were asked to rate each slide (depicting a facial expression) for how much of the six emotions it displayed on a seven point Likert scale. Hastings et al. (2008) assessed psychopathy using the PCL:SV.
- Iria & Barbosa (2009) used a Go/No go test. Participants were randomly presented with faces (one at a time) displaying fear, happiness, sadness and surprise. Participants were told to press a key on the keyboard when a face displaying fear appeared on a screen. Iria & Barbosa (2009) calculated the number of errors (when participants wrongly identified other facial expressions as fear) and omissions (when participants did not respond to a fearful face).

Differences in methodology also exist in studies that have failed to demonstrate that psychopathic individuals experience difficulty recognising sad and fearful facial expressions (Day & Wong, 1996; Deeley et al., 2006; Glass & Newman, 2006; Habel et al., 2002; Hansen et al., 2008; Kosson et al., 2002).

- Day & Wong (1996) presented participants with faces displaying the following facial expressions; sad, angry, disgust, fear and neutral. For each trial, two faces were presented; an emotional and neutral face. Participants were asked to press one of two buttons on the keyboard to indicate whether the emotional face had been presented on the right or left hand side of the screen.
- Deeley et al. (2006) only investigated responses to fear and happiness presented at different levels of intensity. Participants were asked to press one of two buttons to identify the gender of the face being presented.
- Glass & Newman (2006) presented one of four emotional words; anger, fear, sad and happy, one second before presenting a row of four faces. Participants were asked to identify which of the four faces matched the emotion that had been presented.
- Habel et al. (2002) presented participants with only sad and happy faces and asked them to rate the face on a 7-point Likert scale (1= extremely happy, 4=neutral and 7= extremely sad).

- Both Kosson et al. (2002) and Hansen et al. (2008) asked participants to press one of six buttons on a keyboard to identify the correct emotion that had been presented.

One of the main problems with the methodological design of some facial recognition tasks is that they may be sensitive to response bias in two ways. Firstly, most studies have failed to consider the difference between sensitivity to detecting the facial expression and a willingness to report on this. For example, consider a situation in which an observer must detect a weak signal (e.g. a blip on a radar screen) and report its presence. On a given trial, the observer thinks that they may have seen a target but is not sure (a weak perception), what should his response be? If the consequences of a false alarm (saying there is a signal in error) are small, then the observer may be willing to report the target, but if the consequences are serious the observer may not be willing to report. A similar argument can be constructed over the consequences of missing a target (saying there isn't a target when in fact there is). In this example, the perception is exactly the same but the reporting of the perception is different. In signal detection theory (Green & Swets, 1966) these are referred to as sensitivity (calculated via d' (d-prime)) and bias (calculated via β (beta)). As stated earlier, (most) previous studies of facial recognition have not considered whether the results they have obtained might be due to genuine sensitivity difference (d') or whether they might reflect differences in the willingness to report the presence of the expression β . I will consider the facial recognition task used by Blair et al. (2004).

Blair et al. (2004) presented participants with facial expressions that gradually morphed into one of the six basic emotions (sad, fear, happy, disgust, surprise and

anger) and the participants' reaction time to name the emotion was recorded. Consider how a change in β might affect such a task even if d' is held constant. A person with low β would be willing to say that they detected the expression at an early stage (with less perceptual evidence) than one with a high β . Hence this person may appear to be good at the task when reaction times are examined. However, this should be at the cost of making more errors and so the same individual may appear to have a deficit if error rate was examined. Thus the same observer could be regarded as superfunctional or dysfunctional depending on the measure. Clearly only a careful examination of both reaction times and error rates would appear to resolve this problem. It raises the question about whether this is a possible explanation for the results of studies such as Blair et al. (2004). It would seem probable that individuals with psychopathic traits would tend towards low β scores as such individuals tend to be risk takers so the idea appears to have some face validity (I could find no empirical evidence to address this idea). On the other hand, such a theory would predict deficits (if measured by errors) on all emotional expressions, rather than specific to one or two emotional expressions, which is not in line with the results presented by Blair et al. (2004).

A second form of bias that may affect tasks is a bias towards interpreting a facial expression. For example, in Kosson et al. (2002) and Hansen et al.'s (2008) facial recognition tasks, participants may repeatedly press the anger button because of a bias towards the detection of anger. This bias may also exist during studies where a neutral face is morphed through a number of stages into an emotion. The participant may respond earlier because he or she is experiencing a bias towards angry faces. Thus it would appear that on such tasks that the individual is very good at detecting certain expressions (angry ones) but not good at others (e.g. happy) simply because of a bias

in responding rather than a difference in sensitivity. Such a bias, of course, is not without great interest, but is not what is predicted by the theory that suggests that it is an ability to detect the presence of certain facial expressions (Blair et al., 2005).

One way of addressing response bias is to use a forced choice experimental design where the participant is required to choose between options. In such a task, the signal (or target) is always presented for a set amount of time (so that one participant cannot choose to respond earlier than another and therefore receive a different set of sensory information) and the participant then gives their response without time pressure (again to ensure that this is not a factor). The participant is typically presented with two choices (for example, was the signal presented at the first or second interval) one of which they must choose. In other words the participant is not permitted to say, 'I don't know'. By forcing all participants to always make a decision, the bias parameter β is eliminated from calculations and hence a measure of sensitivity is left (see MacMillan & Creelman, 1991).

1.3 Gender and facial recognition

A review of the literature related to the role of gender and facial recognition is beyond the scope of this thesis. The focus of this chapter is to explore whether psychopathy is related to a specific difficulty recognising sadness and fear by using a facial recognition task. However, many studies that have explored the relationship between psychopathy and facial recognition have included slides of both female and male faces and failed to take into account whether gender may affect performance on such tasks. For example, Hofmann, Suvah & Litz (2006) found that opposite sex slides are processed quicker than same sex slides.

There is a study that has explored the relationship between psychopathy, facial recognition and gender. Wilson, Demetriooff & Porter (2008) investigated the relationship between a self-report psychopathy measure - the Psychopathic Personality Inventory (PPI, Lilienfeld & Andrews, 1996) and the ability to identify characteristics associated with vulnerability or success in others. In this study, the measurement of success was occupational achievement. Wilson et al. (2008) used slides of both males and females. Half of the characters in the slides were smiling and the other half were sad. Each character on a slide was accompanied by a brief biographical description. For example, Matt the doctor, likes skydiving, dislikes exercise or Sarah the lumberjack, likes smoking, dislikes watching television. Each description contained details about occupation (this information was designed to portray success) and likes and dislikes.

Wilson et al. (2008) therefore created four groups; happy-successful, happy-unsuccessful, unhappy-successful and unhappy-unsuccessful. Wilson et al. (2008) hypothesised that signs of vulnerability and success would both be useful information for psychopathic individuals to retain. Hence they predicted that participants with high levels of psychopathic traits would be more likely to recall slides depicting successful and sad individuals or a combination of both. Participants were presented with slides and asked to recall as much information as possible about the individuals presented in the slides. Wilson et al. (2008) found that the overall detection rates between the psychopathic and non-psychopathic groups were the same. However, participants with high scores on the PPI were significantly more likely to recall female faces that were sad and unsuccessful. In fact, Wilson et al. (2008) found that the detection rate for female, sad and unsuccessful faces in the participants with a

high PPI score was almost perfect. Wilson et al. (2008) did not find support for their hypothesis that psychopathic participants would also demonstrate superior recall of the happy, successful male faces who they argued could be viewed as the most useful and least vulnerable characters in the study. Wilson et al. (2008) believe that this is at odds with Babiak & Hare's (2006) view that psychopathic individuals also target individuals who are perceived to have power or high status because of their potential usefulness.

The results of this study suggest that individuals with a high level of psychopathic traits are able to identify characteristics associated with vulnerability in others. However, this study is different to many other facial recognition tasks for two main reasons. In this task, participants were provided with additional information about individuals presented in the slides. Secondly, participants were asked to recall details of individuals they had seen in slides, this task therefore contains a memory component. However, given that the results of this study have found that gender may be a factor that individuals consider when assessing vulnerability in others, I will therefore explore the relationship between psychopathy and recognition of different emotions in both female and male faces.

2. DETECTION OF EMOTIONAL FACES TASK (DEFT)

2.1 Design of the DEFT

A facial recognition task will be administered to participants in this study which will allow further exploration of whether psychopathic individuals are impaired in their recognition of sad and fearful facial expressions. The facial recognition task which will be used in this study has been designed to avoid response bias which appears

evident in other facial recognition tasks (Blair et al., 2004). The task is termed the Detection of Emotional Faces Task (DEFT) and was developed by Snowden, Bowen & Gray (unpublished MSc thesis) prior to this study. The pictures of facial expressions were taken from (Ekman & Friesen, 1976). Four female and four male faces were selected. In the DEFT, four faces (four alternate forced-choice; 4AFC) all of the same gender, which are numbered, only one of which is displaying an emotion (the other three faces have neutral expressions see figure 9.1) are presented for 5 seconds. The participant is required to press a number on a keyboard to indicate which of the four faces is displaying an emotion. This is the emotional detection part of the task. Note that in this task, the participant is not asked to name the emotion. Hence, this technique also eliminates a bias towards interpretation of the emotion, as at this stage the participant does not have to name the emotion.

Forty eight trials are randomly presented in the DEFT, which means that each of the six emotions is presented during eight trials.

Figure 9.1



Figure 9.1 Example of a screen shot from the DEFT. In this example, the emotional expression is presented at 100% (picture 2, happy expression) to familiarise the participants with the procedure during the practise phase. However, during the task the expressions are all morphed at 40%.

Participants are then presented with six different emotions labelled 1-6; happy, sad, fear, anger, surprise and disgust. The participant is asked to press either 1-6 to identify which of the six emotions is being displayed by the emotional face. This is referred to as the emotional labelling part of the task. There is no time limit to this part of the task.

The DEFT used a 40% morphed picture, which is an arbitrary figure simply based on the fact that expressions presented by Ekman & Friesen (1976) were at 100% and a neutral expression represents 0%. Ekman & Friesen (1976) did not claim that all these expressions presented at 100% were fully matched and so there is no way of equating across different expressions. In pilot testing (Snowden et al., personal communication) the 40% images produced performance that was not near floor or ceiling effects in a group of undergraduate students.

2.2 Instructions for completing the DEFT

The following instructions appeared on the computer screen before participants' complete the DEFT.

You are about to observe four pictures of faces. Three of the faces will be neutral expressions. One of them will be of an emotional expression. Your task is to identify which of the faces is the emotional one. Second, you are to indicate what emotion you think the face is expressing.

Press the spacebar to continue.

2.3 Scoring the DEFT

Correct responses for emotional detection and emotional labelling were recorded for each of the six emotions. Participants were able to obtain a maximum score of eight correct responses for emotion detection (the first part of the task) and emotional labelling (the second part of the task). The number of correct responses for both emotional detection and emotional labelling were recorded as percentages (see Table 9.2). If a participant incorrectly identified the face displaying emotion, but correctly labelled the emotion, this response was discarded. If the participant incorrectly

identified the emotional face, it seems unlikely that that he would be able to correctly label an emotion that he failed to detect. Such a response would probably be the result of chance or guessing.

3. PILOTING OF THE DEFT IN A SAMPLE OF UNDERGRADUATE STUDENTS

As this is a novel task, there is little data with which to compare performance.

Snowden et al. (unpublished) presented this task to 39 undergraduate students and found detection scores of 74% happy, 48% sad, 63% fear, 55% anger, 72% surprise and 58% disgust and with standard deviations ranging from 15-21%. I note that chance performance in this task (4-AFC) is 25%.

4. HYPOTHESES

4.1 Hypotheses for the PCL-R and DEFT

Blair et al. (2005) believe that psychopathic individuals experience specific difficulty recognising fear and sadness in others. In contrast, Kosson et al. (2002) concluded that psychopathic individuals do not appear to experience difficulty recognising and labelling fear but they may not experience appropriate physiological responses to this emotion. In fact, Kosson et al. (2002) propose that psychopathic individuals may demonstrate a superior ability to 'decode anger'. Including a facial recognition task therefore allows further testing of Blair et al. (2005) and Kosson et al.'s (2002) theories about the relationship between psychopathy and the recognition of emotion. Given that Factor 1 of the PCL-R captures the interpersonal and affective component of psychopathy, I have predicted that Factor 1 might be related to performance on the DEFT.

Pham & Philipott (2010) attempted to directly test Blair et al.'s (2005) theory by asking participants to complete a facial recognition task with slides of faces displaying the following emotions; sad, fear, happy, anger and disgust. Pham & Philipott (2010) added together participants' responses to sad and fearful stimuli and created a category called amygdalian emotion. They also added together participants' responses to happy, angry and disgust slides and created a category called nonamygdalian emotion. I will also use the method used by Pham & Philipott (2010) in an attempt to further test Blair et al.'s (2005) theory.

Based on Blair et al.'s (2005) theory, I predict that;

- 1) A negative relationship will be found between PCL-R total score and the accurate identification of sad and fearful facial expressions. This effect should be most evident for Factor 1.
- 2) A negative relationship will be found between amygdalian emotion (the sum of responses to sad and fear detection) and PCL-R total score. This effect should be most evident for Factor 1.

Although Kosson et al. (2002) propose that psychopathic individuals may be skilled at decoding particular emotions such as anger, there is no direct evidence from the facial recognition literature that supports this claim. Examining the relationship between the PCL-R and the detection of angry faces will therefore be exploratory.

Wilson et al. (2008) found that psychopathic individuals demonstrated superior recall of sad, unsuccessful female faces. Other facial recognition tasks have not controlled

for gender and have presented slides of both males and females. These studies have still have found a relationship between psychopathy and difficulty detecting sadness and fear in others regardless of the gender of the face being presented. Hence I will also perform exploratory analysis to see if there are any differences in the relationship between psychopathy and DEFT performance as a function of the gender of the facial expression.

4.2 Hypotheses for the PPI-R and the DEFT

Del Gaizo & Falkenbach (2008) explored the relationship between the PPI and performance on a facial recognition task. They found significant negative correlations between PPI total score and PPI-I and the recognition of fear.

I have made predictions that the Coldheartedness scale rather than PPI-I will be related to performance on DEFT as a result of Patrick (2010) and Patrick & Bernat's (2009) conceptualisation of psychopathy. Patrick (2010) and Patrick & Bernat (2009) believe that Factor 1 of the PCL-R and PPI-I of the PPI-R are measuring different underlying constructs. The Coldheartedness scale therefore appears to be more conceptually similar to Factor 1 of the PCL-R.

Based on Blair et al.'s (2005) theory, I predict that;

- 1) A negative relationship will be found between PPI-R total score and the accurate identification of sad and fearful facial expressions. This effect should be more evident for the Coldheartedness scale.

- 2) A negative relationship will be found between amygdalian emotion (the sum of responses to sad and fear detection) and PPI-R total score. This effect should be more evident for the Coldheartedness scale.

As for the PCL-R, examining the relationship between the PPI-R and the detection of angry faces will be exploratory.

5. PARTICIPANTS

See chapter 4 for details of participants.

6. DATA ANALYSIS

6.1 DEFT and normality of scores

The aim was to examine the relationship between measures of psychopathy (one based upon file review and interview, the PCL-R, and one based on self-reported traits and behaviours, the PPI-R) and participants' performance on the DEFT. The DEFT produces an emotional detection and emotional labelling score for each of the six emotions (happy, sad, fear, disgust, happy and surprise, 12 scores in total).

As in previous chapters, there are many possible correlations between the measures of psychopathy and the DEFT hence I used the same strategy to guard against Type I errors whilst trying to avoid Type II errors. The DEFT data were checked for indications that they were normally distributed using the techniques outlined in chapter 4.

Table 9.1 Kolmogorov-Smirnov test of normality for the DEFT task

| | Kolmogorov-Smirnov | | |
|--------------------|--------------------|----|--------|
| | Statistic | Df | Sig. |
| Happy Detection | .189 | 51 | .000** |
| Happy Labelling | .103 | 51 | .200 |
| Sad Detection | .185 | 51 | .000** |
| Sad Labelling | .136 | 51 | .019* |
| Fear Detection | .168 | 51 | .001** |
| Fear Labelling | .212 | 51 | .000** |
| Anger Detection | .190 | 51 | .000** |
| Anger Labelling | .164 | 51 | .002** |
| Surprise Detection | .158 | 51 | .003** |
| Surprise Labelling | .123 | 51 | .053 |
| Disgust Detection | .152 | 51 | .005** |
| Disgust Labelling | .208 | 51 | .000** |

* $p < .05$, ** $p < .01$

Table 9.1 summarises the results of the KS test for the 12 scores produced by the DEFT. The results of the KS test suggest that six scores produced by the KS test are not normally distributed; happy detection, sad detection, fear detection, fear labelling, anger detection and disgust labelling. Figures 9.2-9.7 show the distribution of DEFT scores which were not normally distributed (each histogram shows a normal distribution).

Figure 9.2

Distribution of scores for Happy Detection

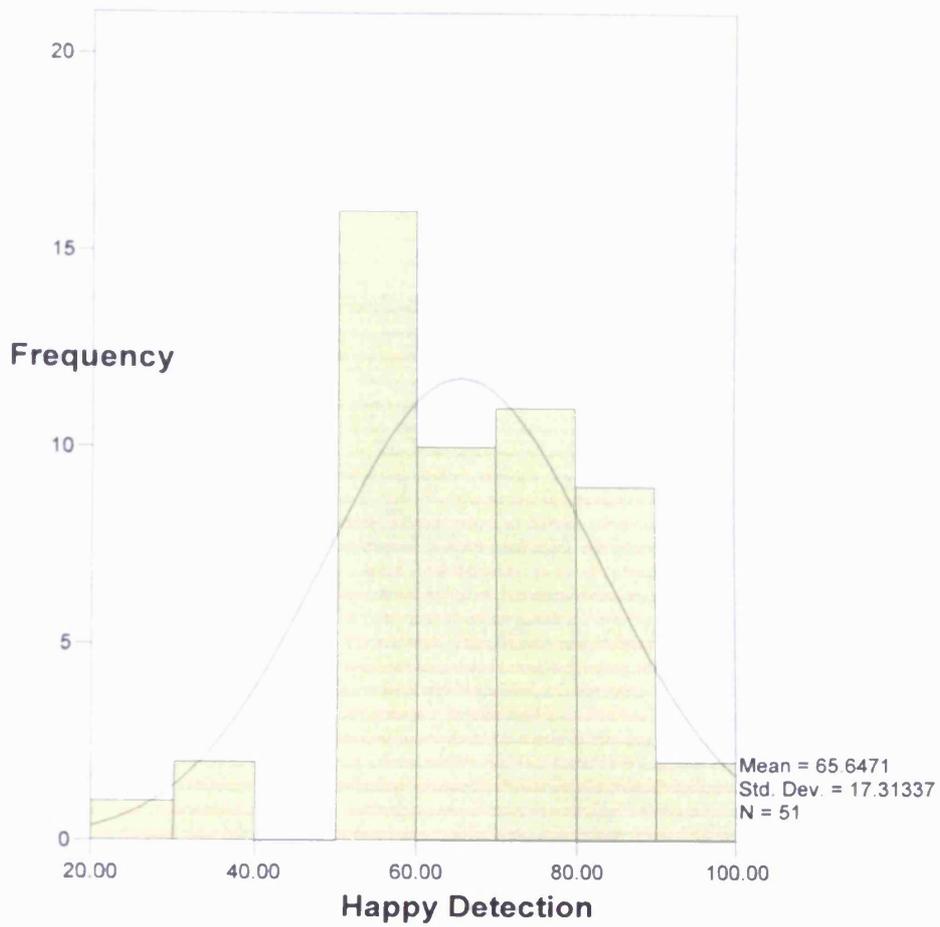


Figure 9.3

Distribution of scores for Sad Detection

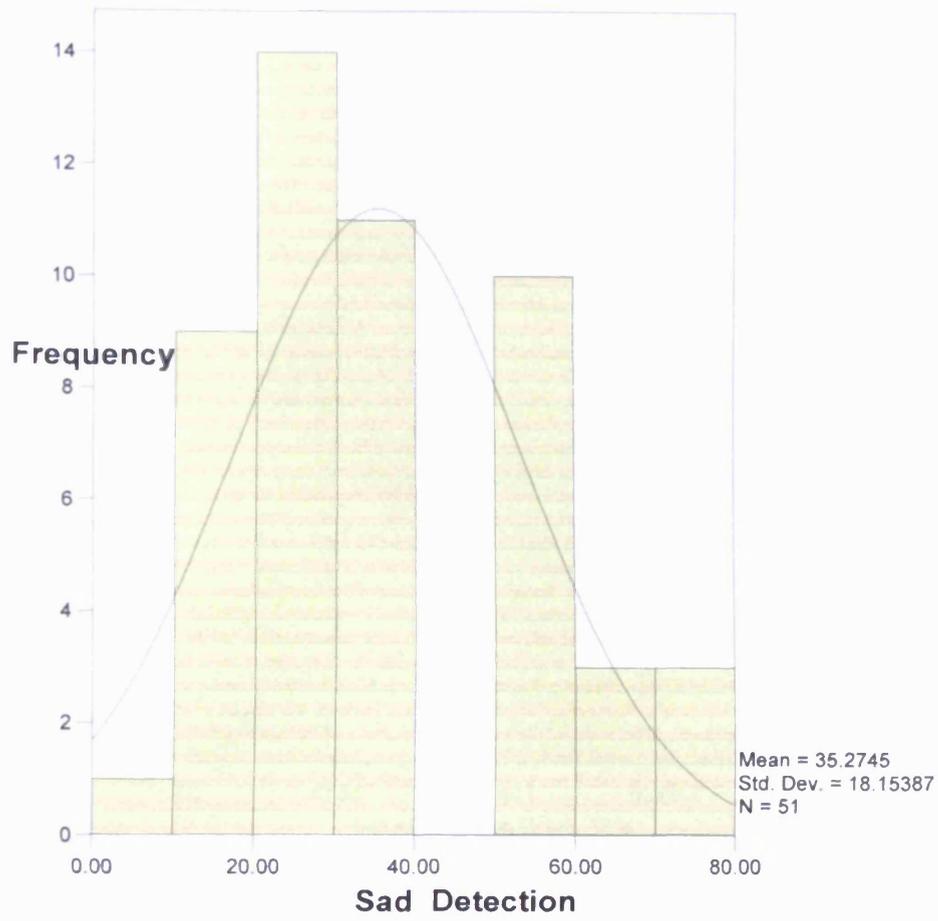


Figure 9.4

Distribution of scores for Fear Detection

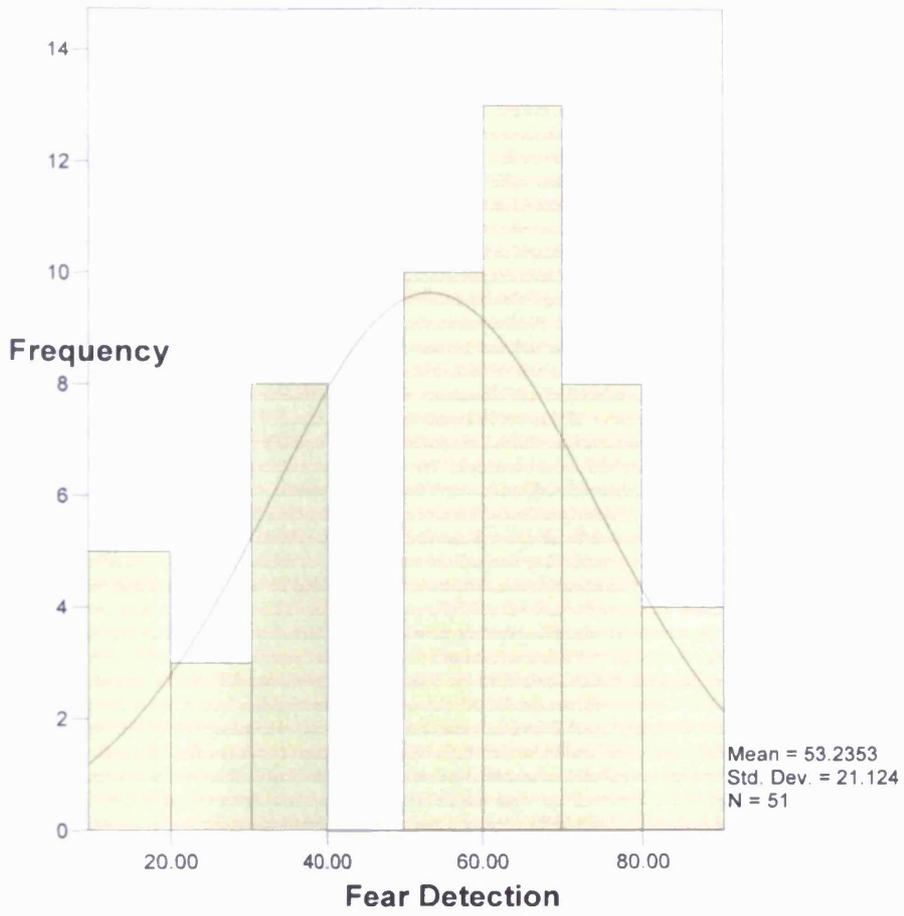


Figure 9.5

Distribution of scores for Fear Labelling

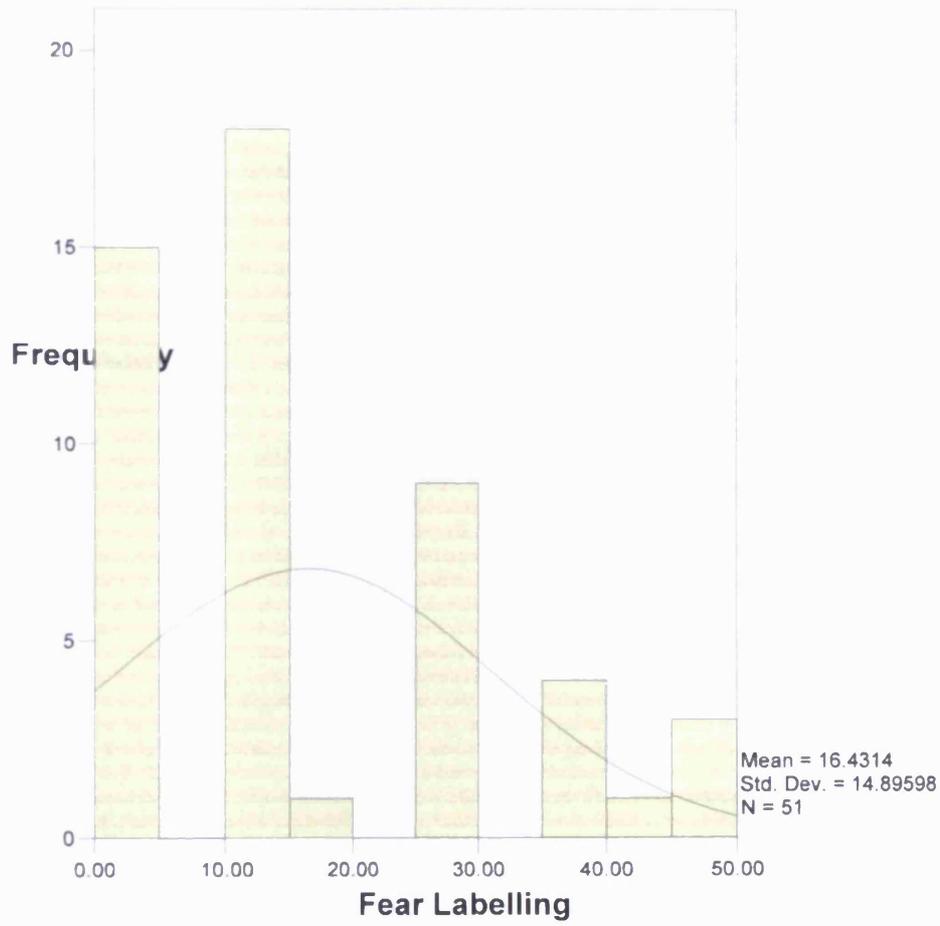


Figure 9.6

Distribution of scores for Anger Detection

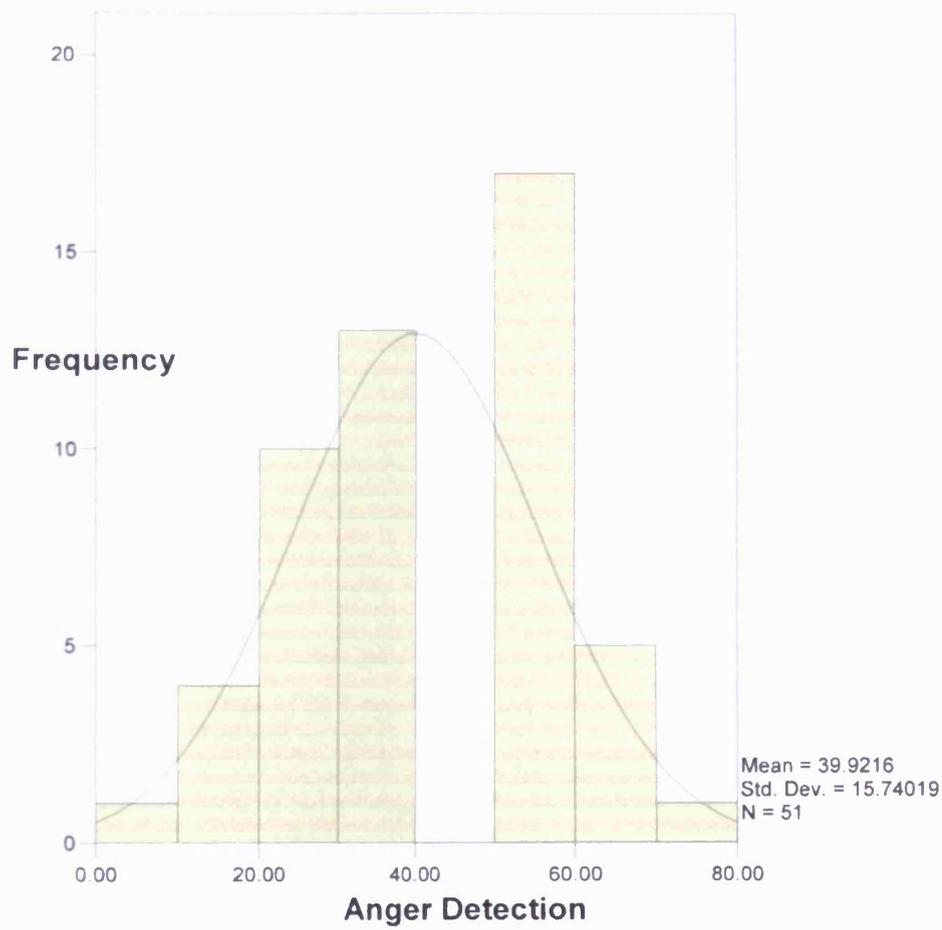
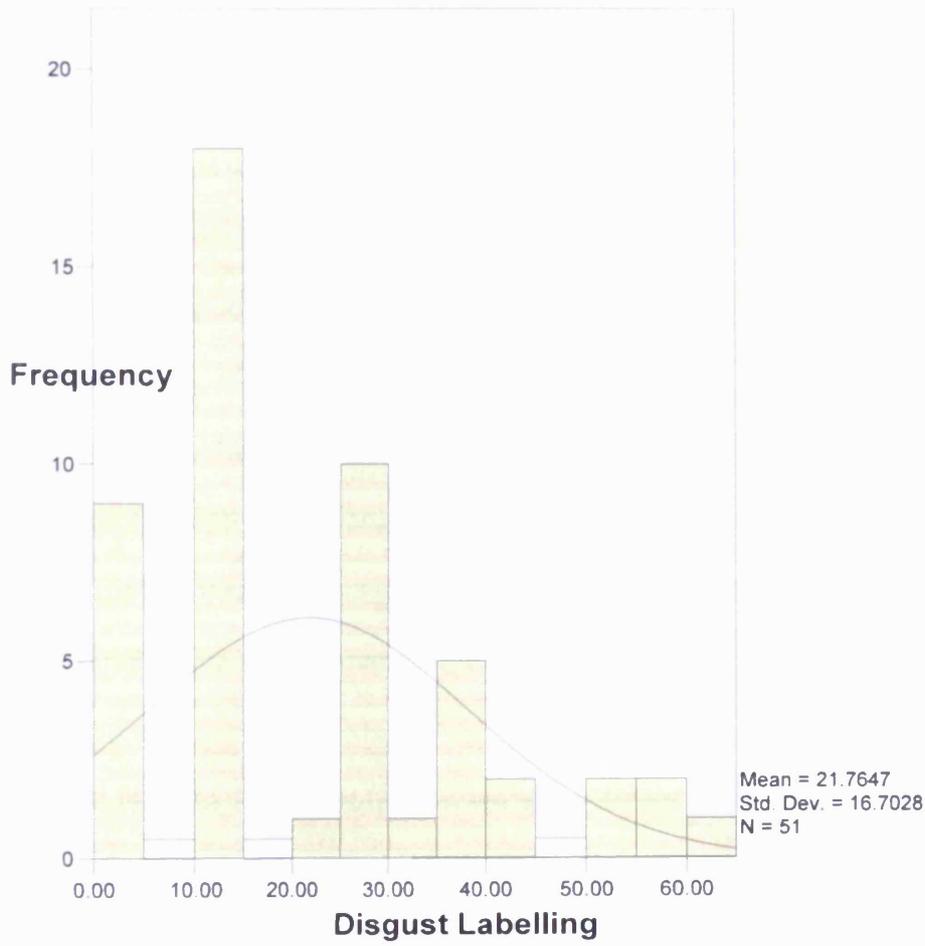


Figure 9.7

Distribution of scores for Disgust Labelling



An attempt was therefore made to transform each of the above scores (See Figures 9.2-9.7 for distribution of scores before data transformation). Fear detection was transformed using square root (Constant-Fear Detection). On this occasion the constant used was 89, as the biggest score for this variable was 88. After transformation, the KS test was no longer significant which means the data did not break the assumptions for normal distribution ($< .002$).

Sad detection was transformed using a square root transformation. After transformation, the KS test was no longer significant which means the data did not break the assumptions for normal distribution ($< .012$).

However, after using a range of different transformations, the KS test remained significant for happy detection, fear labelling, anger detection and disgust labelling. This means that these scores violated the assumptions for use of parametric statistics. I will therefore use a non-parametric test, Spearman's Rho, to analyse these data.

6.2 Exploring the relationship between amygdalian and nonamygdalian emotion (Pham & Philipott, 2010) and psychopathy

Pham & Philipott (2010) added together participants' responses to sad and fearful stimuli and created a category called amygdalian emotion. They also added together participants' responses to happy, angry and disgust slides and created a category called nonamygdalian emotion. I replicated this method used by Pham & Philipott (2010). Neither nonamygdalian nor amygdalian emotion scores violated the assumption for use of parametric statistics, therefore Pearson's Product Moment was used to analyse these data.

6.3 Exploring the relationship between gender and the DEFT

Eight different slides were presented for each emotion, four were female and four were male. It was therefore possible to explore the relationship between gender and performance on the DEFT. Correct responses for only emotional detection were recorded for each of the six emotions (happy, sad, fear, surprise, anger and disgust). For each emotion, the percentage of correct responses (for four slides) was recorded as a percentage (0-100%). In 2.3, I explained that scores for emotion labelling were discarded if the emotion detection score was inaccurate. Given that there were only four male slides and four female slides for each emotion, the emotion labelling scores became meaningless when responses were discarded.

This produced 12 scores, responses to male and female slides for each of the six emotions. These 12 scores did break the assumptions for using parametric statistics. It was not possible to transform these data, I therefore used a non-parametric statistical test, Spearman's rho.

7. RESULTS

7.1 DEFT Performance

Table 9.2 Descriptive statistics for the DEFT

| Percentages of correct responses | Mean | Standard Deviation | Range |
|---|-------------|---------------------------|--------------|
| Happy Detection | 65.64 | 17.31 | 25-100 |
| Happy Labelling | 57.21 | 23.20 | 0-100 |
| Sad Detection | 35.27 | 18.15 | 0-75 |
| Sad Labelling | 23.80 | 18.16 | 0-66 |
| Fear Detection | 53.23 | 21.12 | 13-88 |
| Fear Labelling | 16.43 | 14.89 | 0-50 |
| Anger Detection | 39.92 | 15.74 | 0-75 |
| Anger Labelling | 18.68 | 13.62 | 0-50 |
| Surprise Detection | 59.58 | 19.34 | 25-100 |
| Surprise Labelling | 40.62 | 19.29 | 0-88 |
| Disgust Detection | 47.84 | 21.40 | 13-88 |
| Disgust Labelling | 21.76 | 16.70 | 0-63 |

Table 9.2 illustrates overall performance on the DEFT. For such a task to be useful in detecting individual differences it is important that they are free from floor and/or ceiling effects and that they provide a good range of scores across the set of individuals (such issues are rarely mentioned in most of the previous literature on psychopathy and emotional expression processing). Detection rates varied from 35% (sad) to 65% (happy) and had standard deviations from 16-21%. In such a task chance levels are at 25% so it appears that most of the expressions were detected well above

chance level, with no sign of ceiling effects and with a good range, although the results of sad expressions may contain some floor effects.

As this is a novel task, there is little data with which to compare performance.

Snowden et al. (unpublished) presented this task to 39 undergraduate students and found detection scores of 74% happy, 48% sad, 63% fear, 55% anger, 72% surprise and 58% disgust and with standard deviations ranging from 15-21%. Therefore the pattern of performance on the DEFT in this sample of offenders is similar to the undergraduates but with overall poorer performance. No other data on offender populations exists with which to compare the present data.

It might be tempting to say that these offenders are better at detecting happy faces (65%) than sad faces (35%). However, it needs to be stressed that each task used a 40% morphed picture, which is an arbitrary figure simply based on the fact that expressions presented by Ekman & Friesen (1976) were at 100% and a neutral expression represents 0%. Ekman & Friesen (1976) did not claim that all these expressions presented at 100% were fully matched and so there is no way of equating across different expressions.

7.2 DEFT performance and intelligence

Table 9.3 IQ measured by WASI total, verbal and performance IQ scores and the DEFT

| | WASI Total Score | Verbal IQ | Performance IQ |
|---------------------------------|------------------|-----------|----------------|
| Happy Detection ^c | .20 | .16 | .16 |
| Happy Labelling ^a | .13 | .16 | .19 |
| Sad Detection ^b | -.08 | -.25 | -.12 |
| Sad Labelling ^a | -.12 | -.33 | -.24 |
| Fear Detection ^b | .12 | .00 | .12 |
| Fear Labelling ^c | .24 | .23 | .25 |
| Anger Detection ^c | .26 | .30 | .26 |
| Anger Labelling ^a | .20 | .23 | .18 |
| Surprise Detection ^a | .34* | .33 | .34* |
| Surprise Labelling ^a | .21 | .28 | .32 |
| Disgust Detection ^a | .15 | .25 | .19 |
| Disgust Labelling ^c | -.12 | -.15 | -.26 |

* $p < .05$, ** $p < .01$

^a Pearson's r ^b Pearson's r on transformed data ^c Spearman's Rho

Table 9.3 summarises the correlation co-efficient for total, verbal and performance IQ measured by the WASI and performance on the DEFT.

Examination of performance on the detection phase of the DEFT shows that all but one of the correlations were positive (the exception being for the detection of sad faces), suggesting that IQ does have some influence on DEFT performance. However, only the correlation for the detection of surprise and WASI total score reached statistical significance ($r = .34$). For the second stage of the DEFT (labelling the

detected emotion) the results were rather mixed with some positive and some negative relationships to the IQ measures, however, none of these reached statistical significance. Overall, I felt that there was enough evidence to be concerned that IQ does influence performance on the DEFT (though not in a simple manner) and therefore, consideration of the possible effects of IQ will be undertaken when analysing the DEFT data with respect to psychopathic traits.

7.3 The relationship between psychopathy and the DEFT

7.3.1 PCL-R total and factor scores and the DEFT

Table 9.4 PCL-R total and factor scores and the DEFT

| | PCL-R total | Factor 1 | Factor 2 |
|---------------------------------|-------------------------|--------------------------|----------|
| Happy Detection ^c | -.12 | -.12 | -.08 |
| Happy Labelling ^a | -.15 | -.24 | -.12 |
| Sad Detection ^b | -.25¹ | -.31^{1*} | -.13 |
| Sad Labelling ^a | .00 | -.09 | .05 |
| Fear Detection ^b | .00¹ | .12¹ | -.14 |
| Fear Labelling ^c | -.01 | -.03 | .01 |
| Anger Detection ^c | .11 | .11 | .08 |
| Anger Labelling ^a | -.07 | .03 | .04 |
| Surprise Detection ^a | -.16 | -.21 | -.28 |
| Surprise Labelling ^a | -.04 | -.06 | .01 |
| Disgust Detection ^a | -.10 | -.05 | -.09 |
| Disgust Labelling ^c | .06 | .09 | .09 |

* $p < .05$, ** $p < .01$ ***Significant after Bonferroni correction $p < .01$. Correlations of

interest are presented in bold. ¹One tailed test.

^a Pearson's r , ^b Pearson's r on transformed data, ^c Spearman's rho

Table 9.4 summarises the correlation co-efficient for PCL-R total and factor scores and the DEFT. A significant negative correlation of moderate effect size was found between PCL-R Factor 1 and the detection of sad facial expressions ($r = .31$) which did not survive Bonferroni correction. As Factor 1 produced a significant correlation, I also examined the underlying facets. The only significant result was for Facet 1 of the PCL-R (which reflects an exploitative interpersonal style) and the detection of sad

facial expressions ($r = -.40$) which did survive Bonferroni correction. (See Appendix 5 Table 9.14 for all PCL-R Facets and DEFT scores).

Table 9.5 PCL-R total and factor scores and the DEFT after partialling out IQ

| | PCL-R total | Factor 1 | Factor 2 |
|---------------------------------|----------------------------|----------------------------|----------|
| Happy Labelling ^a | -.17 | -.23 | -.01 |
| Sad Detection ^b | -.45^{1***} | -.40^{1***} | -.27* |
| Sad Labelling ^a | -.12 | -.15 | .01 |
| Fear Detection ^b | .03¹ | .19¹ | -.05 |
| Anger Labelling ^a | .03 | .10 | .07 |
| Surprise Detection ^a | -.18 | -.18 | -.07 |
| Surprise Labelling ^a | .07 | -.03 | .21 |
| Disgust Detection ^a | -.14 | -.07 | -.05 |

* $p < .05$, ** $p < .01$ ***Significant after Bonferroni correction $p < .01$. Correlations of interest are presented in bold. ¹One tailed test.

^a Pearson's r ^b Pearson's r on transformed data

Table 9.5 summarises the correlation co-efficient for PCL-R total and factor scores and the DEFT when controlling for IQ. Given that there is some effect of IQ on the DEFT, I also examined whether the effects found remained after partialling out IQ. It was only possible to carry out partial correlations where data did not violate the assumptions for use of parametric statistics. Hence, it was not possible to carry out partial correlations and control for the effects of IQ with the following variables; happy detection, fear labelling, anger detection and disgust labelling. After controlling for IQ, the relationships between both PCL-R total score ($r = -.45$) and Factor 2 ($r = -.27$) and the detection of sad faces were also now significant. The relationship between Factor 1 and the detection of sad faces remained significant but a stronger

relationship was found ($r = -.40$). Both the relationships between PCL-R total score and Factor 1 and the detection of sad faces remained significant after Bonferroni correction. Further analysis revealed a significant relationship between Facet 1 and the detection of sad faces ($r = -.44$) which did survive Bonferroni correction. (See Appendix 5 Table 9.15 for all PCL-R Facets and DEFT scores after partialling out IQ).

7.3.2 PPI-R total and factor scores and the DEFT

Table 9.6 PPI-R total and factor scores and the DEFT

| | PPI-R total | PPI-I Fearless Dominance | PPI-II Self-Centred Impulsivity | Coldheartedness |
|------------------------------------|------------------------|--------------------------------|---------------------------------------|-------------------------|
| Happy Detection ^c | .24 | .23 | .15 | -.13 |
| Happy Labelling ^a | .01 | .25 | -.09 | -.15 |
| Sad Detection ^b | .02¹ | .09¹ | -.03 | .06¹ |
| Sad Labelling ^a | .06 | .17 | -.01 | .03 |
| Fear Detection ^b | .10¹ | .16¹ | .05 | -.00¹ |
| Fear Labelling ^c | .14 | .23 | .04 | -.02 |
| Anger Detection ^c | -.00 | .25* | -.11 | -.00 |
| Anger Labelling ^a | .12 | .30* | -.20 | .22 |
| Surprise Detection ^a | -.09 | -.00 | -.13 | .00 |
| Surprise Labelling ^a | .01 | .15 | -.11 | .16 |
| Disgust Detection ^a | -.04 | -.01 | -.02 | -.12 |
| Disgust Labelling ^c | .06 | .10 | .02 | -.05 |

* $p < .05$, ** $p < .01$ ***Significant after Bonferroni correction $p < .01$. Correlations of

interest are presented in bold. ¹ One tailed test.

^a Pearson's r ^b Pearson's r on transformed data ^c Spearman's rho

Table 9.6 summarises the correlation co-efficients for the self-report psychopathy measure, the PPI-R total and factor scores and the DEFT. PPI-I demonstrated significant positive relationships with the detection ($r = .25$) and labelling of angry faces ($r = .30$).

Table 9.7 PPI-R total and factor scores and the DEFT after partialling out IQ

| | PPI-R total | PPI-I Fearless Dominance | PPI-II Self-Centred Impulsivity | Coldheartedness |
|---------------------------------|-------------------------|--------------------------------|---------------------------------------|------------------------|
| Happy Labelling ^a | .02 | .24 | -.08 | -.08 |
| Sad Detection ^b | -.01¹ | .11 | -.10 | .06¹ |
| Sad Labelling ^a | .03 | .19 | -.06 | -.01 |
| Fear Detection ^b | .13¹ | .15 | .09 | .01¹ |
| Anger Labelling ^a | .19 | .33* | .03 | .20 |
| Surprise Detection ^a | -.04 | -.03 | -.06 | .09 |
| Surprise Labelling ^a | .05 | .13 | -.07 | .25 |
| Disgust Detection ^a | -.05 | -.03 | -.02 | -.10 |

* $p < .05$, ** $p < .01$ ***Significant after Bonferroni correction $p < .01$. Correlations of interest are presented in bold. ¹ One tailed test.

^a Pearson's r ^b Pearson's r on transformed data

Table 9.7 summarises the correlation co-efficient for PPI-R total and factor scores and the DEFT when controlling for IQ. It was only possible to carry out partial correlations where data did not violate the assumptions for use of parametric statistics. Hence, it was not possible to carry out partial correlations and control for the effects of IQ with the following variables; happy detection, fear labelling, anger detection and disgust labelling. Controlling for IQ did not change the pattern of results. PPI-I

still demonstrated a significant positive relationship with the labelling of angry faces ($r = .33$). The correlation was of similar magnitude.

7.4 Psychopathy and amygdalian and nonamygdalian emotion (Pham & Philipott, 2010)

7.4.1 PCL-R and amygdalian and nonamygdalian emotion

Table 9.8 PCL-R total and factor scores and amygdalian and nonamygdalian emotion

| | PCL-R Total | Factor 1 | Factor 2 |
|-------------------------------|-------------------------|-------------------------|-----------------|
| Amygdalian Emotion | -.15¹ | -.14¹ | -.18 |
| Non-Amygdalian Emotion | -.05 | -.02 | -.04 |

* $p < .05$, ** $p < .01$ ***Significant after Bonferroni correction $p < .02$. Correlations of interest are presented in bold. ¹ One tailed test

Table 9.8 summarises the correlation co-efficients for the PCL-R total score and factors and the relationship with amygdalian and nonamygdalian emotion. No significant relationships were found for the PCL-R and amygdalian and nonamygdalian emotion. (See Appendix 5 Table 9.16 for all PCL-R Facets and amygdalian and nonamygdalian emotion).

Table 9.9 PCL-R total and factor scores and amygdalian and nonamygdalian emotion after partialling out IQ

| | PCL-R Total | Factor 1 | Factor 2 |
|-------------------------------|-------------------------|-------------------------|-----------------|
| Amygdalian Emotion | -.25¹ | -.12¹ | -.19 |
| Non-Amygdalian Emotion | -.02 | .01 | .06 |

* $p < .05$, ** $p < .01$ ***Significant after Bonferroni correction $p < .02$. Correlations of interest are presented in bold. ¹ One tailed test

Table 9.9 summarises the correlation co-efficients for the PCL-R total score and factors and the relationship with amygdalian and nonamygdalian emotion when controlling for IQ. No significant relationships were found for the PCL-R and amygdalian and nonamygdalian emotion. However, I note that the strength of the correlation between PCL-R total score and amygdalian emotion increased ($r = -.25$) and just failed to reach statistical significance ($p < .06$). (See Appendix 5 Table 9.17 for all PCL-R Facets and amygdalian and nonamygdalian emotion after partialling out IQ).

7.4.2 PPI-R and amygdalian and nonamygdalian emotion

Table 9.10 PPI-R total and factor scores and amygdalian and nonamygdalian emotion

| | PPI-R Total | PPI-I Fearless Dominance | PPI-II Self-Centred Impulsivity | Coldheart'ss |
|------------------------|-------------------------|--------------------------|---------------------------------|------------------------|
| Amygdalian Emotion | -.10¹ | .16 | .04 | .02¹ |
| Non-Amygdalian Emotion | .07 | .22 | .05 | -.11 |

* $p < .05$, ** $p < .01$ ***Significant after Bonferroni correction $p < .02$. Correlations of interest are presented in bold. ¹ One tailed test

Table 9.10 summarises the correlation co-efficients for the PPI-R and factors and the relationship with amygdalian and nonamygdalian emotion. No significant relationships were found for the PPI-R and amygdalian and nonamygdalian emotion.

Table 9.11 PPI-R total and factor scores and amygdalian and nonamygdalian emotion after partialling out IQ

| | PPI-R Total | PPI-I Fearless Dominance | PPI-II Self-Centred Impulsivity | Coldheart'ss |
|------------------------|-------------|--------------------------|---------------------------------|--------------|
| Amygdalian Emotion | -.12 | .16 | .06 | .03 |
| Non-Amygdalian Emotion | .12 | .21 | .08 | -.07 |

* $p < .05$, ** $p < .01$ ***Significant after Bonferroni correction $p < .02$. Correlations of interest are presented in bold. ¹ One tailed test

Table 9.11 summarises the correlation co-efficients for the PPI-R and factors and the relationship with amygdalian and nonamygdalian emotion. The relationships between

the PPI-R and amygdalian and nonamygdalian emotion were not greatly changed by controlling for IQ.

7.5 The relationship between psychopathy, gender and the DEFT

7.5.1 The PCL-R, gender and the DEFT

Table 9.12 Spearman's Rho correlations for the PCL-R total and factor scores and the gender of slides presented during the DEFT

| | PCL-R Total Score | Factor 1 | Factor 2 |
|----------------------------------|--------------------------|-----------------|-----------------|
| Female Sad Detection | -.12 | -.11 | -.09 |
| Male Sad Detection | -.23 | -.27* | -.13 |
| Female Fear Detection | -.08 | -.04 | -.11 |
| Male Fear Detection | .03 | .10 | -.16 |
| Female Happy Detection | -.10 | .11 | .00 |
| Male Happy Detection | -.16 | -.21 | -.08 |
| Female Anger Detection | -.02 | -.01 | -.06 |
| Male Anger Detection | .27 | .17 | .21 |
| Female Surprise Detection | -.27 | -.16 | -.30* |
| Male Surprise Detection | -.05 | -.09 | -.05 |
| Female Disgust Detection | -.13 | -.09 | -.07 |
| Male Disgust Detection | -.09 | .08 | -.16 |

* $p < .05$, ** $p < .01$

(See 6.3 for details of how data were analysed). Table 9.12 summarises the correlation co-efficients for the PCL-R total and Factor scores and the gender of slides presented during the DEFT. A significant negative correlation was found between Factor 1 and

the detection of sad faces in males ($r = -.27$) but not for female faces ($r = -.11$).

However, these correlations were not significantly different. A significant negative correlation was also found between Factor 2 and the recognition of surprise in female faces ($r = -.30$) but not for male faces ($r = -.05$). These correlations were also not significantly different.

7.5.2 The PPI-R, gender and the DEFT

Table 9.13 Spearman's Rho correlations for the PPI-R total and factor scores and the gender of slides presented during the DEFT

| | PPI-R Total Score | PPI-I Fearless Dominance | PPI-II Self-Centred Impulsivity | Coldheart'ness |
|------------------------------------|--------------------------|---------------------------------|--|-----------------------|
| Female Sad Recognition | -.17 | -.03 | -.12 | .09 |
| Male Sad Recognition | .15 | .14 | .05 | .08 |
| Female Fear Recognition | .13 | -.02 | .07 | -.11 |
| Male Fear Recognition | .03 | .25 | .06 | -.03 |
| Female Happy Recognition | .25 | .24 | .20 | -.07 |
| Male Happy Recognition | .07 | .07 | .03 | -.09 |
| Female Anger Recognition | .14 | .05 | .18 | -.11 |
| Male Anger Recognition | .00 | .32* | -.19 | .03 |
| Female Surprise Recognition | -.12 | .05 | -.20 | .02 |
| Male Surprise Recognition | -.01 | -.01 | -.01 | .08 |
| Female Disgust Recognition | .03 | .04 | .08 | -.16 |
| Male Disgust Recognition | -.02 | .08 | -.08 | .17 |

* $p < .05$, ** $p < .01$

Table 9.13 summarises the correlation co-efficients for the PPI-R total and factor scores and the gender of slides presented during the DEFT. The only significant correlation was a positive relationship between PPI-I and the recognition of anger in males ($r = .32$) but not for females ($r = .05$). However, these correlations were not significantly different.

It was not possible to carry out partial correlations to control for the effects of IQ because these data were not normally distributed and therefore violated the rules for use of parametric statistics.

8. DISCUSSION

8.1 The PCL-R and the DEFT

The DEFT was included in this thesis to allow further testing of the idea that psychopathic individuals experience specific difficulty identifying fear and sadness in others. Given that I found that IQ was related to performance on the DEFT, where possible, I carried out partial correlations to control for the effects of IQ. A significant negative correlations was found between Facet 1 (which measures an exploitative interpersonal style) ($r = -.40$) of the PCL-R and the detection of sad faces. Although the relationship with Factor 1 was significant ($p < .05$) this did not survive Bonferroni correction. After controlling for IQ, the relationships between PCL-R total score ($r = -.45$), Factor 1 ($r = -.40$) and Factor 2 ($r = -.27$) became significant. The relationship between Facet 1 and the detection of sad faces remained significant but the correlation became slighter stronger. Contrary to earlier predictions, I found no relationship between the detection or labelling of fear and the PCL-R, which is also part of the

Blair et al.'s theory. Overall, these results provide some support for Blair et al.'s (2005) theory.

One major finding to emerge from this analysis was a significant negative correlation of moderate effect size between Facet 1 of the PCL-R and the detection of sad facial expressions. Hansen et al. (2008) previously stated that it seemed logical that Facet 2 of the PCL-R, which measures the affective component of psychopathy, should be related to performance on a facial recognition test. However, I found that Facet 1, rather than Facet 2, was related to the detection of sad faces. For female faces only, Hansen et al. (2008) also found that Facet 1 was negatively correlated with the recognition of disgust in facial expressions ($r = -.31$). I also found a significant negative relationship with Facet 1 but the emotion was sadness rather than disgust.

In order to further test Blair et al.'s (2005) I used a method by Pham & Philipott (2010) who added together participants' responses to sad and fearful stimuli and created a category called amygdalian emotion. They also added together participants' responses to happy, angry and disgust slides and created a category called nonamygdalian emotion. Contrary to earlier predictions, I found no relationship between PCL-R total score or Factor 1 and amygdalian emotion. However, after controlling for IQ, the strength of the correlation between PCL-R total score and amygdalian emotion increased ($r = -.25$) and just failed to reach statistical significance. It is possible that in a larger sample size that this result may have reached statistical significance.

In contrast to Blair et al. (2005), Kosson et al. (2002) concluded that psychopathic individuals do not appear to experience difficulty recognising and labelling fear but they may not experience appropriate physiological responses to this emotion. In fact, Kosson et al. (2002) suggest that psychopathic individuals may demonstrate a superior ability to 'decode anger'. I failed to find a significant relationship between the detection and labelling of anger and the PCL-R.

Overall, these results provide some support for Blair et al.'s (2005) theory in that I found a negative relationship between PCL-R total score, Factor 1 and Facet 1 and the detection of sad faces. I also note that the relationship between PCL-R total score and amygdalian emotion just failed to reach statistical significance. However, the fact that I found no relationship between the detection of fear and the PCL-R provides some support for Kosson et al.'s (2002) theory.

8.2 The PPI-R and the DEFT

The PPI-R is a self-report measure of psychopathy. The aim was to explore whether there was any relationship between the PPI-R and performance on the DEFT. There is a study that has explored the relationship between the PPI and performance on a facial recognition task. Del Gaizo & Falkenbach (2008) explored the relationship between the PPI and performance on a facial recognition task. They found significant negative correlations between PPI total score ($r = -.18$) and PPI-I (Fearless Dominance) ($r = -.15$) and the recognition of fear.

Contrary to earlier predictions, I did not find any relationships between PPI-R total score and the Coldheartedness scale and the detection or labelling of sadness or

fearful facial expressions. My results are clearly at odds with the findings of Del Gaizo & Falkenbach (2008) and with Blair et al.'s (2005) theory. However, I did find a significant positive relationship between PPI-I and the detection of angry faces ($r = .25$) which is consistent with Kosson et al.'s (2002) theory that psychopathic individuals might demonstrate a superior ability to decode anger. Further evidence which is at odds with Blair et al.'s (2005) theory is my failure to find any relationship between amygdalian emotion (a combination of responses to sad and fearful facial expressions) and the PPI-R.

Overall, using a self-report psychopathy measure, I found no support for Blair et al.'s (2005) theory. However, failure to find support for Blair et al.'s (2005) theory is actually evidence to support Kosson et al.'s (2002) theory. Participants in this study with high levels of self-reported psychopathy traits did not demonstrate poorer performance in the recognition of sadness and fear. Contrary to my earlier predictions, I found that PPI-I, rather than the Coldheartedness scale, was associated with superior detection of anger, which is further support for Kosson et al.'s (2002) theory.

8.3 The relationship between gender and the DEFT

Wilson et al. (2008) found that participants with high scores on the PPI were significantly more likely to recall female faces that were sad and unsuccessful. In fact, Wilson et al. (2008) found that the detection rate for female, sad and unsuccessful faces in participants with a high PPI scores was almost perfect. I therefore performed exploratory analyses to see if there were any differences in the relationship between psychopathy and DEFT as a function of the gender of the facial expression. A significant negative correlation was found between PCL-R Factor 1 and the detection

of sad faces in males ($r = -.27$) but not for female faces ($r = -.11$). Further analysis revealed that these correlations were not significantly different.

Wilson et al.'s (2008) results suggest that gender appears to have been a significant factor in the recall of sad, unsuccessful faces. However, I failed to find any difference in the detection of sad faces between male and female slides. There is a difference between the methodology used by Wilson et al. (2008) and the DEFT. Wilson et al.'s results are based on participants' ability to recall information presented on slides, which therefore contains a memory component. In contrast, the DEFT measures the ability to detect and label emotion. Previous studies have failed to consider the possible role of gender when exploring the relationship between psychopathy and facial recognition. Clearly further research is necessary.

9. CONCLUSION

Overall, these results provide some support for Blair et al.'s (2005) theory of psychopathy. I found a significant relationship between the detection of sad faces and PCL-R total score, Factor 1 and Facet 1 of the PCL-R. The fact that I failed to demonstrate a relationship between psychopathy and the detection of fear is support for Kosson et al.'s (2002) theory.

Contrary to my earlier predictions, I found that PPI-I of the PPI-R rather than the Coldheartedness scale was associated with superior detection of anger. This is further support for Kosson et al.'s (2002) theory that psychopathy is associated with a superior ability to 'decode anger'. I failed to find any difference in the detection of emotion between male and female slides.



CHAPTER 10 PSYCHOPATHY AND EMOTIONAL PRIMING

1. INTRODUCTION

1.1 Measuring emotional processing

A number of studies have found that psychopathic individuals experience specific difficulty recognising sadness and or fear and these findings form the basis for Blair, Mitchell & Blair's (2005) neurocognitive theory of psychopathy. However, Kosson, Suchy, Mayer & Libby (2002) have a different view which is that psychopathic individuals do not appear to experience difficulty recognising and labelling fear but may not experience appropriate physiological responses to such stimuli. Previous studies have measured the blink startle response or electrodermal activity as an indicator of responsiveness to the emotional valence of slides (Levenston, Patrick, Bradley & Lang, 2000; Patrick, Bradley & Lang, 1993; Justus & Finn, 2007; Patrick, Cuthbert & Lang, 1994; Vanman, Mejia, Dawson, Schell & Raine, 2003) (see chapter 1). In this chapter I will therefore explore the relationship between psychopathy measured using the PCL-R and PPI-R and responsiveness to the emotional content of slides.

1.2 Selection of a task to measure responsiveness to the emotional valence of slides

The studies described above in 1.1 require the measurement of physiological or electrophysiological changes during stimulus presentation. Whilst such studies are most valuable, they have some limitations. Firstly, the measurements require specialist equipment that is expensive and not available to many clinicians or staff who might be interested in examining emotional processing of any individual

offender. Secondly, such equipment requires careful calibration and there are marked differences in the response of each individual that are due to the exact position of the electrodes, the amount of gel used, etc. Hence such techniques are limited in what they can tell us about the response of any individual.

My original aim was to measure the blink startle or galvanic skin response whilst participants were presented with slides that differed in emotional valence.

Unfortunately the security department at HMP Long Lartin did not give permission for this equipment to be used in a high security prison. Therefore, it was necessary to identify another task that would allow assessment of participants' reactions to the emotional valence of slides which did not require this equipment.

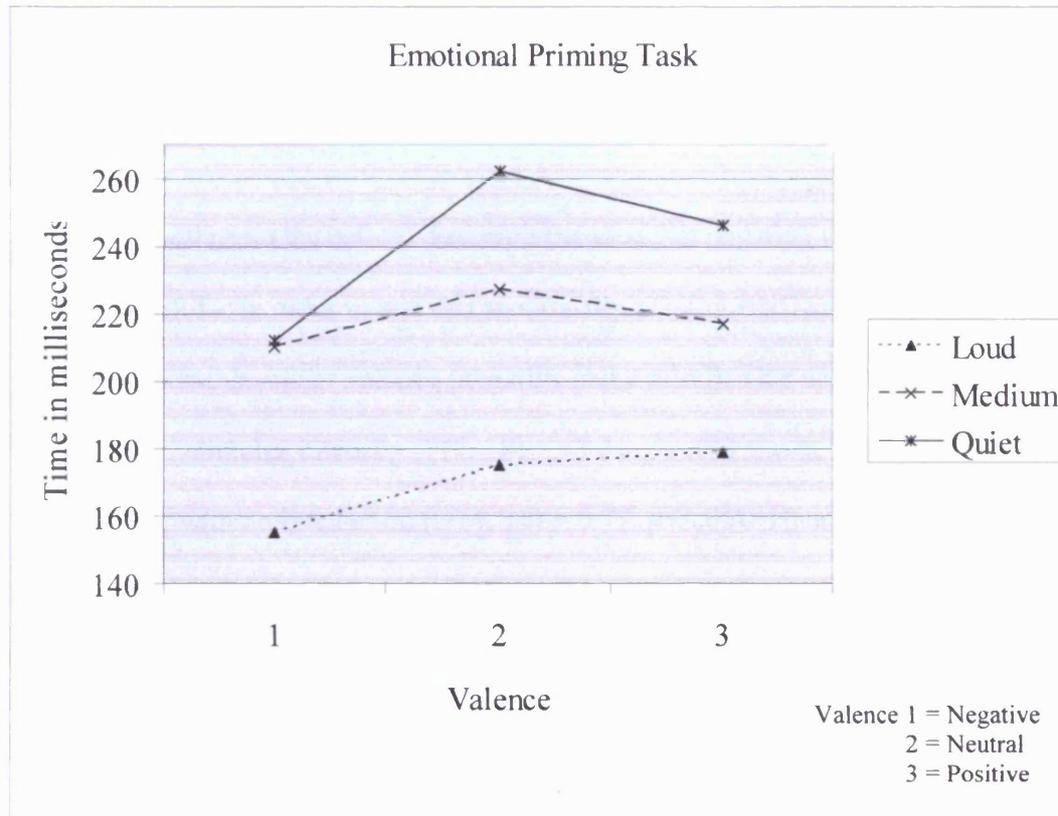
1.3 The Emotional Priming Task (EPT)

I developed the EPT in conjunction with Professors Robert Snowden and Nicola Gray. We reasoned that the basic idea behind the modulation of startle paradigm was that the presentation of the negative picture puts the person in a heightened state of readiness (as encountering a snake whilst out walking might do) so that they are able to respond quickly to any event that occurs (such as the loud noise in the startle paradigm). If this is the case, then we might also be able to measure this heightened state of readiness by a simple reaction time (RT) task whereby a person presses a button as quickly as possible following a target stimulus. It might be argued that the startle reflex is a separate system to that which controls RT responses (it is beyond the scope of this thesis to explore this issue), however, it seemed likely to us that similar effects could occur at many levels of stimulus processing and we decided to develop a

paradigm that mirrors the emotional modulation of the startle paradigm, but replacing measuring startle with a RT task to the same type of noise stimuli.

1.4 Piloting of the EPT

Figure 10.1



Prior to the commencement of my data collection the EPT was piloted by my supervisor’s research team. Figure 10.1 shows the results of a pilot study on nine undergraduate students from Cardiff University (data from Snowden and Gray, personal communication). At this stage, three levels of stimulus intensity were presented (loud, medium and quiet) and three valences of pictures (negative, positive and neutral). Inspection of figure 10.1 would appear to show that for high stimulus

intensities there is the expected effect where RTs are fastest to negative valence pictures and slowest to positive pictures. At low stimulus intensities the effect of positive images appears to speed the RTs compared to neutral images. A 3x3 ANOVA showed main effects of stimulus intensity ($F(2, 36)=11.55, p <.01$) and of valence ($F(2, 36)= 5.57, p<.05$), but no interaction was detected ($F(4,36) = 0.91 p>.05$). Hence despite the appearance of a differential effect of positive valence with stimulus intensity this did not appear in this global ANOVA.

My main hypotheses (see below) deal with the idea that negative valence images should speed RTs. In order to test this specifically a 2 X 3 ANOVA was performed using just the two levels of valence (negative and neutral). This also produced the main effect of stimulus intensity ($F(2, 18) = 12.21, p <.01$) and of valence ($F(2, 18) = 6.08, p <.05$), with no interaction ($F(4, 18) = 0.77, p > .05$). Hence, it appears that the effect of the negative image was robust and consistent across the different intensity conditions.

Hence, this pilot shows that the task can pick up a speeded RT when negative images are shown, and that this is true for all the stimulus intensities tested. The effects of positive images were less clear with some hints (though no statistical evidence) that there could be differential effects related to stimulus intensity. As the main aim of this experiment was to examine the processing of the negative valence images, it was felt that this pilot study provided evidence of the utility of the task. As it also suggested that the effect was present for all sound intensities, the middle sound intensity was dropped so as to shorten the task.

2. HYPOTHESES

2.1 Hypotheses for the PCL-R and the EPT

This is the first time that the EPT has been completed by a forensic sample and is also novel in taking two separate measures of psychopathy, the PCL-R and PPI-R.

1) Both Blair et al.'s (2005) and Kosson et al.'s (2002) theories predicts that there will be a negative relationship between PCL-R total score and the difference between reaction time to negative compared with neutral slides.

This effect should be most evident for Factor 1.

2.2 Hypotheses for the PPI-R and the EPT

Benning et al. (2005) demonstrated that participants with a high score on PPI-I (Fearless Dominance) of the PPI, demonstrated a reduced blink startle to negative pictures. However, I have previously stated that Patrick & Bernat (2009) and Patrick (2010) believe that the Factor 1 of the PCL-R is more similar to the Coldheartedness scale of the PPI-R than PPI-I. I therefore predict that there will be;

1) A negative relationship between PPI-R total score and the difference between reaction time to negative compared with neutral slides. This effect should be most evident for the Coldheartedness scale.

3. METHOD

3.1 Participants

See chapter 4 for details of participants.

3.2 The EPT

3.2.1 Design and materials

Participants were presented with positive, negative and neutral slides on a computer screen. Slides were identified from the International Affective Picture Systems (IAPs, Lang, Bradley & Cuthbert, 2001). Eighteen slides were identified as experimental target slides. Six had negative valence, six had a positive valence and six had neutral valence. Each of these target slides was presented on three occasions. On one occasion the slide was presented for 2000ms without any accompanying sound. On two occasions it was presented for 1000ms and then a target sound (noise) was played (on one occasion a loud sound, on the other a quiet sound). The slide continued to be shown until a response was made. As well as these target slides, 54 other slides from the IAP were chosen as filler items. These items had a wide range of valences so that the target slides were not identifiable on the basis of their valence. These slides were also presented three times each for 2000ms but no target sound ever accompanied them. The target slides were therefore embedded in a sequence of filler slides such that a target slide always had at least 2 filler slides between them and as many as 5 filler slides. Within these constraints the order of the 216 presentations (18 target and 54 filler slides presented 3 times each) was then randomised. All participants were presented with the same slide sequence.

The target sounds were bursts of white noise of 50 ms duration. Due to an inability to calibrate the equipment for each participant or control for extraneous outside noise, I was not able to present the sounds at a specific sound level. Instead the volume on the

computer was adjusted so the quiet sound could be comfortably heard whilst the loud sound produced a mild startle on first encountering it.

Participants were told to hit the spacebar on the keyboard as quickly as possible on hearing a noise. For each participant, average reaction times (in milliseconds) were measured.

The stimulus presentations and reaction time recorded was controlled via custom written programmes using Superlab (Cedrus Corporation, California) and presented on a Toshiba Satellite Pro L10 laptop.

3.2.2 Details of the emotional valence and arousal of slides used in the EPT

A number of earlier studies have explored the relationship between psychopathy and responsiveness to the emotional content or valence of slides (Blair, Jones, Clark & Smith, 1997; Levenston et al., 2000; Patrick et al., 1993; Vanman et al., 2003). All these studies have used slides from IAPs, (Lang, Bradley & Cuthbert, 2001) or the earlier 1988 version (Lang & Greenwald, 1988). According to the (IAPS) Technical Manual, (Lang et al., 2001) slides are rated on two dimensions, valence and arousal. Valence is the extent to which a slide is rated as pleasant to unpleasant, the higher the score the more pleasant the slide is rated to be. Arousal is rated according to how calm or excited a slide makes the viewer feel, a high score conveys excitement or arousal. All the studies that I have previously referred to have attempted to match slides on emotional arousal (Blair et al., 1997; Levenston et al., 2000; Patrick et al., 1993; Vanman et al., 2003). Table 10.1 summarises the valence and arousal scores for

slides used in a number of published studies (Blair et al., 1997; Levenston et al., 2000; Patrick et al., 1993; Vanman et al., 2003).

Negative, positive and neutral slides clearly differ in valence. However, it is possible to match negative and positive slides for arousal. The mean score for negative slides used in the EPT was 6.27 and 5.05 for positive slides (see Appendix 6 for details of slides used in the EPT). A one-sample t-test was conducted to explore whether a difference exists in the arousal rating between positive and negative slides used in the EPT. A significant difference was found ($p < .000$) which means that the negative slides were more emotionally arousing than the positive slides.

Typically slides that are positive and arousing (for male participants) tend to be erotic females and scenes of people engaged in thrill seeking activities such as sky diving. In fact, Levenston et al. (2000) used 13 different slides of erotic females. I did not include such slides because I was aware that all the prisons where I collected data held men who were convicted of serious sexual offences against adult females. Such material would not be considered inappropriate within a high security prison.

Typically romantic couples and animals are high on valence but not rated as high on arousal as erotic females. In the absence of erotic females, it was harder to find positive slides with high arousal ratings and I did not want to just include 'thrill seeking activities'. The significance of the arousal ratings of positive slides will be discussed in section 4.

The slides used in the EPT were broadly speaking comparable to slides used in previous studies (Blair et al., 1997; Levenston et al., 2000; Patrick et al., 1993; Vanman et al., 2003) in terms of their valence and arousal.

Table 10.1 Mean valence and arousal ratings for slides used in a number of published studies

| | Mean Valence rating positive slides | Mean Valence rating negative slides | Mean Valence rating neutral slides | Mean Arousal rating positive slides | Mean Arousal rating negative slides | Mean Arousal rating neutral slides |
|--------------------------------|-------------------------------------|-------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|------------------------------------|
| My slides | 6.92 | 2.04 | 5.15 | 5.05 | 6.27 | 2.64 |
| Blair et al. (1997) | * | 4.27 | 5.04 | * | 5.24 | 2.52 |
| Patrick et al. (1993) | 7.45 | 2.54 | 5.03 | 6.16 | 5.97 | 2.62 |
| Levenston et al. (2000) | 7.52 | 2.43 | 5.02 | 6.70 | 6.32 | 2.70 |
| Vanman et al. (2003) | 7.42 | 2.93 | * | 5.61 | 5.85 | * |

*Slides were not presented.

3.2.3 Instructions for completing the EPT

The following instructions appeared on the computer screen before participants completed the EPT.

You are about to see a series of pictures. Some of the pictures are coupled with a tone which you will hear through headphones. Please look at each picture carefully. There will be a short memory test at the end. Please press the space bar as soon as you hear the tone. Please respond as quickly as you can to the noise.*

Thank you for your participation. Press the space bar when you are ready.

* Participants were informed at the end of the experiment that there was no memory test.

3.2.4 Scoring the EPT

Participants were randomly presented with positive, negative and neutral slides. Their reaction times when presented with the acoustic probe were measured in milliseconds. The average time was calculated for positive, negative and neutral slides in both the quiet and loud conditions (six conditions). Of particular interest is participants' reaction time to the content of negative slides relative to neutral. Healthy individuals typically respond quicker to negative stimuli and therefore demonstrate a difference between their reaction time to negative slides compared to neutral slides. If psychopathic individuals do not process the emotional content of the stimulus then this difference in RTs whilst viewing neutral vs. negative stimuli should not occur for these individuals. Participants' responses to positive slides were included for interest. Differences in average reaction times between negative, positive and neutral slides in both the quiet and loud acoustic probe conditions were therefore calculated for every participant.

4. DATA ANALYSIS

The aim was to examine the relationship between measures of psychopathy (one based upon file review and interview, the PCL-R, and one based on self-reported traits and behaviours, the PPI-R) and participants' performance on the EPT. This task produces four scores relating to RTs when viewing negative, neutral or positive slides.

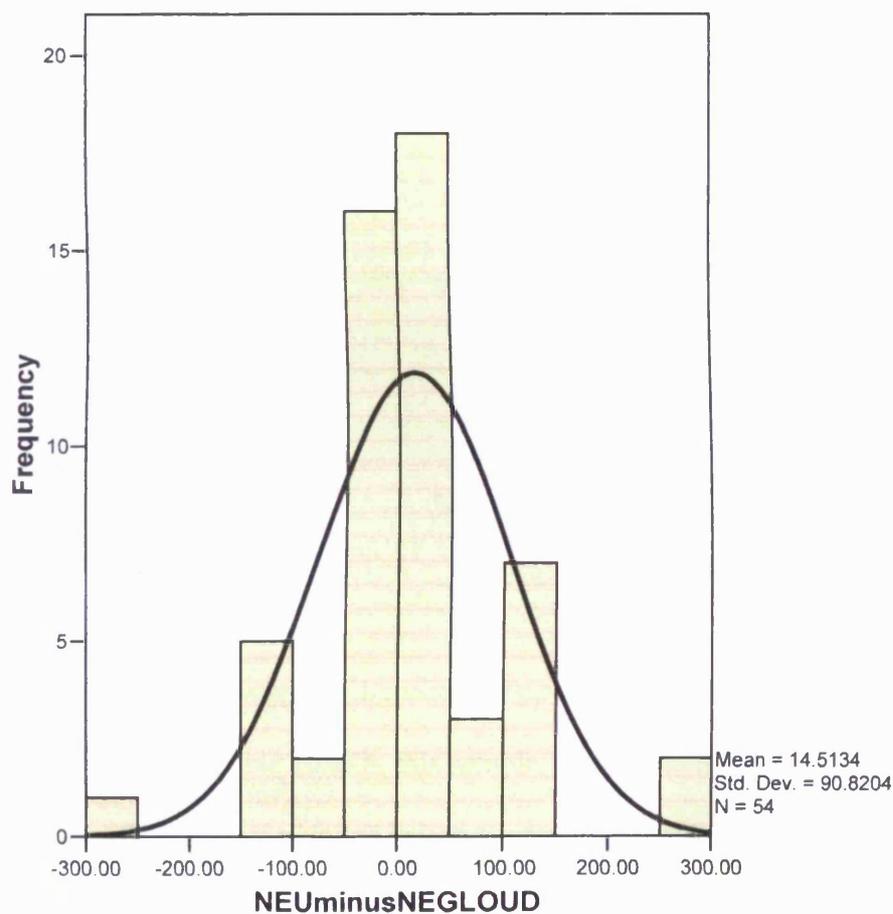
My hypothesis is that psychopathic individuals will show a reduced modulation in RTs due to the valence of the stimuli compared to the non-psychopaths. Hence, in the main analysis, I calculated this difference in RTs between these types of slides ($RT_{nn} = RT_{neutral} - RT_{negative}$; termed RT_{nn} to indicate the difference between neutral and negative slides). As I expect $RT_{negative}$ to be smaller than $RT_{neutral}$ strong modulation of RTs would be reflected by large RT_{nn} . Thus, I predict a negative correlation between RT_{nn} and psychopathy scores. Given the effect of the volume of the sound is not known, separate RT_{nn} scores were calculated for each sound level. For completeness, I also calculated a similar RT_{np} score that examined if the positive slides produced a faster response than the neutral slides (It might be expected that the positive slides would produce slower responses in which case RT_{np} would become negative). Hence for the main analysis there were four scores produced by the EPT relating to the difference between both negative or positive slides and neutral at the two sound levels.

As in previous chapters, there are many possible correlations between the measures of psychopathy and the EPT, hence I used the same strategy to guard against Type I errors whilst trying to avoid Type II errors. The EPT data were checked for indications that they were normally distributed using the techniques outlined in chapter 4.

Only RT_{nn} in the loud condition was not normally distributed (see figure 10.2). It is clear from the histogram, which displays a normal distribution curve, that this data demonstrates positive kurtosis. An attempt was made to transform this variable using a number of methods (Tabachnick & Fidell, 2007); square root, subtracting the score

from a constant (in this case the largest score) and using a log. None of these transformations were successful in normalising this variable. However, many transformations address skewness rather than kurtosis. As it was not possible to transform this data, a non parametric test, Spearman's rho will be used to analyse RT_{nn} in the loud condition. Given that all the other variables from the EPT did not break the assumptions for use of parametric statistics, Pearson's Product Moment will be used to analyse these data.

Figure 10.2 Distribution of scores for RT_{nn} in the loud condition



5. RELATIONSHIP BETWEEN THE EPT AND INTELLIGENCE

Table 10.2 IQ measured by the WASI total, verbal and performance IQ scores and the EPT

| | WASI total score | Verbal IQ | Performance IQ |
|--|------------------|-----------|----------------|
| Negative (loud) ^a | -.38** | -.30 | -.12 |
| Negative (quiet) ^b | -.48** | -.42** | -.26 |
| Positive (loud) ^b | -.37** | -.44** | -.21 |
| Positive (quiet) ^b | -.30* | -.41* | -.13 |
| Neutral (loud) ^b | -.27 | -.31* | -.09 |
| Neutral (quiet) ^b | -.35* | -.36* | -.19 |
| Neu(loud)- neg(loud) ^a | .14 | .09 | .09 |
| Neu(quiet)- neg(quiet) ^b | .07 | .07 | .07 |
| Neu(loud)- pos(loud) ^b | .06 | .19 | .13 |
| Neu(quiet)- pos(quiet) ^b | -.08 | .02 | .01 |

* $p < .05$, ** $p < .01$

^a = Spearman's rho, ^b = Pearson's r

The correlations between intelligence measured by the WASI and performance on the EPT are shown in Table 10.2. In this sample, significant negative correlations of moderate effect size were found between reaction times for negative, positive and neutral slides in both loud and quiet conditions and WASI total score and Verbal IQ. Only Performance IQ failed to demonstrate any statistically significant relationships with the EPT task. However, crucially, no significant relationships were found

between the difference between either neutral and negative or positive slides in either the quiet or loud conditions. Given that intelligence does not appear to be related to performance on the crucial variables of interest for performance on the EPT, RT_{nn} and RT_{np} , I will not control for the effects of IQ.

6. RESULTS

6.1 Descriptive statistics for the EPT

Table 10.3 Descriptive statistics for the EPT

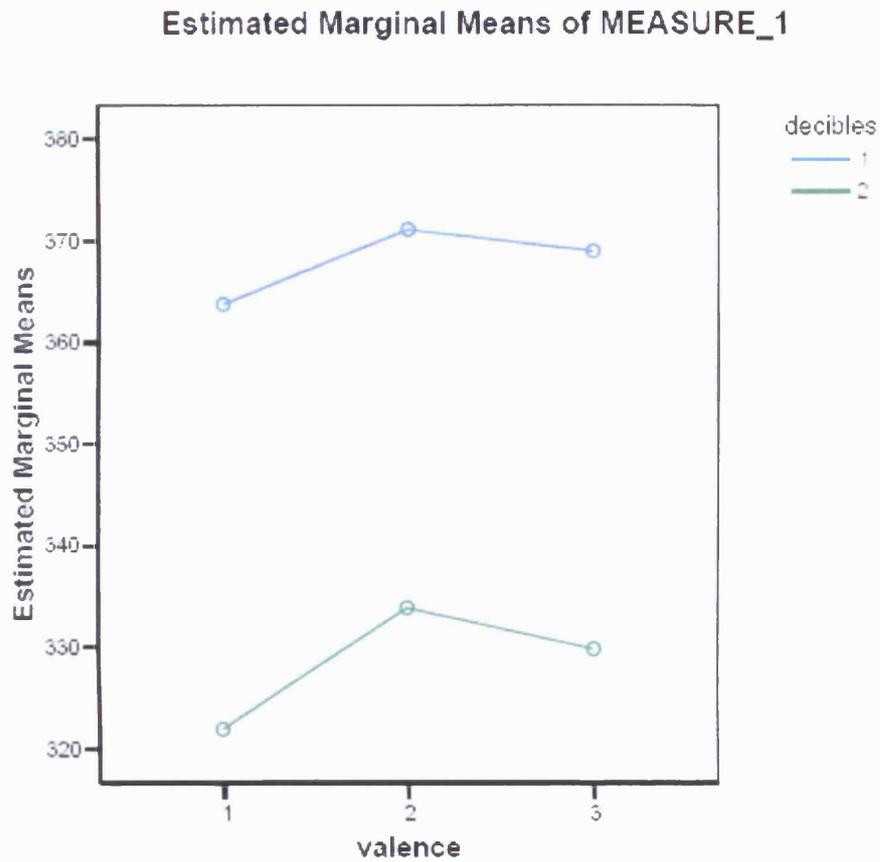
| | Mean Reaction time (Milliseconds) | Standard Deviation | Range |
|-------------------------|--|---------------------------|--------------|
| Negative (loud) | 321.9 | 147.1 | 146-816 |
| Negative (quiet) | 363.7 | 141.9 | 162-721 |
| Positive (loud) | 329.8 | 124.2 | 162-640 |
| Positive (quiet) | 368.9 | 137.1 | 165-797 |
| Neutral (loud) | 333.9 | 135.9 | 170-738 |
| Neutral (quiet) | 371.1 | 138.2 | 189-371 |

The data from the EPT are presented in Table 10.3. This is the first time this task has been administered to offenders, so there is no normative sample with which to compare this data. For each of the six conditions, there is a good spread of scores. Figure 10.3 shows RTs to the loud and quiet noise bursts as a function of the emotional valence of the slide. It was not possible to conduct a two-way analysis of variance, to explore whether there were any differences in participants' reaction times to the valence (emotional content) of the slides and noise (quiet and loud conditions) and any interaction between valence and noise because one of the variables negative (loud) violated assumptions for use of parametric statistics.

However, a series of Wilcoxon Signed Rank tests showed that the effect of sound intensity was significant (all $ps < .001$) for all valences, however, there were no significant effects (all $ps > .05$) of valence when comparing the positive or negative images to the neutral images at either sound intensity.

Despite this disappointing result (that image valence did not significantly alter RTs), I reasoned that this maybe due to the high levels of psychopathy in this sample. Indeed, it was my hypothesis that those with high psychopathy scores would not show this valence affect. Hence, I proceeded to examine the effects of psychopathy score on the EPT.

Figure 10.3 Reaction times to the loud and quiet noise bursts as a function of the emotional valence of the slide.



Noise 1=quiet 2=loud

Valence 1=negative 2=neutral 3=positive

6.2 The relationship between psychopathy and performance on the EPT

6.2.1 The PCL-R and EPT

Table 10.4 PCL-R total and Factor scores and the EPT

| | PCL-R total | Factor 1 | Factor 2 |
|--|-------------------------|------------------------|--------------------------|
| Neu(loud)- neg(loud) ^a | -.08¹ | .13¹ | -.25 |
| Neu(quiet)- neg(quiet) ^b | -.16¹ | .03¹ | -.41^{**} |
| Neu(loud)- pos(loud) ^b | -.03 | -.00 | -.01 |
| Neu(quiet)- pos(quiet) ^b | -.18 | -.23 | -.16 |

* $p < .05$, ** $p < .01$ ***Significant after Bonferroni correction $p < .01$. Correlations of interest are presented in bold. ¹ One tailed tests

^a = Spearman's rho, ^b = Pearson's r

Table 10.4 summarises correlation co-efficients for PCL-R total and Factor scores and the EPT. Neither PCL-R total score nor Factor 1 score were related to any index of the EPT. However, Factor 2 showed a negative correlation of moderate effect size for RT_{nn} for the quiet condition ($r = -.41$). The correlation for the loud condition was in the same direction but did not reach statistical significance. Further examination at the Facet level did not reveal any significant effects (see Appendix 7 Table 10.6).

6.2.2 The PPI-R and the EPT

Table 10.5 PPI-R total and factor scores and the EPT

| | PPI-R total | PPI-I Fearless Dominance | PPI-II Self Centred Impulsivity | Coldheartedness |
|------------------------------------|-------------------|--------------------------|---------------------------------|--------------------|
| Neu(loud)-neg(loud) ^a | -.09 ¹ | -.04 | -.11 | .04 ¹ |
| Neu(quiet)-neg(quiet) ^b | -.13 ¹ | -.26 | .00 | -.27 ^{1*} |
| Neu(loud)-pos(loud) ^b | .09 | .06 | .08 | -.07 |
| Neu(quiet)-pos(quiet) ^b | -.31* | -.23 | -.30* | -.00 |

* $p < .05$, ** $p < .01$ ***Significant after Bonferroni correction $p < .01$.

^a = Spearman's rho, ^b = Pearson's r

¹ One tailed tests

Table 10.5 summarises the correlation co-efficients for the self-report psychopathy measure, the PPI-R total and factor scores and the EPT. A significant negative correlation was found between RT_{nn} in the quiet condition and the Coldheartedness scale ($r = -.27$), however this failed to survive Bonferroni correction. Significant negative correlations were found between PPI-R total ($r = -.31$) and PPI-II ($r = -.30$) and RT_{np} in the quiet condition.

7. DISCUSSION

7.1 The PCL-R and EPT

The aim was to explore the relationship between psychopathy and reaction to the emotional valence of slides. This EPT was developed as a method to explore responsiveness to the emotional valence of slides and was attractive because it was easy to administer, particularly in high security prisons. This was also the first time that an EPT had been completed by a forensic sample and was novel in taking two

separate measures of psychopathy, the PCL-R and PPI-R. I explored whether there was any relationship between psychopathy measured by both the PCL-R and PPI-R and the difference between neutral and positive and negative slides in both loud and quiet conditions.

Contrary to earlier predictions, no significant relationships were found between PCL-R total or Factor 1 and the difference in reaction times between neutral and negative slides. Unexpectedly, and contrary to earlier predictions, a significant negative correlation was found for Factor 2 in the quiet condition. However, further analysis revealed non-significant relationships for Facets 3 and 4.

This is the first time that such an EPT has been administered to a sample of offenders. There are no results with which to compare this data. Buodo, Sarlo & Paloma (2002) found that participants responded significantly faster to threatening slides compared with sport/adventure and household objects. However, this was a sample of healthy individuals rather than offenders. There are previous studies that have used other methods to measure physiological responsiveness to emotional material such as electrodermal activity or blink startle response. Patrick et al. (1993) found that psychopathic, in contrast to non-psychopathic participants, failed to demonstrate any difference in blink startle to negative compared with neutral slides. Vanman et al. (2003) replicated this result in a sample of community based volunteers. Levenston et al. (2000) also found that psychopathic participants demonstrated reduced blink startle to both victim and threatening slides.

Previous studies, using the blink startle response as a measure of emotional processing, have also found that a high score on Factor 1 is related to reduced blink startle in response to negative slides in psychopathic individuals (Patrick et al., 1993). Once again Vanman et al. (2003) replicated this result in a community based sample. Although I used a different method to measure emotional processing, the results are contrary to earlier predictions and at odds with results of previous studies. A significant negative correlation was found for Factor 2 and the difference between neutral and negative slides. Previous research does not predict that Factor 2, which is the irresponsible lifestyle and antisocial component of psychopathy, should be related to emotional processing. This result means that participants with a high score on Factor 2 of the PCL-R were less responsive to the valence of negative slides relative neutral.

There is another study that has found that Facets 3 and 4 of the PCL-R might be related to performance on a moral reasoning task. Glenn, Raine & Schug (2009a) found that psychopathic individuals demonstrated reduced activity in the left amygdala whilst completing a moral reasoning task. However, no differences were found between psychopathic and healthy individuals in terms of their performance on this moral reasoning task (Glenn, Raine, Schug, Young & Hauser, 2009b). Glenn et al. (2009a) found that all four Facets of the PCL-R were negatively related to activity in the left amygdala during this moral reasoning task. I am aware that direct comparisons cannot be made between a moral reasoning task and the EPT but it is of interest that both Facets 3 and 4 were found to be related to reduced amygdala activity during this task. Further research is clearly necessary to explore the relationship between Factor 2 (and Facets 3 and 4) and emotional processing.

7.2 The PPI-R and EPT

No significant relationships were also found between PPI-R total and PPI-I and the differences in average reaction times to negative and neutral slides in both conditions of noise. Although a negative correlation was found between neutral and negative slides (in the quiet condition) and the Coldheartedness scale, this did not survive Bonferonni correction. Unexpectedly, a significant negative correlation was found between RT_{np} in the quiet condition and PPI-R total score and PPI-II.

Once again, there is no data with which to compare these results. Benning et al. (2005) found that participants with a high score on PPI-I (Fearless Dominance) of the PPI, demonstrated a reduced blink startle to negative pictures. This is similar to the pattern of results that has been found with Factor 1 of the PCL-R. I found no evidence that PPI-I (Fearless Dominance) of the PPI-R was related to response to the valence of negative slides in this study.

7.3 Limitations of the EPT

My aim was to identify a task that would measure physiological responsiveness to emotional material in order to allow further testing of Kosson et al.'s (2002) theory that psychopathic individuals fail to demonstrate appropriate physiological arousal to negative stimuli. However, as it was not possible to measure the blink startle response, the EPT, which is similar to the method used by Buodo et al. (2002), was developed to measure responsiveness to the emotional valence of slides.

It proved difficult to match positive and negative slides for emotional arousal without including slides of erotic females, which have previously been rated as the most arousing positive slides (Lang et al., 2001). The positive slides used in the EPT were therefore significantly less arousing than the negative slides. On reflection, in order to ensure that the positive and negative slides were matched for emotional arousal, I should have included more arousing positive slides, which would still have been possible even taking into account the fact that I did not want to include images of erotic females.

The fact I found a relationship between the PPI-R and RT_{np} in the quiet condition could be due to the fact that participants did not find the positive slides arousing in comparison to neutral slides and therefore a smaller difference in reaction time was found between these slides. However, I did not find this pattern of results for the PCL-R.

However, the EPT has been demonstrated to be a reliable method of assessing responsiveness in healthy individuals (Buodo et al., 2002) and this was also case for the pilot data I presented earlier in 1.4. This task has not been previously piloted with forensic populations. Although I note that for the blink startle response, the same pattern of responses has been found for both a community based sample of healthy individuals and forensic populations (Vanman et al., 2003).

Contrary to earlier predictions a relationship was not found between psychopathy and responsiveness to negative slides (only for Factor 2 which was unexpected). Failure to find a relationship between psychopathy and responsiveness to negative slides may be

a result of the content of the negative slides. If this task was administered in the future, it might also be necessary to review the content of the negative slides. Buodo et al. (2002) found that reaction time to blood injuries was significantly longer than for threatening slides. This was clearly not taken into account in the design of the EPT. Three of the negative slides contained blood or burn injuries. It is possible that the presence of these slides resulted in an overall slower reaction time to negative slides.

I note that previous studies have included slides depicting attack on others (Levenston et al., 2000; Patrick et al., 1993; Vanman et al., 2003), which were not included as part of the negative slides presented during this study.

It would therefore be interesting to update the EPT in the future and include slides showing people displaying sadness or fear. For example, there are a number of IAP slides that show an assailant, often with a weapon and the victim clearly displaying fear. There are also a number of slides showing people displaying sadness for example, an undernourished African child crying and people crying at a funeral. It would be interesting to repeat the EPT using these slides and exclude any slides containing blood injuries.

8. CONCLUSIONS AND FURTHER WORK

The EPT was administered in order to explore responsiveness to the content of negative slides relative to neutral. Contrary to earlier predictions, no significant relationships were found between PCL-R total or Factor 1 scores and the difference in reaction times between neutral and negative slides. Unexpectedly, a relationship was

found with Factor 2 of the PCL-R and RT_{mn} in the quiet condition. For PPI-R, I found a negative relationship with responsiveness to positive slides relative to neutral in the quiet condition. It is possible that these results suggest that there is a relationship between psychopathy and responsiveness to positive material. It is also possible that failure to find a relationship between psychopathy and responsiveness to negative slides relative to neutral may be due to the limitations of the EPT.

There are clearly few studies that have investigated the relationship between psychopathy and physiological responsiveness to emotional material. The results of this study indicate that further research is necessary to continue to explore the relationship between Factor 2 of the PCL-R and responsiveness to negative images.

CHAPTER 11 HOW DO THE DIFFERENT MEASURES OF EMOTIONAL PROCESSING RELATE TO EACH OTHER?

1. INTRODUCTION

The aim of this thesis was to explore the relationship between emotional processing and psychopathy. Participants were asked to complete two emotional intelligence (EI) measures, the MSCEIT and the TMMS. The concept of emotional intelligence involves the capacity to perceive emotions, understand those emotions and manage them. Therefore it would seem that the tools developed to measure emotional intelligence would be ideal to examine the emotional deficit hypothesised to underpin psychopathy and that deficits in emotional intelligence would be manifest in those with high scores on measures of psychopathy.

Petrides & Furnham (2001, 2003) make a distinction between 'trait EI' and 'ability EI'. Trait EI is an individual's own perception or self assessment of his/her ability to recognise, understand and manage emotional states. In contrast to trait EI, ability EI is conceptualised as a cognitive ability and is measured by a performance test which has correct answers.

Participants were also asked to complete a facial recognition task (Detection of Emotional Faces, DEFT), in order to specifically examine their responses to sad and fearful stimuli.

Finally, in order to measure responsiveness to the emotional valence of slides, participants were asked to complete an Emotional Priming Task (EPT), which measures reaction time to slides that differ in emotional valence.

Both the DEFT and the MSCEIT are tasks that have correct responses. Branch 1 of the MSCEIT is Perceiving Emotions and is based on two tasks which measure the ability to firstly identify emotion in facial expressions (similar to the DEFT) and secondly emotion conveyed in pictures and patterns such as a tree in a barren desert. These tasks contain stimuli

related to a range of emotions which includes anger, sadness and fear. It could be argued that participants who demonstrate poor performance on the DEFT would also demonstrate poor performance on the MSCEIT. This could also be the case for the EPT which measures participants' reactions to the emotional content of negative and positive slides relative to neutral slides. Once again, participants who fail to respond to the emotional content of negative slides (and positive slides, although these were only added for interest) may demonstrate poorer performance on both the MSCEIT and DEFT.

In contrast to the other measures and tasks administered during this thesis, the TMMS measures an individual's own perception or self assessment of his/her ability to recognise, understand and manage emotional states. Given that Pham & Philipott (2010) previously demonstrated that psychopathic individuals may have poor insight into their ability to understand emotions, it is possible that negative relationships may be found between the TMMS and the DEFT, EPT and the MSCEIT because participants may over-estimate their ability to understand and manage emotions.

However, emotional processing is a multidimensional concept. It may not be the case that if a participant demonstrates poor performance on one task, that he will also demonstrate poor performance on another task with an emotional component. The results of a number of studies support this idea. For example, psychopathic individuals have been found to not respond to the emotional content of negative words (Begleiter, Gross & Kissin, 1967; Day & Wong, 1996; Graves, Landis & Goodglass, 1981; Strauss, 1983; Williamson, Harpur & Hare, 1991) but studies have found that they may demonstrate a superior ability to recognise signs of vulnerability and success in others (Book, Quinsey & Langford, 2007; Wilson, Demetriooff

& Porter, 2008). Psychopathic individuals have also been found to demonstrate comparable performance to healthy individuals on a moral reasoning task (Glenn, Raine, Schug, Young & Hauser, 2009b). Exploring the relationships between the different emotional processing tasks is therefore exploratory and secondary to the main aims of the thesis. I will therefore not identify any hypotheses.

2. DATA ANALYSIS

Prior to identifying a statistical test to analyse the data, it was firstly necessary to explore whether data was normally distributed using Kolmogorov-Smirnov (KS) test. As stated in previous chapters, I used a significance level of ($p < .001$) for the KS test. Where data has been found to not violate the assumptions of parametric statistics, Pearson's Product Moment will be used to analyse data. For all other analyses Spearman's Rho will be used. Only the emotional detection component of for the DEFT task will be used in order to reduce the total number of correlations. In previous chapters, I have controlled for the effects of IQ where this has been demonstrated to be related to performance on a task. However, given that a number of variables violate the assumptions for use of parametric statistics, it was not possible to carry out partial correlations to explore the relationship between all tasks. I therefore considered it meaningless to carry for partial correlations to control for IQ for some tasks but not all.

3. RESULTS

Table 11.1 Summary of the relationship between different tasks

| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|----------------------------|-------------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|-------------------------|----------------------------|-------------------------|
| 1 | -.45^{1***} | -.07³ | -.12¹ | -.08¹ | -.07¹ | -.20² | .06³ | -.02² | .13¹ | .27³ | .03¹ |
| 2 | | -.08³ | .06¹ | .13¹ | .04¹ | .03² | -.04³ | .01² | -.04¹ | -.03³ | .00¹ |
| 3 | | | .44^{3**} | .03³ | .13³ | .12³ | -.07³ | -.06³ | .05³ | -.04³ | .02³ |
| 4 | | | | .21¹ | .18¹ | .16² | .03³ | .16² | .11¹ | -.04³ | .15¹ |
| 5 | | | | | -.21¹ | .22² | .02³ | .10² | .33^{1*} | -.00³ | .02¹ |
| 6 | | | | | | -.09² | -.26³ | -.32^{2*} | -.02¹ | -.36^{3***} | -.11¹ |

* $p < .05$, ** $p < .01$. ***Significant after Bonferroni correction $p < .002$. The correlations of interest are indicated in bold.

1 MSCEIT total score, 2 TMMS total score 3 NEU-NEG (Loud), 4 NEU-NEG(Quiet), 5 NEU-POS (Loud), 6 NEU-POS (Quiet), 7 sad detection, 8 happy detection, 9 fear detection, 10 surprise detection, 11 anger detection, 12 disgust detection

¹ Pearson's r

² Pearson's r on transformed data

³ Spearman's rho

Table 11.1 provides a summary of how the different tasks administered to participants during this research relate to each other. I have not included correlations for how the different emotions in the DEFT task relate to each other. A significant negative correlation of moderate effect size was found between MSCEIT and TMMS total scores ($r = -.45$) which remained significant after Bonferroni correction. I also found that the difference between neutral and positive slides in the quiet condition was negatively related to the detection of

fear ($r = -.32$) and anger ($r = -.36$). However, in the loud condition this variable was positively related to the detection of surprise ($r = .33$).

4. DISCUSSION

4.1 MSCEIT and TMMS

A negative relationship was found between the MSCEIT, an ability EI measure, and the TMMS, which is a self-report or trait EI measure ($r = -.45$) which survived Bonferroni correction. Petrides & Furnham (2001, 2003) make a distinction between 'trait EI' and 'ability EI'. Trait EI is an individual's own perception or self assessment of his/her ability to recognise, understand and manage emotional states. In contrast, ability EI is a cognitive ability and is measured by a performance test which has correct answers. Petrides, Furnham & Mavroveli (2007) state that trait and ability EI measures reflect different underlying constructs of EI. They believe that trait EI is a personality trait and should therefore be linked to the field of personality psychology and that ability EI best fits within the field of human cognitive ability (see chapter 3).

Even though both are described as EI measures, it appears that the MSCEIT and TMMS may not be measuring the same underlying construct. As previously stated (see chapter 3), there is clearly no agreement about exactly what EI is and whether it is a cognitive ability or similar to existing personality constructs e.g. the 'big 5'. These results support Petrides et al.'s (2007) suggestion that a clear distinction should be made between ability and trait EI measures.

Warwick & Nettlebeck (2004) previously found a non-significant correlation between TMMS and MSCEIT total scores ($r = .19$) in a sample of college students. However, my results suggest that in a sample of offenders, there is a negative relationship between trait and ability

EI, which is at odds with the findings of Warwick & Nettlebeck (2004). There is no normative data for forensic populations for either the MSCEIT or TMMS. However, I note that MSCEIT total score for this sample was not significantly different from the mean score from a normal population. The mean score for TMMS was significantly lower than the mean score from a normal population. There do not appear to be any obvious differences between this sample and the normal population. These results therefore suggest that in this sample of offenders, participants who self-report high levels of EI on the TMMS actually demonstrate poorer performance on the MSCEIT.

One explanation for these results is that they provide evidence that the TMMS and MSCEIT may be tapping different underlying constructs associated with EI. However, these results suggest that participants who rated themselves as having high levels of EI on the TMMS actually demonstrated poor performance on the MSCEIT. This result may reflect the fact that participants lack insight into the difficulties they experience in accurately identifying and managing emotions. As stated in chapter 8, Pham & Philipott (2010) found that psychopathic individuals do not perceive themselves to experience any difficulty accurately decoding facial expressions and over-estimate their performance. Given that my sample contained a number of participants with high levels of psychopathic traits, this may also be one explanation for why I found a negative relationship between the MSCEIT and TMMS.

4.2 MSCEIT and DEFT

No statistically significant relationships were found between MSCEIT total score and the detection of any emotion in the DEFT task. This result is surprising given that both tasks require participants to detect and label emotions. I note that a positive correlation of moderate effect size was found between MSCEIT total score and the detection of angry faces which

just failed to reach statistical significance. In a larger sample size this result may well have reached statistical significance.

4.3 MSCEIT and EPT

No relationship was found between performance on the MSCEIT and responsiveness to either the emotional content of negative or positive slides. The MSCEIT contains a number of different tasks including assessing emotion in facial expressions, emotion conveyed in pictures and patterns such as a tree in a barren desert, abstract images such as red irregular triangles (designed to portray anger) and brief scenarios of complex social situations. It is possible that the MSCEIT therefore taps a range of different skills related to emotional processing. The MSCEIT manual advises against use of the eight task scores because of low levels of reliability and I therefore did not explore how each of the MSCEIT tasks might relate to the EPT.

4.4 TMMS and DEFT

These results appear at odds with the findings of Pham & Philipott (2010) as no relationship was found between the TMMS and DEFT. Pham & Philipott (2010) found that participants with a high level of psychopathic traits reported less difficulty in accurately identifying emotion which was at odds with their performance on a facial recognition task. Given that this sample contains a number of participants with high levels of psychopathic traits, a negative relationship might have been expected as these participants may have rated themselves as being skilled at understanding their own emotions but demonstrated poorer performance on the DEFT.

4.5 TMMS and EPT

No relationship was found between the TMMS and the EPT. A negative relationship between these two tasks might have been expected for the same reasons that I identified in 4.4.

4.6 DEFT and EPT

A number of relationships were found between the DEFT and EPT. I found that the difference between neutral and positive slides in the quiet condition was negatively related to the detection of fear and anger. However, in the loud condition this variable was positively related to the detection of surprise. In chapter 10, I highlighted that the positive slides used in the DEFT task were less arousing than the negative slides. These results may be due to the fact that the positive slides were not arousing enough.

4.7 Review

Other than a significant negative relationship between the MSCEIT and TMMS, no other relationships were found between the different measures of emotional processing administered during this research. Phan, Wager, Taylor and Liberzon (2002) state that many researchers have hypothesised that different areas of the brain may have specialised roles in emotional processing. However, they state that studies often produce conflicting findings because of differences between emotional tasks administered and imaging techniques. Phan et al. (2002) carried out a meta-analysis to explore whether different areas of the brain are related to aspects of emotional processing. They reviewed the results of 55 studies that used a range of emotional processing tasks and imaging techniques. Phan et al. (2002) highlight an important point which is that emotional processing tasks often contain cognitive components. They state that different emotional processing tasks, for example, facial recognition and autobiographical recall (which contains a memory component) vary greatly in terms of their

cognitive demands and it is often difficult to disentangle the cognitive and emotional components.

Phan et al. (2002) found that no single area of the brain was activated by all emotional tasks. However they found that in 50% of the studies reviewed that the medial prefrontal cortex (MPFC) was activated to a range of different emotions and tasks, which they believe means that this area of the brain may play a general role in emotional processing. Phan et al. (2002) found statistically significant relationships between activation of the following areas of the brain and specific emotions and tasks;

- Fear and the amygdala
- Sadness and the subcallosal cingulate
- Emotional tasks with a high cognitive demand (tasks which required a participant to recall significant emotional events of a personal nature) and the anterior cingulate
- Emotional tasks with a recall or memory component and the insula
- Emotional tasks with a visual component and the amygdala

Another study by Bush, Luu & Posner (2000) attempted to explore whether different areas of the brain were activated during the administration of a cognitive compared with emotional version of the Stroop interference test. Participants were presented with a series of words on a screen and asked to press a button to record how many words they had seen. In the cognitive interference part of the task, participants were presented with the word four written three times, in the emotional component, participants were presented with emotional words like murder presented three times. Consistent with their predictions, Bush et al. (2000) found that

emotional areas of the brain were activated during the emotional Stroop and cognitive areas were activated during the cognitive version. However, interestingly they found that activation of the emotional area of the brain (Orbitofrontal cortex, amygdala, anterior cingulate affective division and insular cortex) was suppressed during the cognitive task. The results of this study highlight the importance of considering both the cognitive and emotional components of tasks.

Returning to my results, the tasks administered during this research contain a number of emotional and cognitive components. For example, the MSCEIT contains images of different facial expressions (anger, sadness, fear) and emotion in abstract pictures. However, it also contains a number of other tasks such as the Facilitation Task (Section B) which assesses how different moods interact and support thinking and reasoning. The following is an example. *“What mood(s) might be helpful to feel when creating new exciting decorations for a birthday party?”* The MSCEIT also contains a task that requires the participant to consider a hypothetical situation involving emotional decision making. This task requires the respondent to evaluate the effectiveness of a number of options in a situation where a hypothetical individual is required to regulate emotions. It therefore also contains a perspective taking component which requires the participant to empathise with the hypothetical individual in the scenario. For example. *“Marie woke up feeling pretty well. She has slept well, felt rested and had no particular cares or concerns. How well would each action help her preserve her mood?”* (Section D). One task in the MSCEIT (Section F) measures whether an individual can compare different emotions to sensations such as colour, light and temperature. The following is an example. *“Imagine feeling guilty that you forgot to visit a close friend who has a serious illness. In the middle of the day, you realise you completely forgot to visit your friend at the hospital. How much is the feeling of guilt like the*

following?” The respondent is presented with descriptive words; cold, blue and sweet and asked to rate each descriptive word on a 5-point Likert scale; 1 equals not alike to 5 equals very much alike. This task therefore requires the individual to process the emotional significance of words. The MSCEIT therefore contains a range of different emotional tasks that are likely to be related to activity of different areas of the brain.

Although both the MSCEIT and DEFT contain a facial recognition task, differences do exist between these tasks. The DEFT requires the participant to detect the correct face (one from four) displaying emotion and then label the emotion being presented by selecting from a list of six emotions. However, in the Faces task of the MSCEIT, the respondent is presented with a series of pictures of different people and asked to rate how the individual in the picture is feeling. Each picture is followed by four different emotions for example, happiness, fear, surprise, disgust and excitement. The respondent has to assess how much of each of the four different emotions is displayed by the individual in the picture on a 5-point likert scale, for example, 1 equals no happiness and 5 equals extreme happiness. Clearly differences exist between these two tasks. Although the MSCEIT has one task that is related to the detection of emotion in facial expression (Section A), which is similar to the DEFT, the MSCEIT has a range of other tasks and this may be the reason why no relationship was found.

Unlike the other emotional processing tasks, the TMMS is based on an individual's assessment of his/her own experiences of emotion in contrast to other tasks that present the participant with a series of external emotional slides or scenarios. Phan et al. (2002) make a distinction between emotions that are experienced by the individual in contrast to emotions

that may be created by a task. Once again the TMMS and other tasks may be tapping different aspects of emotional processing.

Given that the EPT measures participants' reactions to the emotional content of slides, it might have been expected that participants who failed to respond to the emotional content of slides may have also demonstrated poorer performance on both the MSCEIT and DEFT. However, this was not the case. Unlike the other tasks, the EPT measures the influence of the emotional content of slides (pictures) on the person's reaction time to target noises. The EPT is the only task where the crucial variables (RT_{nn} and RT_{np} in both the quiet and loud conditions) are not related to intelligence. The fact that the performance on the EPT was not significantly related to performance on any of the other emotional processing tasks further highlights the point that emotional processing is complex and that it is difficult to disentangle the emotional from cognitive components of each task.

5. CONCLUSION

A significant negative relationship was found between the TMMS and MSCEIT which are both EI measures. This result could be viewed as evidence that these measures are tapping different underlying constructs associated with EI. However, another possible explanation is that this result may be evidence that participants in this sample lack insight into the difficulties they experience in accurately identifying and managing emotions which is consistent with the findings of Pham & Philipott (2010). To date, little research has been conducted to explore whether psychopathic individuals have insight into the emotional difficulties that are believed to be central to this disorder. These results indicate that further research is necessary.

These results also highlight that emotional processing is complex and multidimensional and that the relationship between tasks used in this research may not be straightforward. Phan et al. (2002) highlight that emotional processing may be underpinned by a number of specific emotional competencies linked to the activity of different parts of the brain. They also highlight that emotional processing tasks also often contain cognitive components, in fact a number of studies have now highlighted the importance of considering the cognitive and emotional components of tasks (Bush et al., 2000; Glenn, Raine & Schug, 2009a; Glenn, Raine, Schug, Young & Hauser, 2009b). Further research is therefore necessary to explore whether there are a range of different competencies that underpin emotional processing that are linked to activity of different areas of the brain and importantly how these might be related to psychopathy.

CHAPTER 12 GENERAL DISCUSSION

1. Introduction

The aim of this thesis was to explore the relationship between emotional processing and psychopathy. A number of studies have found that psychopathic individuals experience specific difficulty recognising sadness and or fear which forms the basis of Blair, Mitchell & Blair's (2005) neurocognitive theory of psychopathy. However, Kosson, Suchy, Mayer & Libby (2002) believe that psychopathic individuals do not appear to experience difficulty recognising and labelling fear but may not experience appropriate physiological responses to this emotion. Kosson et al. (2002) propose that psychopathic individuals may demonstrate superior ability to 'decode anger'. Vidal, Skeem & Camp (2010) also make a distinction between experiencing emotion, which they state can be measured by laboratory based tasks such as the blink startle response, and possessing emotional skills. Vidal et al. (2010) refer to Karpman's (1941) conceptualisation of primary and secondary psychopathy. According to Karpman (1941) primary psychopaths are born with the affective and interpersonal characteristics of psychopathy, whereas secondary psychopathy is believed to develop in response to adverse childhood experiences such as abuse or parental neglect. Vidal et al. (2010) state that primary psychopathy should therefore be considered an emotional deficit and secondary psychopathy an emotional disturbance.

I aimed to test Blair et al.'s (2005) and Kosson et al.'s (2002) theories by asking participants, whose level of psychopathic traits were assessed using two different

measures of psychopathy the PCL-R and PPI-R, to complete a number of emotional processing tasks.

This research was novel in that I used two different measures of psychopathy and two measures of emotional intelligence, an ability EI measure, the MSCEIT and a trait EI measure, the TMMS. A facial recognition task (DEFT task) was administered to examine the idea that psychopathic individuals are specifically impaired in their recognition of sad and fearful expressions. An emotional priming task (EPT) was also administered to measure participants' reactions to the emotional valence of slides.

2. What has this research told us about the relationship between psychopathy and emotional processing?

Consistent with Blair et al.'s theory (2005), after controlling for IQ, I found significant negative relationships between PCL-R total score, Factor 1 and Facet 1 and the detection of sad faces. These results mean that participants with a high score on PCL-R total score, Factor 1 and Facet 1, demonstrated poorer detection of sad faces. Although finding a negative relationship between Facet 1 and the detection of sad faces is consistent with Blair et al.'s (2005) theory, the fact that it was Facet 1 rather than Facet 2 was unexpected. Facet 1 captures the exploitative interpersonal style associated with psychopathy, whereas Facet 2 reflects the affective or emotional component of psychopathy. Psychopathic individuals are known to exploit others, which is based on their ability to detect vulnerability in others. It would therefore appear that Facets 1 and 2 should both be related to the poor detection of sad faces. Hansen, Johnsen, Hart, Waage & Thayer (2008) also found a significant negative

relationship between Facet 1 (and no relationship with Facet 2) and the recognition of disgust in facial expressions in female faces.

Blair et al.'s (2005) theory predicts that psychopathic individuals demonstrate an impairment in the detection of fear. However, I failed to find a relationship between the PCL-R and the PPI-R and the detection of fear, which is clearly at odds with Blair et al.'s (2005) theory. However, there are two other studies that have found a negative relationship between psychopathy and sad facial expressions and both studies also failed to find a relationship with fearful facial expressions (Dolan & Fullam, 2006; Hastings, Tangney & Stuewig, 2008). The results of these studies are consistent with my findings.

In order to further test Blair et al.'s (2005) theory, I used a method developed by Pham & Philipott (2010) who added together participants' responses to sad and fearful stimuli and created a category called amygdalian emotion. They also added together participants' responses to happy, angry and disgust slides and created a category called nonamygdalian emotion. Contrary to earlier predictions, I found no relationship between PCL-R or PPI-R and amygdalian emotion. However, after controlling for IQ, the strength of the correlation between PCL-R total score and amygdalian emotion increased and just failed to reach statistical significance. It is possible that in a larger sample that this result may have reached statistical significance.

Results from the DEFT task do, however, provide some support for Kosson et al.'s (2002) theory. I found a significant positive relationship between PPI-I of the PPI-R

and the detection and labelling of angry faces. This means that participants with a high score on PPI-I of the PPI-R demonstrated superior ability to accurately identify and label anger. However, I did not find that the PCL-R was related to the superior detection of angry faces.

My results relating to the relationship between the MSCEIT (which is an ability EI measure) and psychopathy provide further support for Kosson et al.'s (2002) theory. I found a significant positive relationship between performance on the MSCEIT and intelligence, I therefore completed two different analyses of the data, one of which was to control for the effects of IQ. I unexpectedly found that Factor 2 of the PCL-R was positively related to Branch 1 (Perceiving Emotions) and MSCEIT total score (after controlling for IQ). This means that participants with a high score on Factor 2 of the PCL-R, which is the antisocial and irresponsible lifestyle component of psychopathy, demonstrated better performance on the MSCEIT and specifically Branch 1 which is Perceiving Emotions. The idea that psychopathic individuals may demonstrate superior ability to detect emotion is support for Kosson et al.'s (2002) theory. Unexpectedly it was Factor 2, rather than PCL-R total score or Factor 1, which was related to performance on the MSCEIT. No significant relationships were found between MSCEIT total score or Branch 1 and the PPI-R, either before or after controlling for the effects of IQ.

The EPT was administered to test Kosson et al.'s (2002) theory that psychopathic individuals may not experience appropriate physiological responses to emotion. Despite predicting that participants with a high PCL-R and Factor 1 scores would not respond to the emotional valence of negative slides, I found a negative relationship

between Factor 2 of the PCL-R and the difference between neutral and negative slides in the quiet condition. This means that participants with a high score on Factor 2 of the PCL-R did not respond to the emotional valence of negative slides. This is support for Kosson et al.'s (2002) theory. However, it was once again unexpected that it was Factor 2 rather than either PCL-R total score or Factor 1 (I will explore this issue in section 3).

Overall, my results are mixed and appear to provide some support for both Blair et al.'s (2005) and Kosson et al.'s theory (2002). In support of Blair et al.'s (2005) theory I found that psychopathic individuals experience difficulty identifying sadness in others. In support of Kosson et al.'s theory (2002) I found no evidence at all that participants with high levels of psychopathy demonstrated poorer performance at detecting or labelling fear. I also found some evidence that participants with a high score on PPI-I demonstrated superior performance at recognising and labelling anger. In the EPT, I also found that Factor 2 of the PCL-R was related to poor responsiveness to the emotional content of negative slides.

Kosson et al.'s (2002) theory appears to provide a better explanation for the behaviour that psychopathic individuals often display, such as the ability to con and exploit others and the fact that sadistic offenders may derive gratification from witnessing the suffering of others. Such behaviour would require psychopathic individuals to be able to detect sadness and fear in others.

Recent studies investigating the relationship between psychopathy and performance on a moral reasoning task provides further support for Kosson et al.'s (2002) theory.

Psychopathic individuals demonstrated reduced activity in the left amygdala whilst completing a moral reasoning task (Glenn, Raine & Schug, 2009a). However, no differences were found between psychopathic and non-psychopathic individuals in terms of their performance on this moral reasoning task (Glenn, Raine, Schug, Young & Hauser, 2009b). Glenn et al. (2009b) conclude that these results suggest individuals with high levels of psychopathy “*may cognitively know the difference between right and wrong (i.e., the moral judgment), they may not have the feeling of what is right and wrong and thus may lack the motivation to translate their moral judgments into appropriate moral behaviour*” (pp. 910).

A number of studies have found that psychopathic individuals may actually demonstrate a superior ability to identify vulnerability in others. Book, Quinsey & Lang (2007) found that individuals with a high score on PCL-R Factor 1 were more able to accurately assess vulnerability in video clips of target individuals. Wilson, Demetriooff & Porter (2008) found that individuals with a high score on the PPI were more able to recall characteristics associated with vulnerability or success in females based on information presented on slides. In both these studies, participants with high levels of psychopathic traits were more able to identify vulnerability in others.

3. How are the different underlying factors of psychopathy related to emotional processing?

Patrick, Bradley & Lang (1993) found that a high score on Factor 1 was related to reduced blink startle response. Vanman, Mejia, Dawson, Schell & Raine (2003) found that both Factors 1 and 2 were both related to the blink startle response and that a high

score on Factor 2 was related to increased startle modulation. There appear to be few published studies that have found that Factor 2 is related to emotional processing.

It is therefore of interest that my results suggest that Factor 2 (rather than Factor 1) is positively associated with the MSCEIT and negatively associated with the difference between neutral and negative slides on the EPT. This means that participants with a high score on Factor 2 are skilled at identifying emotion but their performance on the EPT suggests that they do not respond in the same way as healthy individuals to the emotional valence of negative slides.

There is another study that has found that Facets 3 and 4 of the PCL-R may be related to performance on an emotional processing task. Glenn et al. (2009a) found that psychopathic individuals demonstrated reduced activity in the left amygdala whilst completing a moral reasoning task. However, no differences were found between psychopathic and healthy individuals in terms of their performance on this moral reasoning task (Glenn et al., 2009b). Glenn et al. (2009a) found that all four facets of the PCL-R were negatively related to activity in the left amygdala during a moral reasoning task. Glenn et al. (2009b) state that the amygdala is believed to be involved in processing cues associated with distress in others and to guide individuals away from anti-social behaviour. However, in light of their results, Glenn et al. (2009b) reanalysed their results in order to assess the role of the dorsolateral prefrontal cortex (DLPFC) in moral reasoning. Glenn et al. (2009b) state that the DLPFC region of the brain plays an important role in terms of over-riding social and emotional decision making and is linked to cost-benefit analysis. They found that activity in the left DLPFC was positively related to Facets 3 and 4 of the PCL-R and not Factor 1. This

result means that psychopathic individuals may use other cognitive strategies when making moral judgements. Overall, these results suggest that there is a complex relationship between Factors 1 and 2 (and the underlying facets) of the PCL-R and emotional processing.

There is often debate between researchers and clinicians about the relationship between Factors 1 and 2 of the PCL-R and a range of different variables. One recent example is the relationship between the factors of the PCL-R and violence. I am aware that this is not related to understanding emotional processing in psychopathic offenders but it highlights how thinking about the relationship between the factors of the PCL-R and other variables can change over time.

Hare & Neumann (2010) believe that the affective component of psychopathy (Factor 1) is related to the risk of future violence (Kennealy, Hicks & Patrick, 2007; Parks & Bard, 2006; Vitacco, Neumann & Jackson, 2005). However, a more recent meta-analysis by Yang, Wong & Coid (2010) concluded that in fact Factor 2 has a stronger relationship with future violence than Factor 1. Hare & Neumann's (2010) comments were based on the results of a number of studies with good sample sizes. However, Min Yang et al. (2010) reached a different conclusion based on the results of a larger number of studies and more data.

There are few studies, of limited sample sizes, that have highlighted a relationship between Factor 1 and emotional processing. My results suggest that further research is necessary to explore the relationship between Factor 2 and emotional processing.

4. What has this research told us about psychopathy?

In chapter 5, I highlighted that Patrick & Bernat (2009) believe that the two factors of the PPI and PCL-R are not identical. They also state that PPI-I is different to PCL-R Factor 1 in that the former is more closely associated with features of psychological adjustment such as social dominance and resilience. They point out that the PPI factors are independent of each other in comparison to the two PCL-R factors which are moderately correlated. Patrick (2010) has identified three components that he believes underpin the construct of psychopathy which he refers to as disinhibition, boldness and meanness (see chapter 5). Patrick (2010) goes on to say that meanness is related to Factor 1 of the PCL-R, whereas PPI-I captures boldness. Both Factor 2 of the PCL-R and PPI-II of the PPI-R are both believed to capture disinhibition, which might account for the results of a number of studies that have found a significant positive relationship between these two scales (Edens, Poythress, Lilienfeld & Patrick, 2008; Edens & McDermott, 2010; Malterer, Lilienfeld, Neumann & Newman, 2010; Poythress, Lilienfeld, Skeem, Douglas, Edens, Epstein et al., 2010).

I found a significant positive correlation between Factors 1 and 2 of the PCL-R ($r = .48$) which is consistent with other studies (Hare, 2003). In contrast, a non-significant correlation was found between PPI-I and PPI-II of the PPI-R ($r = .17$) which is consistent with Patrick & Bernat's (2009) ideas about that the extent to which the underlying factors of the PCL-R and PPI are related.

I failed to find a significant relationship between Factor 1 (or Facets 1 and 2) of the PCL-R and PPI-I of the PPI-R which is consistent with my earlier predictions and the results of a number of studies (Edens et al., 2008; Edens & McDermott, 2010). I also

found significant relationships (that survived Bonferroni correction) between Factor 1 and Facets 1 and 2 of the PCL-R and the Coldheartedness scale of the PPI-R. I also found a relationship between PPI-II and Factor 2, although the relationships with Facets 3 and 4 did not survive Bonferroni correction. These results may suggest that the Coldheartedness scale, which was found to be distinct from PPI-I and PPI-II (Benning, Patrick, Hicks, Blonigen & Krueger, 2003), may also be tapping meanness rather than boldness.

The PPI-R and PCL-R demonstrated different relationships with the tasks administered during this research. For example, a strong positive relationship was found between Factor 2 of the PCL-R and MSCEIT total score whereas in contrast a non-significant but negative relationship was found with PPI-II. The two measures demonstrated different relationships with the TMMS. Factor 1 and the Coldheartedness scale demonstrated a positive relationship with all scales of the TMMS, whereas PPI-I demonstrated a negative pattern. For the EPT, a significant negative relationship was found between Factor 2 and the difference between neutral and negative slides, no relationship was found with PPI-II.

To summarise, my results provide support for Patrick & Bernat (2009) and Patrick's (2010) ideas that the PPI and PCL-R are measuring different underlying constructs of psychopathy. I found that the underlying factors of the PCL-R were related but this was not the case for the PPI-R. I also found that Factor 1 of the PCL-R was related to the Coldheartedness scale but not PPI-I. The PCL-R and PPI-R also demonstrated different relationships with the tasks used in this research.

5. What is the relationship between the emotional processing tasks used in this research?

One finding from this research which is of particular interest is the significant negative correlation between MSCEIT and TMMS total scores. One possible explanation for these results is that they provide evidence that the TMMS and MSCEIT may be tapping different underlying constructs associated with EI.

However, these results suggest that participants who rated themselves as having high levels of EI on the TMMS actually demonstrated poor performance on the MSCEIT.

This result may reflect the fact that participants lacked insight into the difficulties they experienced in accurately identifying and managing emotions. As stated in chapter 8, Pham & Philipott (2010) found that participants with a high level of psychopathic traits reported less difficulty in accurately identifying emotion than either the low psychopathy or a control group of healthy individuals. Pham & Philipott (2010) suggest that this result means that psychopathic individuals do not perceive themselves to experience any difficulty accurately decoding facial expressions and over-estimated their performance. Given that my sample contained a number of participants with high levels of psychopathic traits, this may also be one explanation for why I found a negative relationship between the MSCEIT and TMMS.

Vidal et al. (2010) state that it is possible that individuals with primary psychopathy may have an emotional deficit that prevents them from experiencing emotions in the same way as healthy individuals. However, such individuals may compensate by acquiring emotional skills and as a result present as though they are emotionally skilled and thus mask their emotional deficits. In other words, they know the words of emotion but not the music (Johns & Quay, 1962). Vidal et al. (2010) suggest that this

process of emotional compensation may result in such individuals being skilled in social situations and even demonstrate success in the workplace. In contrast, Vidal et al. (2010) believe that individuals with secondary psychopathy may present as emotionally disturbed and demonstrate poorer performance on emotionally based tests of EI, it appears that such individuals know neither the words nor the music of emotion. It is therefore possible that psychopathic individuals do not recognise that they experience emotional difficulties because they have compensated by acquiring skills that mask their difficulties.

Copestake, Gray & Snowden (2011) refer to Cleckley's (1988) use of the term 'semantic aphasia' to describe how psychopathic individuals fail to see themselves as others do. Cleckley (1988) states that it must be difficult for an individual who has never experienced emotion to report on its presence or absence. An example might be to ask an individual who is colour blind to report on the redness of a strawberry. This individual may well be able to mimic how he has heard other people describe the colour red, but his perception of red will be different. The same may also be true for psychopathic individual's experience of emotion. With reference to emotions, a psychopathic individual may honestly report on his levels of emotion without realising that his experiences may be different to other peoples.

From my clinical experience, individuals with high levels of psychopathic traits demonstrate different levels of insight into their emotional difficulties. I have found that such individuals are sometimes honest about the fact that even from a young age they were aware that their emotional experiences were different to others. For example, such individuals report that they did not feel the same as their siblings

following the death of a family pet or at the funeral of a grandparent. However, other individuals have responded with anger when questioned about their emotional experiences and are keen to point out that they are very emotional, for example, suggesting that they cry at sad TV programmes or films. However, given that psychopathic individuals are also skilled at impression management this behaviour may be due to impression management and fear of the consequences if they do admit to experiencing emotional difficulties. Clearly further research is necessary to explore psychopathic individuals' understanding of their own emotions. In my opinion, it is important to make a distinction between their perceptions of emotion and their experiences of emotion.

One way to explore psychopathic individual's experience of emotion might be to review all the evidence that an assessor has used to score the shallow affect item of the PCL-R. For example, failing to demonstrate what might be considered a normal response to a significant emotional life event such as bereavement or the breakdown of a long-term relationship. It would be interesting to explore how the individual reacted to a particular emotional situation in his life and whether he believes that other individuals might have reacted in the same way. Where differences are found between the individual's reaction to an emotional situation and the typical or normal response, it would then be interesting to explore why the individual believes that his emotional reaction might be different to the typical or normal response.

Failure to find a relationship between different emotional processing tasks such as the MSCEIT and DEFT, which might have been expected given that both contain a similar task, suggests that emotional processing is complex and multidimensional.

This is highlighted by the findings of Phan, Wager, Taylor and Liberzon (2002) who found that different emotions (fear, happiness and sadness) and different emotional processing tasks may be related to activity in different areas of the brain. Clearly further research is necessary to identify exactly which specific abilities may be tapped by different emotional processing tasks and how these might be underpinned by different areas of the brain and psychopathy.

6. Relationship between psychopathy and intelligence

Although it was not a direct aim of this thesis to explore the relationship between psychopathy and intelligence, some interesting findings have emerged which are worthy of further consideration. My results have demonstrated clear correlations between psychopathy and intelligence. This is at odds with Hare's (2003) earlier claims that there is no relationship between psychopathy and intelligence. However, there are now a number of more recent studies that have found that there is a relationship between the different underlying facets of psychopathy and intelligence. However, despite Vitacco, Neumann & Wodushek (2008) claims that no relationship should be found between IQ and PCL-R scores, Beggs & Grace (2008) found a significant negative relationship between PCL-R total score and IQ measured by the WASI (Wechsler, 1999) ($r = -.20$) in a sample of 216 male offenders in a prison in New Zealand. However, I note that all offenders in this sample were convicted of sexual offences and that the average PCL-R score for this sample was 8.2, which is significantly lower than the mean score for North American offenders which is 22.1 (Hare, 2003). I am not aware if published norms exist for offenders from New Zealand.

I used the same measures as Beggs & Grace (2008) but my sample size was much smaller and the average PCL-R score in my sample was 19.88. I found a stronger negative relationship between psychopathy and IQ ($r = -.33$) than Beggs & Grace (2008). In chapter 4, I explored whether there were any differences between participants at the three different prisons. No difference was found between participants in terms of their IQ. Although a difference was found between participants' PCL-R scores at the three different prisons, it was always my intention to obtain a good range of PCL-R scores and this assessment was completed in line with Prison Service guidelines.

There are differences between previous studies that have failed to find a relationship between psychopathy and IQ in terms of the assessments they have used to measure IQ and psychopathy and the characteristics of participants. For example, Vitacco et al. (2005) used the PCL: SV to measure psychopathy and their sample was 840 civil psychiatric patients. Weizmann-Henelius, Viemero & Eromen (2004) used the WAIS-R (Wechsler, 1981) to assess IQ and their sample was Norwegian female offenders. Salekin, Neumann, Leistico & Zalot (2004) used the PCL:YV (Forth, Kosson & Hare, 2003) to assess psychopathy and the K-BIT (Kaufman & Kaufman, 1990) to assess IQ in a sample of adolescents. Vitacco et al. (2008) used the PCL:SV in a sample of 100 male offenders. The fact that my results were consistent with the findings of Beggs & Grace (2008) might be due to using the same measures of IQ and psychopathy.

7. Limitations of the research

There are a number of limitations that need to be taken into account when considering the findings of this research related to participants and the tasks which were used.

Participants were located at three different prisons, HMP Leyhill which is an open prison and HMP Frankland and HMP Long Lartin which are both high security prisons. It is clear that differences do exist between participants located at the three different prisons. Participants at HMP Leyhill were older, less criminally versatile and participants at HMP Long Lartin were only convicted of violent offences whereas those from HMP Leyhill and HMP Frankland were convicted of both sexual and violent offences. No differences were found between participants in terms of intelligence but the participants at HMP Frankland had higher levels of psychopathic traits than those located at either HMP Long Lartin or HMP Leyhill. It was my intention to include participants with higher psychopathic traits and this is the reason why I collected data at the DSPD unit at HMP Frankland. Although it is possible that differences between participants may have affected the results, it is important to note that many participants from HMP Leyhill started their prison sentences in high security prisons.

The other issue that is important to take into account is that only 1:5 participants who were approached actually took part in the research. I have provided details about the reasons why participants did not take part in the research in chapter 4. A number of participants agreed to take part initially but then failed to attend for different reasons. It is possible that there is a difference between those participants who agreed to take part and those who did not. However, I did not have participants' permission to use their PCL-R scores when they did not take in part in the research. It would have been interesting to explore whether a difference exists between those participants who took part compared with those who did not in terms of their levels of psychopathy. However, this was not possible.

As stated in chapter 4, when I collected data at HMP Long Lartin my position was Head of Psychology. During the course of collecting data, I transferred to HMP Leyhill. Whilst I was located at HMP Long Lartin, offenders would have been aware of my position and this may have impacted on their decision to take part in the research. Some participants may have been anxious that there would be negative consequences if they declined to take part in the research. As previously stated in chapter 4, following my transfer to HMP Leyhill, I did not ask any offenders on my caseload to take part in the research because of a potential conflict of interest.

Another issue relates to completion of PCL-R assessments. Of the 23 PCL-Rs completed at HMP Long Lartin, I second scored 20 of these assessments, I did not second score any PCL-Rs at HMP Frankland but second scored 10 out of the 26 PCL-Rs completed at HMP Leyhill. I have raised this issue because a difference clearly exists in terms of my involvement with PCL-R assessments at the three different prisons. However, I do not believe that this is an issue because all PCL-R assessments were either completed and or supervised by psychologists who had successfully completed HM Prison Service PCL-R training and achieved inter-rater reliability through either the Darkstone or HM Prison Service certification process. All PCL-Rs were therefore completed to a high standard in line with Prison Service PCL-R Guidelines (Attrill, 2004).

When considering the results of this research, there are a number of issues that need to be taken into account in terms of the both the DEFT and EPT. I will start with the DEFT task. The DEFT was designed to avoid response bias which appears evident in

other facial recognition tasks (Blair, Mitchell, Peschardt, Colledge, Leonard, Shine et al., 2004; Kosson et al., 2002; Hansen et al., 2008). This task was piloted in a sample of 39 undergraduate students and as a result Snowden, Bowen & Gray (unpublished) believe it to be a reliable method to assess the detection and labelling of emotion.

However, the DEFT was not piloted on a forensic sample. It is possible that differences may exist between healthy individuals and offenders in terms of their performance on this task. However, I note that for other tasks such as the blink startle response, a similar pattern of responses was found for both offenders and a community based sample in two different studies (Patrick et al., 1993, Vanman et al., 2003).

My original aim was to measure physiological responsiveness to emotional material by measuring either the blink startle or galvanic skin response. In chapter 10, I have described why this was not possible and how I ended up using the EPT. In chapter 10, section 3.2.2, I provided details about how the slides for the EPT were selected and in Table 10.1, I summarised how these slides compared to four other published studies (Blair et al., 1997; Levenston et al., 2000; Patrick et al., 1993; Vanman et al., 2003). In chapter 10, I described how I found a significant difference between the emotional arousal rating for positive and negative slides which means that the negative slides were more emotionally arousing than the positive slides. I found a relationship between the PPI-R (after controlling for IQ) and RT_{np} in the quiet condition which could be due to the fact that participants did not find the positive slides arousing in comparison to neutral slides and therefore a smaller difference in reaction time was found between these slides.

In chapter 10, I also identified another limitation of the EPT. If this task was to be administered in the future, it might also be necessary to review the content of the negative slides. Buodo, Sarlo & Paloma (2002) found that reaction time to blood injuries was significantly longer than for threatening slides. This was clearly not taken into account in the design of the EPT. Three of the negative slides used in the EPT contained blood or burn injuries. It is therefore possible that the presence of these slides resulted in an overall slower reaction time to negative slides. I note that previous studies have included slides depicting attack on others (Levenston et al., 2000; Patrick et al., 1993; Vanman et al., 2003), which were not included as part of the negative slides presented during this study. The EPT was a novel task, which has not been piloted in a forensic sample. There is no data with which to compare my results.

8. Recommendations for further research

Based on my results, I have a number of suggestions for further research. Firstly I recommend that further research is conducted to explore psychopathic individuals' understanding of their own emotions. In my opinion, it is important to make a distinction between their perceptions of emotion and their experiences of emotion.

Secondly, it would be interesting to explore the relationship between Patrick's (2010) triarchic conceptualisation of psychopathy and intelligence. Patrick (2010) has identified three components that he believes underpin the construct of psychopathy which he refers to as disinhibition, boldness and meanness (see chapter 5). Patrick (2010) goes on to say that meanness is related to Factor 1 of the PCL-R, whereas

PPI-I captures boldness. Patrick (2010) states that military leaders and politicians are more likely to be bold than mean but in comparison incarcerated offenders are more likely to be mean rather than bold. Hall & Benning (2006) also refer to the idea of the 'successful psychopath', who they believe has core psychopathic traits but may refrain from serious antisocial behaviour. They believe that intelligence may be a significant factor in determining how psychopathic traits are expressed. For example, an individual may have psychopathic traits but high intelligence which may increase awareness about the consequences of antisocial behaviour. As a result, the individual may pursue a profession such as business or politics where such characteristics may be viewed as valuable. It would be interesting to explore the relationship between Patrick's (2010) triarchic conceptualisation of psychopathy, particularly in relation to the successful psychopath, and intelligence.

Finally, I recommend that further research is conducted to explore the relationship between Factor 2 of the PCL-R and emotional processing.

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Address to which all correspondence should be sent (if different from above):

Psychology Department,
HMP Long Lartin,
South Littleton,
Evesham,
Worcestershire.
WR11 8TZ.

Contact Telephone Number: 01386 835412

Name, Status and Address of Research Supervisor (if appropriate):

Name and Address of Sponsoring Body (if appropriate):

My fees are currently £1550 per year. This year 2004/2005 the prison contributed £500 and I agreed to pay the rest. I will be applying for funding from the Prison Service. If this is unsuccessful I will pay my own fees.

If more than one researcher will be engaged on the project, please copy this page and provide details on all.

Please attach a CV for all researchers

PROPOSED RESEARCH - AIMS AND OBJECTIVES

To continue to explore emotional processing in psychopathic offenders.

Reason for undertaking research project:

(e.g. for Ph.D. thesis, for commissioning body, or as part of the programme of study of a research unit)

This research will be completed for a PhD thesis. However, this research is relevant to the work being undertaken at the Dangerous and Severe Personality Disorder Units.

What is (are) the research question(s)?

The aim of the research is to continue to explore the relationship between psychopathy and emotional processing. Psychopathy will be measured using the Psychopathic Personality Inventory Revised (PPI-R; Lilienfeld & Widows, 2005) and Hare Psychopathy Checklist Revised (PCL-R, Hare, 2003). The PPI-R is a 154 item self-report psychopathy measure. It has been standardised for use in adults 18 years and above. Normative data is available for a sample of offenders in the technical manual. The PPI-R has eight scales, 2 factors and yields an overall score of psychopathy. The PCL-R is completed by a trained assessor and provides a total score which is a global measurement of psychopathy, 2 factors and 4 underlying facets. Factor 1 is described as interpersonal and affective and consists of 8 items. Factor 2 is described as lifestyle/antisocial and consists of 10 items. Factor 1 is split into facet 1, interpersonal and facet 2, affective. Factor 2 is split into facet 3, lifestyle and facet 4, antisocial.

Participants' emotional processing will be assessed using the following measures;

- 1) The MSCEIT which is a 141 item emotional intelligence test recommended for use in adults 17 years and above. The test booklet is divided into eight sections A-H. Each of the sections corresponds to one of the eight MSCEIT tasks, described below. The MSCEIT provides an overall Emotional Intelligence score (EQI), two Area scores, four Branch scores and eight task scores.
- 2) The TMMS, which was developed in order to measure what Mayer & Gaschke (1988) referred to as "meta mood experience" or the ability to reflect, monitor, evaluate and regulate feelings. Salovey, Stroud, Woolery & Epel (2002) state that the TMMS scales measures self-reported or perceived emotional intelligence. The TMMS is a 30 item self-report measure. Participants are

asked to read each statement and rate the extent to which they agree with it using a 5 point Likert scale (1= strongly disagree, 2= somewhat disagree, 3= neither agree nor disagree, 4 =somewhat agree and 5= strongly agree).

The TMMS has three subscales,

1. Attention to emotion (Attention)
2. Clarity of emotions (Clarity)
3. Repair of emotions (Repair)

3) The Detection of Emotional Faces Task (DEFT) which was developed by Snowden, Bowen & Gray (unpublished MSc thesis). The pictures of facial expressions, depicting six emotions; happy, sad, fear, disgust, anger and surprise, were taken from (Ekman & Friesen, 1976).

4) Measurement of either galvanic skin response or the blink startle response whilst participants are reviewing slides that vary in emotional valence and arousal.

Is there related published research of relevance to the study?

If so, please describe:

Psychopathy is a disorder that is characterised by significant emotional deficits. Psychopathic individuals demonstrate impaired aversive conditioning (Flor, Birbaumer, Hermann & Patrick, 2002; Hare, 1970; Lykken, 1957), which means that they fail to learn the relationship between a stimulus that is associated with a negative consequence, for example, a shock or a noxious odour. Psychopathic individuals have also been found to not demonstrate blink startle modulation when viewing negative slides, which is typically observed in healthy individuals (Levenston, Patrick, Bradley & Lang, 2000; Patrick, Bradley & Lang, 1993; Vanman, Mejia, Dawson, Schell & Raine, 2003).

There are a number of studies that have used facial recognition tasks to examine the idea that psychopathic individuals are impaired in their recognition of sad and fearful expressions (Blair, Mitchell, Richell, Kelly, Leonard, Newman et al., 2002; Blair, Mitchell, Peschardt, Colledge, Leonard, Shine, Murray et al., 2004). Children assessed as having psychopathic traits have also

been found to demonstrate difficulty recognising fearful expressions in others (Blair & Coles, 2000; Stevens, Charman & Blair, 2001).

There are also studies that have demonstrated that psychopathic individuals demonstrate reduced physiological responsiveness to the distress of others and fearful scenarios (Aniskiewicz, 1979; House & Milligan, 1976; Patrick, Cuthbert & Lang, 1994).

What are the potential benefits of the research:

- **to the Prison Service?**

This research will be of benefit to the Dangerous and Severe Personality Disorder (DSPD) imitative. DSPD is a joint Prison Service, Home Office and Department of Health funded initiative. The aim is to develop treatment for high-risk violent and sexual offenders who have psychopathic and or other personality disorders that are functionally linked to their offending. The research described above, indicates that in general, psychopathic offenders have lower level of electrodermal activity and are less electrodermally responsive (Hare 1971; Pham, 2000 & Herpertz, 2001) and that they demonstrate reduced electrodermal responses to distress cues (Blair, 1997). There appears to be value in continuing to explore emotional processing in psychopathic offenders as the results may assist with the development of future interventions to address risk in this group.

- **to academic knowledge in the field of study?**

As far as I am aware, there are no other studies that have previously compared the relationship between psychopathy and emotional intelligence using the MSCEIT. This research is also novel in that two different measures of psychopathy will be used the PPI-R and PCL-R.

RESEARCH PLAN AND METHODOLOGY

Briefly describe the research methodology:

All participants will be convicted offenders who have previously been assessed using the Hare Psychopathy Checklist (PCL-R) and have a completed WASI.

Participants will be approached and provided with a written description of the research and a

consent form.

Participants will be asked to complete the following self-report questionnaires; MSCEIT, Trait Meta-Mood Scale (TMMS) and Psychopathic Personality Inventory Revised (PPI-R).

Galvanic skin response (GSR) or blink startle will be measured while participants are presented with a range of different slides from the International and Affective Picture System (IAPS, Ekman & Friesen, 1976). These slides depict a number of different scenarios including scenes that are neutral, distressing and threatening in content.

Participants will complete a facial recognition task, the DEFT (Detection of Emotional Faces Task).

What data gathering and sampling techniques will be employed?

Please include with this application any research tools such as questionnaires, interview schedules etc... Where data on prisoners is required, details of the information sought should be attached.

Potential participants will be identified for this study by asking staff from the psychology departments at HMP Long Lartin and Frankland to identify offenders who have both completed PCL-R and WASI assessments. Members of staff from these psychology departments will then approach offenders and ask if they would be prepared to meet with the experimenter to discuss the study. All participants will be asked to complete a consent form and give permission for their PCL-R and WASI scores to be disclosed.

I will not approach participants directly because my role at HMP Long Lartin is Head of Psychology. I therefore do not want participants to feel pressurised into taking part in this research or fear that there may be negative consequences associated with failing to take part.

How will internal and external validity be established?

The Hare Psychopathy Checklist Revised (PCL-R) will only be completed in line with Prison Service Guidelines (Attrill, 2004). The advice is that all PCL-R should be second scored. I will

therefore second score all PCL-Rs where necessary.

All the emotional performance/ability tests have scoring guides.

I will be trained to use the GSR and equipment to measure blink startle equipment to ensure that responses are recorded and the equipment is properly calibrated.

Which (if any) measurement tools will be used?

In order to measure GSR and/or blink startle the following equipment is necessary;

- GSR amp includes finger electrodes or electrodes to be put on the face around the eyes
- Powerlab, 2 channels include chart software, which will allow measurements to be recorded on a computer
- a number of cables
- gel will also be required

Please list any equipment, which you are intending to bring into the prison establishment.

As above.

What is the proposed timetable for the research?

It is proposed that it is likely to take 36 months to collect the data (it may be longer depending on how many participants agree to take part). I anticipate that data collection will start in 2006.

When is the research due to be completed?

Fieldwork: Data collection October 2009.

Report: Part-time PhD. Registered October 2004 for 6 years.

RESEARCH ANALYSIS AND DISSEMINATION

How will the research results be analysed?

Using appropriate statistical techniques.

How long will the research materials be retained?

Until the thesis has submitted.

How will the results of the research be disseminated? (e.g. thesis, article, book etc...) Indicate how the results will be made available to the Prison Service.

The research will be submitted as part of a PhD thesis. The aim is that the findings will also be published in professional journals.

ACCESS TO PRISON ESTABLISHMENTS, PRISONERS AND PRISON STAFF

What establishment is access being sought for (name(s) or type(s) of establishment)?

The research will mainly be conducted at HMP Long Lartin. However, in order to access offenders who have high scores on the PCL-R, I am seeking permission for this research to be conducted at the Prison Service Dangerous and Severe and Personality Disorder site, HMP Frankland. In order to access offenders who have low scores on the PCL-R it may be necessary to identify a lower security prison. For example, HMP Leyhill which is a resettlement, open prison that holds a significant number of life sentenced prisoners. Governors or their allocated research co-ordinator will be approached to seek their permission to have access to their prison.

Have these establishments (or any others) been approached separately about this research? If so, please provide details:

I have discussed this research with Gill Attrill, Senior Principal Psychologist, who is responsible for developing the treatment programme due to be piloted at the Westgate Unit (HMP Frankland) and Rampton High Security Special Hospital.

How long will the researcher(s) need to be inside each prison establishment (number of days and numbers of hours a day)?

I am based at HMP Long Lartin. I will approach HMP Frankland and ask how long (and on how many occasions) it might be practical for me to visit the DSPD unit as I am aware that I will need to be escorted.

How long will the researcher(s) need to be in contact with prisoners?

Participants who have already had a completed PCL-R and IQ (Wechsler Abbreviated) will be approached. I anticipate that the self-report questionnaires will take about 2-3 hours to complete and the physiological assessment a further 2-3 hours. In total, I anticipate that the researcher will need to spend about 1 day with each participant.

How many prisoners would be involved?

Between 50-100.

Are there any special requirements (random selection, specific prisoner groups etc.)?

No.

How long will the researcher(s) need to be in contact with prison staff?

This research does not require involvement from other staff.

Which type of staff would be involved?

Not relevant.

How many staff would be involved?

Not relevant.

Are there any resource implications for Prison Service Headquarters? (anticipated demands on staff time, office requirements, information etc...)

No. Only ongoing discussion with Gill Attrill about the findings of the research.

RESEARCH ETHICS

What procedures are there in place to ensure that the consent of inmates will be obtained on a valid and informed basis and that the information will comply with the Data Protection Act?

(Attach examples of consent forms)

Information sheet for participants is attached. During the initial interview participants will be informed that some of the slides contain upsetting or unpleasant material. Previous studies have used slides of erotic females. However, it is highly probable that a number of participants may have convictions for serious sexual offences. I will therefore not include slides of erotic females.

I will also explain to participants that this research is not related to my role at HMP Long Lartin and that their results will not be shared with any staff at HMP Long Lartin or other prisons. I will also stress that there will not be any consequences associated with declining to take part in the research.

Under which ethical guidelines will the research be conducted?

British Psychological Society.

Has a relevant Ethics Committee approved the research?

Please attach a copy of the submission to the Ethics Committee and its response:

No.

Signature:

Date:

Please return this form, together with

- Copies of the CVs of all researchers
- Copies of any submission to an Ethics Committee and its response
- Copies of any questionnaires, topic schedules, and consent forms

To ONE of the following:

Prison Governor/ Research Contact

Area Psychologist

CONSENT FORM AND INSTRUCTIONS

CARDIFF UNIVERSITY SEPTEMBER 2006

INFORMATION FOR PARTICIPANTS

What is the purpose of this research?

This is a piece of research being carried out by researchers from Cardiff University Professor Snowden and Dr. Gray and myself. The aim of the research is to look at how understanding emotions might be affected by an individual's personality characteristics.

What will happen if I agree to take part in this research?

We will ask you to complete a number of assessments that measure your personality characteristics.

We would then like to see how good you think you are at dealing with your own emotions and understanding emotions in others. One of these tests is a paper and pen exercise in which you will be presented with a number of situations. Some of these tests are computer based. Words and pictures will be presented on the screen and you will be provided with instructions about how to complete the tasks. Some of the slides do contain unpleasant scenes such as mutilated bodies.

What will happen to the results?

These results will not be shared with anyone at your prison and will not have any impact on the way you are treated or future decisions that are made about you, for example, parole or a progressive move. These results will be kept in a locked cabinet. You will not be identified once your results are entered onto computer, as your results will only be identified by a number. Only the researchers have a list of names that correspond to the numbers. Prior to taking part in this research you will

already have a completed Hare Psychopathy Checklist Revised (PCL-R) and WASI (IQ) assessments. I will ask your permission to use these results as part of the research.

What happens next if I agree to take part?

If you agree to take part, I will come and meet with you and ensure that you want to take part and ask you to complete a consent form. If you change your mind and decide that you don't want to take part you can withdraw at any time without giving a reason and your results will not be used as part of the study. Eventually we hope that the results will be published but you will not be identified in any future publication.

Consent form to take part in research supervised by Cardiff University

I.....give my consent to take part in this research. I have been informed that this means;

- 1) Giving my permission for my PCL-R score to be used
- 2) Giving my permission for my IQ score to be used
- 3) Taking part in a pen and paper exercise designed to look at how people understand emotions
- 4) Completing a number of personality questionnaires
- 5) Take part in computer based tasks
- 6) I have been informed that some of the pictures are unpleasant
- 7) I have been informed that I can withdraw at any time and my results will not be used in this study
- 8) I have been informed that only the researchers will know my results
- 9) I have been informed that participation in this research will not affect any future decisions that might be made about me by the Prison Service

Signed.....

Dated.....

INSTRUCTIONS

Thank you for agreeing to take part in a number of tasks that have been designed to explore how people understand both their own and other peoples' emotions. I am going to ask you to take part in 5 different tasks.

The first is a questionnaire that is called the MSCEIT. *Here is the booklet and here is the answer sheet. The MSCEIT contains eight different sections. Each section has its own instructions. Try to answer every question. If you are unsure of the answer make your best guess. Please record your answers on the separate MSCEIT answer sheet.*

The second is also a questionnaire that is called the Psychopathic Personality Inventory Revised or PPI-R. *The items that you will be reading and answering describe many different ways that people can think and feel. There are no right or wrong answers, and by answering each item as honestly as you can, you will help us have a better understanding of your feelings and beliefs. These items have been answered by thousands of individuals and will help us get a better understanding of how you are the same as or different from other people. As you will see, the instructions ask you to read a list of items (hold up the booklet) and rate how true or false the description is for you. If you aren't sure whether an item is true or false for you, choose the answer that is closest to how you would describe yourself. Please answer all the items as best you can, even if some are difficult or don't seem to apply to you. If you have any questions or concerns please don't hesitate to ask.*

The third questionnaire is called the TMMS. *Please read each statement and decide whether or not you agree with it. Place a number in the blank line next to each statement using the following scale:*

5=strongly agree

4=somewhat agree

3=neither agree nor disagree

2=somewhat disagree

1=strongly disagree

The next 2 tasks are computer based. Please read the following instructions for the first task. *You are about to see a series of pictures. Some of the pictures are coupled with a tone which you will hear through headphones. Please look at each picture carefully. There will be a short memory test at the end. Please press the space bar as soon as you hear the tone. Please respond as quickly as you can to the noise. Thank you for your participation. Press the space bar when you are ready.*

Please read the following instructions on the screen before completing the next task on the computer. *You are about to observe four pictures of faces. Three of the faces will be neutral expressions. One of them will be of an emotional expression. Your task is to identify which of the faces is the emotional one. Second, you are to indicate what emotion you think the face is expressing. Press the spacebar to continue.*

Thank you for participating.

APPENDIX 2

Table 6.4 PCL-R four facets and total, verbal and performance IQ

| | Total IQ score | Verbal IQ | Performance IQ |
|----------------------------------|----------------|-----------|----------------|
| Facet 1 Interpersonal | .01 | .02 | .12 |
| Facet 2 Affective | -.33* | -.29 | -.25 |
| Facet 3 Lifestyle | -.56** | -.55** | -.45** |
| Facet 4 Antisocial | -.48** | -.52** | -.33* |

* $p < .05$, ** $p < .01$

APPENDIX 3

Table 7.7 Descriptive and inferential statistics for the MSCEIT. P-value refers to the results of a one-sample t-test (two-tailed)

| | Mean | Standard deviation | Range | P- value |
|--|--------|--------------------|----------|----------|
| MSCEIT Total | 95.00 | 18.33 | 55 – 141 | .055 |
| Branch 1 Perceiving Emotions | 105.98 | 15.50 | 65 – 135 | .008 ** |
| Faces | 105.86 | 14.56 | 65 – 128 | N/A |
| Pictures | 104.34 | 15.62 | 70 – 139 | N/A |
| Branch 2 Facilitating Thought | 96.07 | 17.06 | 60 – 133 | .10 |
| Facilitation | 98.25 | 13.43 | 67 – 121 | N/A |
| Sensations | 94.63 | 19.95 | 11 – 125 | N/A |
| Branch 3 Understanding Emotions | 91.86 | 16.36 | 56 – 124 | .001 ** |
| Changes | 96.84 | 14.32 | 64 – 125 | N/A |
| Blends | 89.76 | 15.21 | 63 – 130 | N/A |
| Branch 4 Managing Emotions | 90.53 | 16.75 | 52 – 123 | .001 ** |
| Em. Man. | 90.73 | 15.64 | 63 – 120 | N/A |
| Em. Relat. | 92.11 | 18.33 | 56 – 136 | N/A |

* $p < .05$ ** $p < .01$

Table 7.8 PCL-R factors and facets and MSCEIT total and task scores

| | PCL-R Total | Factor 1 | Factor 2 | Facet 1 Interpersonal | Facet 2 Affective | Facet 3 Lifestyle | Facet 4 Antisocial |
|-------------------------|-------------|------------|----------|-----------------------|-------------------|-------------------|--------------------|
| MSCEIT Total | .03 | -.07 | .18 | -.02 | -.05 | -.06 | .13 |
| Experiential EI | .07 | -.11 | .34* | -.11 | .04 | .05 | .24 |
| Branch 1 | .18 | .00 | .30* | -.07 | .07 | .10 | .24 |
| Faces (A) | .09 | -.05 | .21 | -.11 | -.06 | .02 | .06 |
| Pictures (E) | .16 | -.00 | .26 | -.05 | .15 | .12 | .38* |
| Branch 2 | -.12 | -.25 | .20 | -.15 | -.18 | -.05 | .05 |
| Facilitation (B) | -.17 | -.26 | .02 | -.09 | -.14 | -.07 | -.26 |
| Sensations (F) | -.00 | -.04 | .13 | .03 | -.10 | -.12 | .14 |
| Strategic EI | -.07 | -.07 | .31 | -.05 | -.11 | -.18 | -.00 |
| Branch 3 | -.12 | -.13 | -.10 | -.00 | -.20 | -.16 | -.02 |
| Changes (C) | -.04 | -.13 | -.00 | -.04 | -.25 | -.01 | .02 |
| Blends (G) | -.23 | -.19 | -.24 | -.07 | -.20 | -.30 | -.11 |
| Branch 4 | -.01 | -.04 | .04 | .03 | -.02 | -.15 | .01 |
| Emotional Management(D) | -.11 | -.11 | .11 | -.15 | -.18 | -.22 | -.08 |
| Emotional Relations (H) | -.04 | -.13 | .07 | -.13 | -.02 | -.08 | -.00 |

* $p < .05$ ** $p < .01$ ***Bonferroni correction $p < .01$. Correlations of interest are

presented in bold.

Table 7.9 PCL-R factors and facets and MSCEIT subscales after partialling out IQ score

| | PCL-R Total | Factor 1 | Factor 2 | Facet 1 Interpersonal | Facet 2 Affective | Facet 3 Lifestyle | Facet 4 Antisocial |
|--------------------------------|--------------------|-----------------|-----------------|------------------------------|--------------------------|--------------------------|---------------------------|
| MSCEIT Total | .26 | .01 | .49** | .07 | .06 | .28 | .33* |
| Experiential EI | .24 | -.04 | .52** | -.00 | .08 | .29 | .33* |
| Branch 1 | .33* | .07 | .52** | .04 | .23 | .34* | .35* |
| Faces (A) | .21 | .00 | .42** | .00 | .10 | .31 | .23 |
| Pictures (E) | .37* | .10 | .52** | .03 | .29 | .28 | .43** |
| Branch 2 | .00 | -.19 | .31* | -.09 | -.12 | .15 | .14 |
| Facilitation (B) | -.04 | -.11 | .16 | -.01 | .00 | .24 | -.17 |
| Sensations (F) | .15 | .01 | .25 | .10 | -.02 | .05 | .26 |
| Strategic EI | .19 | .05 | .31 | .10 | .01 | .19 | .22 |
| Branch 3 | .11 | -.04 | .28 | .08 | -.09 | .16 | .15 |
| Changes (C) | .10 | -.07 | .32 | .01 | -.14 | .30 | .14 |
| Blends (G) | -.03 | -.13 | -.09 | -.03 | -.13 | -.02 | .04 |
| Branch 4 | .20 | .05 | .32 | .03 | .06 | .19 | .26 |
| Emotional Management(D) | .03 | -.03 | .11 | -.01 | -.13 | .05 | .12 |
| Emotional Relations (H) | .08 | -.08 | .24 | -.17 | .03 | .20 | .15 |

* $p < .05$ ** $p < .01$ ***Bonferroni correction $p < .01$. Correlations of interest are

presented in bold.

Table 7.10 PPI-R total and factors scores and MSCEIT total and task scores

| | PPI-R Total | PPI-I Fearless Dominance | PPI-II Self-Centred Impulsivity | Coldhearted's |
|------------------------------------|------------------------|---|--|----------------------|
| MSCEIT Total | -.12 | .23 | -.26 | -.14 |
| Experiential EI | -.08 | .25 | -.23 | -.03 |
| Branch 1 | -.04 | .20 | -.16 | -.01 |
| Faces (A) | -.02 | .20 | -.14 | -.00 |
| Pictures (E) | -.00 | .24 | -.14 | .01 |
| Branch 2 | -.16 | .15 | -.26 | -.09 |
| Facilitation (B) | -.21 | .06 | -.30* | .04 |
| Sensations (F) | -.02 | .21 | -.09 | -.19 |
| Strategic EI | -.12 | .25 | -.27 | -.10 |
| Branch 3 | -.07 | .28 | -.22 | -.16 |
| Changes (C) | -.00 | .37** | -.17 | -.18 |
| Blends (G) | -.16 | .08 | -.21 | -.25 |
| Branch 4 | -.18 | .16 | -.33* | -.04 |
| Emotional Managem't (D) | -.18 | .02 | -.20 | -.15 |
| Emotional Relations (H) | -.24 | .09 | -.33* | -.18 |

* $p < .05$, ** $p < .01$ ***Bonferroni correction $p < .01$. Correlations of interest are

presented in bold.

Table 7.11 PPI-R total and factors scores and MSCEIT scales after partialling out IQ score

| | PPI-R Total | PPI-I Fearless Dominance | PPI-II Self Centred Impulsivity | Coldhearted's |
|------------------------------------|------------------------|---|--|----------------------|
| MSCEIT Total | .05 | .31 | -.11 | .06 |
| Experiential EI | .00 | .25 | -.13 | .02 |
| Branch 1 | .04 | .20 | -.06 | .08 |
| Faces (A) | .06 | .20 | -.06 | .08 |
| Pictures (E) | .06 | .24 | -.06 | .08 |
| Branch 2 | -.07 | .15 | -.16 | -.10 |
| Facilitation (B) | -.10 | .01 | -.15 | -.01 |
| Sensations (F) | .10 | .25 | .04 | -.12 |
| Strategic EI | .08 | .31 | -.08 | .13 |
| Branch 3 | .12 | .34* | -.02 | .03 |
| Changes (C) | .16 | .42** | .00 | -.01 |
| Blends (G) | .01 | .08 | .00 | -.12 |
| Branch 4 | -.02 | .18 | -.17 | .13 |
| Emotional Managem't (D) | -.01 | .01 | -.03 | -.09 |
| Emotional Relations (H) | -.11 | .09 | -.19 | -.05 |

* $p < .05$, ** $p < .01$ ***Bonferroni correction $p < .01$. Correlations of interest are presented in bold.

APPENDIX 4

Table 8.7 PCL-R facet scores and TMMS subscales

| | Facet 1 Interpersonal | Facet 2 Affective | Facet 3 Lifestyle | Facet 4 Antisocial |
|---------------------------|----------------------------------|------------------------------|------------------------------|-------------------------------|
| TMMS Total | .21 | .19 | .27 | .19 |
| TMMS Repair | .22 | .11 | .28 | .12 |
| TMMS Clarity | .16 | .32* | .37* | .32* |
| TMMS Attention | .14 | .00 | .01 | .00 |

* $p < .05$ ** $p < .01$ ***Significant after Bonferroni correction $p < .02$. Correlations of interest are presented in bold.

Table 8.8 PCL-R facet scores and TMMS subscales after partialling out IQ score

| | Facet 1 Interpersonal | Facet 2 Affective | Facet 3 Lifestyle | Facet 4 Antisocial |
|---------------------------|----------------------------------|------------------------------|------------------------------|-------------------------------|
| TMMS Total | .19 | .12 | .18 | .13 |
| TMMS Repair | .22 | .10 | .29 | .15 |
| TMMS Clarity | .15 | .23 | .27 | .25 |
| TMMS Attention | .13 | -.04 | -.05 | -.05 |

* $p < .05$ ** $p < .01$ ***Significant after Bonferroni correction $p < .02$. Correlations of interest are presented in bold.

APPENDIX 5

Table 9.14 PCL-R facet scores and the DEFT task

| | Facet 1 | Facet 2 | Facet 3 | Facet 4 |
|---------------------------------|----------------------------|-------------------------|---------|--------------|
| Happy Detection ^b | .02 | .16 | -.13 | .03 |
| Happy Labelling ^a | -.19 | -.22 | .12 | .03 |
| Sad Detection ^b | -.40^{1***} | -.16¹ | .14 | -.14 |
| Sad Labelling ^a | -.26 | -.02 | .18 | .04 |
| Fear Detection ^b | .12¹ | .01¹ | .13 | -.04 |
| Fear Labelling ^c | -.05 | -.12 | .06 | -.10 |
| Anger Detection ^c | .01¹ | .17¹ | .19 | .06 |
| Anger Labelling ^a | .00 | -.08 | .03 | .04 |
| Surprise Detection ^a | -.03 | -.17 | -.20 | -.28 |
| Surprise Labelling ^a | .08 | .02 | .09 | -.02 |
| Disgust Detection ^a | -.02 | -.03 | .12 | -.31* |
| Disgust Labelling ^c | .06 | .05 | .26 | -.09 |

* $p < .05$ ** $p < .01$ ***Significant after Bonferroni correction $p < .01$. Correlations of interest

are presented in bold.

^a Pearson's r

^b Transformed data and Pearson's r

^c Spearman's ρ

Table 9.15 PCL-R facet scores and the DEFT task after partialling out IQ

| | Facet 1 | Facet 2 | Facet 3 | Facet 4 |
|---------------------------------|----------------------------|-------------------------|---------|---------|
| Happy Labelling ^a | -.21 | -.17 | .19 | .02 |
| Sad Detection ^b | -.44^{1***} | -.23¹ | .07 | -.34* |
| Sad Labelling ^a | -.30 | -.05 | .18 | .02 |
| Fear Detection ^b | .16¹ | .11¹ | .23 | -.00 |
| Anger Labelling ^a | .08 | -.00 | .29 | .15 |
| Surprise Detection ^a | -.06 | -.00 | -.04 | -.15 |
| Surprise Labelling ^a | .04 | .19 | .28 | .09 |
| Disgust Detection ^a | -.09 | -.04 | .16 | -.35* |

* $p < .05$ ** $p < .01$ ***Significant after Bonferroni correction $p < .01$. Correlations of interest are presented in bold.

^a Pearson's r ^b Transformed data and Pearson's r

Table 9.16 PCL-R facet scores and amygdalian and nonamygdalian emotion

| | Facet 1 | Facet 2 | Facet 3 | Facet 4 |
|------------------------|-------------|-------------|---------|---------|
| Amygdalian Emotion | -.15 | -.11 | .16 | -.09 |
| Non-Amygdalian Emotion | -.01 | -.01 | .22 | -.15 |

* $p < .05$, ** $p < .01$ ***Significant after Bonferroni correction $p < .02$. Correlations of interest are presented in bold. ¹ One tailed test

Table 9.17 PCL-R facet scores and amygdalian and nonamygdalian emotion after partialling out IQ

| | Facet 1 | Facet 2 | Facet 3 | Facet 4 |
|------------------------|-------------|------------|---------|---------|
| Amygdalian Emotion | -.03 | .07 | .39* | -.15 |
| Non-Amygdalian Emotion | -.14 | -.06 | .21 | -.16 |

* $p < .05$, ** $p < .01$ ***Significant after Bonferroni correction $p < .02$. Correlations of interest are presented in bold. ¹ One tailed test

APPENDIX 6

Slides used in the Emotional Priming Task

| Slide | Valence rating | Arousal rating |
|------------------------------|----------------|----------------|
| Negative 2120 Angry | 3.34 | 5.18 |
| Negative 3000 Mutilation | 1.59 | 7.34 |
| Negative 3100 Burn | 1.60 | 6.49 |
| Negative 3130 Mutilation | 1.58 | 6.97 |
| Negative 3150 Mutilation | 2.26 | 6.55 |
| Negative 9040 Starving child | 1.88 | 5.10 |
| Positive 1600 Horse | 7.37 | 4.05 |
| Positive 1920 Porpoise | 7.90 | 4.27 |
| Positive 4650 Erotic Couple | 6.96 | 5.67 |
| Positive 7200 Brownie | 7.63 | 4.87 |
| Positive 8010 Runner | 4.38 | 4.12 |
| Positive 8030 Skier | 7.33 | 7.35 |
| Neutral 5500 Mushroom | 5.42 | 3.00 |
| Neutral 7000 Rolling Pin | 5.00 | 2.42 |
| Neutral 7020 Fan | 4.97 | 2.17 |
| Neutral 7080 Fork | 5.27 | 2.32 |
| Neutral 7100 Fire Hydrant | 5.24 | 2.89 |
| Neutral 7160 Fabric | 5.02 | 3.07 |

Positive valence = 6.92

Negative valence = 2.04

Positive arousal = 5.05

Negative arousal = 6.27

APPENDIX 7

10.6 PCL-R facet scores and Emotional Priming Task

| | Facet 1 Interpersonal | Facet 2 Affective | Facet 3 Lifestyle | Facet 4 Antisocial |
|--|--------------------------|----------------------|----------------------|-----------------------|
| Neu(loud)- neg(loud) ^a | .11 | -.02 | -.14 | -.17 |
| Neu(quiet)- neg(quiet) ^b | .01 | -.07 | -.27 | -.19 |
| Neu(loud)- pos(loud) ^b | -.07 | .09 | .04 | .03 |
| Neu(quiet)- pos(quiet) ^b | -.17 | -.10 | -.24 | -.14 |

* $p < .05$ ** $p < .01$ ***Significant after Bonferroni correction $p < .01$. Correlations of interest are presented in bold.

^a = Spearman's rho, ^b = Pearson's r

