COMPARING PSYCHOPATHY SUBTYPES IN TERMS OF INSTRUMENTAL AND REACTIVE VIOLENCE

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Abstract

Research has suggested that primary psychopaths may be more instrumentally violent, and secondary psychopaths more reactively violent. The aim of the thesis was to conduct a systematic literature review identifying studies of importance within the area of psychopathy and violence. A search of electronic bibliographic databases was conducted using a systematic search strategy including specified keywords. Only four studies met the inclusion criteria and were of adequate quality to be included in the review. Results for this review concluded that there is a primary and secondary psychopathy distinction and that primary psychopathy is associated with instrumental violence and secondary psychopathy is closely linked to reactive violence.

Therefore the research aims were to compare subtypes of psychopathy in terms of instrumental and reactive violence. The study subtyped pre-diagnosed psychopaths using a dimensional measure of personality, the Multidimensional Personality Questionnaire (MPQ-BF) (Patrick, Curtin & Tellegen, 2002). A total of 40 participants with a high psychopathy score and a history of violent offences were recruited from two High Secure Forensic Hospitals and one Therapeutic Community Prison. Results from the research were analysed using model based cluster analysis which replicated previous findings of two distinct psychopathy groups. Findings suggested the primary psychopath group (n = 12) had a trend towards instrumental violence, while secondary psychopath group (n = 28) were more evenly distributed amongst instrumental and reactive violence subtypes. The results also indicated a large effect size (d=0.85) between the subtypes. This is broadly consistent with previous findings in terms of the characteristics of psychopathy subtypes and, to a

lesser extent, their expected propensity for different types of violence. The study supports further investigation using larger sample sizes with a control group.

Finally, the MPQ-BF was analysed and critiqued to establish its validity and reliability within research. It was concluded that the measure had good validity but there was a need for the questionnaire to be normed on a number of varying populations to increase generalisability.

Chapter 1 – Introduction

Psychopathy

Psychopathy is characterised as a personality disorder involving a profound affective deficit accompanied by a lack of respect for the rights of others and societal rules (Woodworth & Porter, 2002). It is commonly suggested that psychopathy is closely synonymous with dangerousness, acts of violence, and with a high risk of criminal recidivism (e.g., Cleckley, 1976; Hare, Cooke & Hart, 1999; Hare & Hart, 1997), and it is often wrongly confused with or used interchangeably with antisocial personality disorder (ASPD) (McEllistrem, 2004). Recently, psychopathy is also suggested to be the key construct in dangerous and severe personality disorder (Cooke, Michie & Skeem, 2007).

On an interpersonal level, psychopaths have been described as egocentric, manipulative, grandiose, lacking empathy and remorse, unable to maintain close relationships, and exhibiting shallow emotions. Behaviourally, psychopaths are described as impulsive, irresponsible, and have poor behavioural controls in relation to interpersonal aggression and hostility. Various studies have suggested that psychopathy may be either a distinct clinical entity or a continuum of disordered personality (Blackburn & Coid, 1998; Murphy & Vess, 2003; Ogloff, 2006). A number of clinicians have suggested that psychopathy is an impairment in recognition or ability to experience emotions or life events (Patrick & Lang, 1999; Williamson, Harpur & Hare, 1991), and psychopathic individuals act without conscience, have a distorted conscience or prefrontal dysfunction (Blair, 2004; Gorenstein & Newman, 1980). Soderstrom (2003) suggested that psychopathy is regarded as a disorder of empathy because of deficits surrounding central coherence and empathic

communication and therefore such individuals display dysfunctions in mentalising emotions and in communicating and recognising emotions. Newman (1998) also suggested a similar information processing deficiency relating to perceiving and understanding the environment and therefore mediating responses to cues in that external mode.

In recent years, psychopathy has been typically assessed using the Psychopathy Checklist Revised (PCL-R; Hare, 1991; 2003). It is argued by many researchers to be the most widely used measure for assessing psychopathy (Cooke, Michie, Hart, & Clark, 2005; Mahmut, Menictas, Stevenson & Homewood, 2011). The PCL-R was initially developed as a diagnostic tool, however as validation for the measure increased so did its popularity to be used in clinical settings as a risk assessment measure. The term "psychopath" has recently been considered a legal term and its diagnosis using the PCL-R has become a vital factor in many criminal cases in the United States of America. Some of these have led to an increase in sentence because of the opinion that high-scoring psychopaths cannot be treated and will never be affected by the consequences of their actions (DeMatteo & Edens, 2006). The PCL-R is comprised of 20 items that measure psychopathy in individuals - rated by an experienced and trained professional. The items are as follows; 1) Glibness and superficial charm, 2) Grandiose sense of self worth, 3) Pathological lying, 4) Conning and manipulative, 5) Lack of remorse or guilt, 6) Shallow affect, 7) Callous/lack of empathy, 8) Failure to take responsibility for own actions, 9) Need for stimulation, 10) Parasitic lifestyle, 11) Lack of realistic long term goals, 12) Impulsivity, 13) Irresponsibility, 14) Poor behavioural controls, 15) Early behavioural problems, 16) Juvenile delinquency, 17) Revocation of conditional release, 18) Criminal versatility, 19) Promiscuous sexual behaviour and 20) Many short-term marital relationships.

The PCL-R is popular with forensic clinicians who conduct risk assessments (Lally, 2003) because of its utility in predicting violent and criminal recidivism (Walters, 2003). However, just like any measure, the PCL-R has its limitations. Some clinicians have the opinion that diagnosing psychopathy in an individual is not productive to successful treatment outcomes, with many maintaining that it is in fact detrimental and dangerous to use terms such as "psychopath" and "psychopathy" to describe an individual (Boccaccini, Murrie, Clark & Cornell, 2008). The stigma can often be difficult to erase from their history (Dolan, 2004). Such strong opinion is founded by the view that psychopathy is a construct, viewed in dimensional terms. As such, research has suggested that an individual may exhibit fewer psychopathic traits over time, thus, becoming less psychopathic as they age (Harpur & Hare, 1994). Interestingly, Hare (1998) has, in fact, raised this point by suggesting that clinicians could simply list the characteristic traits, thereby avoiding the use of the controversial label. In relation to this concern, clinical practice has also given rise to determining an ideal cut off point of the PCL-R total score for prediction purposes. For instance, if the cut off point is too low, clinicians may be wrongly classifying non-psychopathic individuals as psychopathic. Conversely, if the cut off point is too high, clinicians are in danger of missing the accurate classification of psychopaths. In either case, the ramifications may be experienced not only by the evaluated person but also by the larger community (Wallace & Newman, 2004). Hare (1991) suggested a cut off score of ≥30, which has a sensitivity of .72 and a specificity of .93. However, in the past, researchers have used a variety of scores ranging from ≥25 to ≥33 (Salekin, Rogers & Sewell, 1996), which failed to provide consistency.

The argument that clinicians have used the PCL-R as a risk assessment tool without adequate training is also an issue that has been widely debated (Campbell,

2007). A limitation to the measure itself is that ratings on the PCL-R are largely based on institutional records which can often be inaccurate or incomplete, thus affecting the reliability of PCL-R scoring (Edens, Skeem, Cruise & Cauffman, 2001). Furthermore, scoring requires considerable administration time from a qualified psychologist, and high quality collateral information needs to be available for a thorough analysis (Gendreau, Goggin & Smith, 2002). However, to resolve this issue, Hart et al. (1995) developed the Psychopathy Checklist: Screening Version (PCL:SV). The PCL:SV was developed to be a briefer measure useful for screening individuals who may have a low base rate of psychopathy. It can be used initially as a screening measure for individuals at a lower risk of being psychopathic, with a view that the more traditional PCL-R can be employed if someone reaches the cut of score of 30.

Another limitation of the PCL-R is that because it was developed for use with offenders and has a strong scoring criteria for several items (i.e., poor behavioural controls, juvenile delinquency, revocation of conditional release and criminal versatility), it is not suitable for noncriminal population (Poythress et al., 2009). This shortcoming means that the PCL-R cannot be used reliably in research to assess psychopathy in non-forensic groups. Others have expressed concerns that the PCL-R conceptualisation of psychopathy is both under and over inclusive (Ogloff, 2006). For example, the PCL-R does not assess interpersonal anxiety or neurotic behaviour, which, according to Cleckley (1976), is a hallmark feature of psychopathy and considered a critical marker for distinction between primary and secondary psychopathy. As a result, some researchers have found it necessary to add trait anxiety measures to supplement the PCL-R assessment (e.g., Skeem, Johansson, Andershed, Kerr & Louden, 2007).

Although the PCL-R has its weaknesses, there are also strengths associated with the use of the measure. First, there is extensive data on the PCL-R's reliability, validity and generalisability. With regard to reliability, Rogers (2001) reviewed 21 investigations of the PCL-R and found inter-rater reliability scores ranging from 0.77 to 0.98. Second, the PCL-R has been translated and validated in several languages (Cooke, 1995; Côté, 1990). This has shown worldwide acceptance of the measure and despite its shortcomings, demonstrates its vast popularity in the area of psychopathy.

Some consider the PCL-R as the most reliable tool available to identify psychopathic criminals in forensic settings (Morana, Arboleda-Flórez & Câmara, 2005). Finally, the PCL-R has also shown to be a strong predictive factor when investigating recidivism (Urbaniok, Noll, Rossegger & Endrass, 2007; Skeem, Kerr, Andershed & Louden, 2007), however, it is important to note that the measure should not constitute the sole criterion to determining future recidivism, but only in combination with a detailed clinical evaluation (Cooke et al., 2007).

The concept of psychopathy as measured by the PCL-R is said to consist of two factors (Hare, 1991).

- Factor 1: affective and interpersonal aspects often considered to be the core personality factors of the disorder
- Factor 2: measures aggressive and irresponsible interpersonal traits

However, it has been suggested that the items within the scale itself do not represent distinct personality traits but rather are a collection of traits (Lynam & Widiger, 2008) and that a "factor analysis is unlikely to reveal the core components of Psychopathy" (p. 174).

Contrary to the two-factor model, other theoretical interpretations of psychopathy have been suggested by both three-factor and four-factor models. A factor analysis

describing a hierarchical three-factor model (Cooke & Michie, 2001) proposed that the construct of psychopathy comprises interpersonal, affective, and behavioural aspects.

- Factor 1: arrogant and deceitful interpersonal style
- Factor 2: deficient affective experience
- Factor 3: impulsive and irresponsible behavioural style

Cooke and Michie (2001) used data from 1,389 incarcerated males. Based on inspection of the loading plot for an exploratory factor analysis they concluded that the two-factor model did not provide an adequate structural model for PLC-R data. This model recommends the exclusion of the antisocial behaviour items and argues that the fourth factor (antisocial behaviour) is a consequence of the other three factors of psychopathy.

Recently, a number of four-factor models have been suggested in the literature. Importantly, the Four Facet Hierarchical Model, from the second edition of the PCL-R manual (Hare, 2003) includes the three factors highlighted by Cooke and Michie (2001), alongside the antisocial behaviour/criminality factor. This model is suggested to allow a finer descriptive analysis of individuals encountered in clinical practice and the examination of specific correlates with subcomponents of psychopathy, including those of criminal behaviour (Roberts & Coid, 2007). Hare's (2003) incorporated two factor-four facet hierarchical model is suggested to have a superior test structure. This model incorporates the original two factors from the scale, suggesting they are super ordinate factors, and the four facets (i.e., interpersonal, affective, behavioural and antisocial behaviour) become component facets of each of these two super ordinate factors.

However, a potential problem when examining associations between criminal careers and this model of psychopathy is that the fourth factor consists of two items

(juvenile delinquency and criminal versatility) which are components of a criminal career. Attempts to examine correlates of crime with the fourth factor are potentially confounded where a tautological relationship clearly exists between the antisocial lifestyle and criminal behaviour. Debates over inclusion of a fourth (antisocial) factor remain unresolved. Hare and Neumann (2005) argue that factor analysis, item response theory, and multidimensional scaling of all points to the PCL-R and its derivatives are underpinned by four correlated factors: interpersonal, affective, lifestyle, and antisocial; however, the fourth factor, criticised by Cooke and Michie (2001), is not simply a manifestation of the other traits. Furthermore, analysis of large data sets had suggested that the four-factor model is viable (Hare, 2003) and was therefore incorporated in the second edition of the PCL-R.

Cooke et al. (2007) suggest sound logical reasons for antisocial behaviour being a consequence of psychopathy as opposed to being a constituent part of the construct. These include, classical descriptions of psychopathy not describing antisocial behaviour as a central factor, a debate initiated by Skeem and Cooke (2010), suggestions that antisocial acts are qualitatively different from the personality constructs that embody psychopathy, and a suggestion that it is most plausible that psychopathic personality traits have a direct functional link with antisocial behaviour but are not component factors because violence or aggression is a non-specific predictor.

There is continuing debate as to whether the psychopath's criminal behaviour is the consequence of abnormal personality traits or a symptom of psychopathy (Cooke et al., 2007). Lynam and Widiger (2008) suggest that psychopathy should be interpreted as a model of personality as opposed to a discrete entity and further suggest that it can be best conceptualised using the five-factor model (McCrea & Costa, 1990). Miller

and Lynam (2003) suggested that the psychopathic personality is distinct from but best described by antisocial personality disorder and that psychopathy can be understood as an extreme variant of the common dimensions of personality. This suggested a movement away from behaviour-based diagnosis to a more personality-trait grounding. However, other researchers have identified the link between narcissistic personality disorder and psychopathy. Paulhus and Williams (2002) found that narcissism and subclinical psychopathy were moderately correlated but were certainly not equivalent giving support to their distinct constructs.

Psychopathy subtypes

A large amount of empirical literature reviews the pervasive, persistent, and problematic patterns of individuals who commit criminal and violent acts across their lifespans. It is further suggested that the literature has distinguished two distinct subtypes of psychopathy (Karpman, 1941). Primary psychopaths are considered not to respond to punishment and feel little stress or disapproval. They frequently inhibit their antisocial impulses, because it suits them at the time rather than for reasons of conscience (Hancock, Woodworth & Porter, 2013). They are also thought to have "semantic aphasia" (a term coined by Cleckley, 1976), meaning they themselves do not fully understand the meaning of their own words and may be incapable of experiencing genuine emotion. Some believe that primary psychopaths are devoid of feelings and feel little internal psychological distress and although they do possess some inhibitory processes they are less concerned with their effects on others so will do little to constrain those feelings. Others suggest primary psychopaths harbour a genetic component of primary psychopathy and are less amenable to treatment (Viding, Blair, Moffitt & Plomin, 2005).

Secondary psychopaths, however, are seen as risk-takers who are highly likely to feel stress, worry, guilt, and anxiety together with less "coldness" commonly associated with primary psychopaths (Vaughn, DeLisi, Beaver & Wright, 2008). Some authors believe that secondary psychopaths are more vulnerable than others due to life experiences and are often possible victims of child abuse, suggesting a pathway of environmental disadvantage resulting in a disrupted but not entirely absent conscience (Gao, Raine & Schug, 2011).

Porter (1996) also distinguished two aetiological pathways in relation to psychopathy subtypes; one congenital and the other environmental. In his view, *Fundamental psychopathy* was characterised by an inability to form interpersonal bonds, lack of empathy and lack of conscience - all resulting from a genetic predisposition. In *Secondary psychopathy,* the same outcome is evident but seen as a result of early traumatic experiences of physical or sexual abuse or other forms of maltreatment. This produces disassociation of affect and leads to an absence of empathy through disillusionment.

Some theories of psychopathy link the primary and secondary distinction to structural models of personality. In Blackburn's (1975) study of psychopaths, it was concluded that there was a distinction between primary and secondary psychopathy and although they both displayed highly impulsive behaviour, primary psychopaths were extraverted but not neurotic and secondary psychopaths were neurotic but not extraverted.

In Zuckerman's Alternative Five Factor model (Zuckerman, 1995), primary psychopaths are held to be high on dimensions of impulsivity, extraversion and aggression but low on neuroticism. The model described secondary psychopaths as being low on extraversion and high on neuroticism.

In a more comprehensive theory, Lykken (1995) divides antisocial personalities in general of those with abnormal temperaments that make socialising difficult (*psychopaths*), those who are badly socialised (*sociopaths*) and those who are normally socialised but show intermittent antisocial behaviour related to neurotic impulses (*character neuroses*). The latter resemble secondary psychopaths, but Lykken differentiated them from psychopaths completely. Furthermore, Lykken does not believe that primary psychopaths are specifically deficient in emotional experience or affect generally, but that they are specifically lacking in experiencing fear or harm avoidance.

Empirical studies, using mainly the two-factor definition of psychopathy defined by the PCL-R, mirror clinical and theoretical characterisations of primary and secondary psychopathy (Karpman, 1941). A number of studies have reported divergent correlates for PCL-R Factor 1 - which assesses interpersonal and core affective features (e.g., superficial charm, lack of remorse of guilt, callousness) and has been associated with primary psychopathy - and Factor 2, which captures features associated with a deviant lifestyle (e.g., impulsivity, poor behavioural controls) and has been closely linked to secondary psychopathy (Falkenbach, Poythress & Creevy, 2008; Mealey, 1995; Porter, 1996; Zuckerman, 1995).

Past studies have focused on external criteria measures in addition to the PCL-R to develop the distinction between psychopathy subtypes (e.g., Hicks et al., 2004). In their research Hicks et al. (2004) identified psychopath subtypes using the PCL-R and the Multidimensional Personality Questionnaire (MPQ). The authors named the subtypes “emotionally stable psychopath” and “aggressive psychopath” which they suggested represented primary and secondary psychopaths respectively. The emotionally stable subtype was characterised on MPQ factors as *low Stress Reaction,*

meaning feeling a decreased level of anxiety and worry, *high Agentic-Positive Emotionality*, meaning an inclination to experience positive emotion through active engagements in one's environment, *low Social Closeness*, meaning the individual does not like to interact with others and does not take pleasure in close personal ties, *elevated Control*, which describes a reflective, cautious and careful individual, and *low Harm Avoidance* which means an enjoyment in part taking in dangerous activities. The violent subtype were characterised by *high Stress Reaction, high Aggression* meaning the individual enjoys upsetting and frightening others, *high Alienation* which constitutes a believe that others wish to harm them, *low Constraint*, meaning impulsive and sensation seeking behaviour and *low Communal-Positive Emotionality* which describes individuals who seek pleasurable experiences through their relationship with others.

The obvious shortcoming with identifying psychopathy subtypes is that there is no "true" concept of primary or secondary psychopaths. Theoretical driven categories are provisional hypotheses, to be judged on their prediction and explanation (Hogan & Nicholson, 1988). Investigators work back and forth between questions of whether the hypothesised categories even exist and whether the variable they are adopting is the correct measure in identifying them. Aetiological typologies also pose a problem in this respect. Porter (1996) argues that aetiological theories are untestable in research unless a longitudinal approach is adopted. The genetic versus environmental origin that some theories propose is unlikely to be the basis for the primary and secondary distinction because genetic variation contributes to most personality variables (Blackburn, 1975). Therefore, a mixture of genetic and environmental factors seems more probable (Zuckerman, 1995). However, despite the theory concerning psychopathy subtypes, there have been few systematic investigations. Furthermore,

those that have employed cluster analysis to identify subtypes have either lacked theoretical perspective (Vassileva, Kossen, Abramowitz & Conrad, 2005), used inadequate samples (Haapasalo & Pulkkinen, 1992) or failed to use a variety of clustering variables to inform the debate (Herve, Ling & Hare, 2000). Therefore, more research is needed to define the characteristics of primary and secondary psychopaths (Blackburn, 1975; Karpman, 1941; Lykken, 1957, 1995).

Aggression and violence

For many years the terms "aggression" and "violence" have lacked clarity and remained elusive to researchers (Zillmann, 1998). This has occurred due to researchers not defining concepts and leaving the interpretation open to individual discretion. In addition, no distinctions were made between abusive language, threats or actual physical assault. This has resulted in not only methodological issues but also in the uprising of several different definitions of aggression and violence - leaving current data unreliable and often skewed. As demonstrated in the literature discussed above, the terms have been used interchangeably within this area of research and there needs to be a definitive separation between the two concepts.

The study of aggression has historically been both complicated and multi-modal, with definitions in the literature being difficult to quantify both practically and systematically (McEllistrem, 2004). Anderson and Bushman (2002) described aggression as "any behaviour directed towards an individual or property that is carried out with the intention to cause harm" (p. 28). However, Buss (1961) excluded the concept of intent from his definition because he believed that the critical issue is not the premeditation but the reinforced consequences of the outcome. He proposed that aggression can be categorised into *angry aggression* and *instrumental aggression*.

The former is motivated by the desire to inflict pain or discomfort, whereas the latter is motivated by some external reinforcement and its primary aim is not to inflict harm but as a means to a desired end. Meloy (2006) suggested that aggression is a heterogeneous phenomenon that cannot be conceptualised in generic terms. However, for treatment success in clinical settings, there is a need for clear, agreed definitions for aggression and violence.

Steinmetz (1986 p.52) defined violence as "an act carried out with the intention, of physically harming another person". Steinmetz included all incidents from minor common assault to premeditate murder. Strasburg (1978 p.6) defined violent behaviour as "illegal use or threat of force against a person".

Some believe that aggression is more concerned with intention rather than action, and violence is simply aggression in action (Pedersen, Gonzales & Miller, 2000). However, all aggression does not lead to violence and therefore it is suggested that whilst aggression is a result of anger, this is not the same for violence.

Violence is said to be reserved for those acts of aggression that are particularly intense and are said to be more heinous than aggression behaviour. As an example, a single act of common assault can be viewed as aggressive behaviour, however a repeated act of torturing can be considered as violent behaviour (Rippon, 2000). Bushman and Huesmann (2010) also stated that violence is aggression that has extreme physical harm as its goal, such as injury or death. For example, one child pushing another child down is an act of aggression but not an act of violence. One person intentionally hitting, kicking or stabbing someone is an act of violence. Thus, violence is a subset of aggression. Furthermore, it is believed that all violent acts are indeed aggressive, but not all aggressive acts are violent (only the ones that are intended to cause extreme physical damage are called violent) (Bushman and

Huesmann, 2010). Although varying views are still evident from the literature, for clarity, the author will only refer to "violence" throughout the thesis.

Psychopathy and the propensity for violence

Historically, conscience has been an important concept in psychopathy. Porter (1996) suggested that psychopaths have a capacity for empathetic responding and a conscience but that it is switched off through repetitive adverse life experiences, including violence and abuse. Blair (2004) suggested that psychopaths do not respond to punishment (e.g., poor fear conditioning, altered modulation of startle reflex), and developmentally, this results in poor moral socialisation, which in turn results in a poor capacity for empathetic responding. Meloy (1988) suggested that psychopathic individuals could be predisposed to act in a predatory manner because of low levels of autonomic arousal and reactivity, emotional detachment, lack of empathy, and disidentification with the victim. This was also supported by further research (Porter, Woodsworth, Earle, Drugge & Bower, 2003; Serin, 1991). Meloy (2006) further suggested that these individuals are considered highly dangerous because of their premeditation and that they show few objective behavioural signs preceding the violence.

Therefore, it is widely believed that psychopathic offenders are highly likely to commit predatory violent crimes, motivated by readily identifiable goals that are callous and calculating without the emotional context that characterises the violence of other offenders (Cornell et al., 1996; Hare, 2003; Hemphill, Hare & Wong, 1998; Woodworth & Porter, 2002). The results of a study of 101 offenders, showed that psychopathic offenders, compared to non-psychopathic offenders, were motivated by material gain or by revenge and experienced less emotional arousal during the offence

(Williamson, Hare & Wong, 1987). Others have argued that the type of violence exhibited by psychopaths provides an insight into their motivation and affective state (Howard, 2011; Woodworth & Porter, 2002). However, further research is needed so a clearer understanding of the taxonomic implications of antisocial behaviour is achieved (Hodgins, 2007).

Instrumental and reactive violence

Reactive or expressive violence can be defined as the person presenting a high level of arousal at the time the violence is displayed (Howard, 2009) while instrumental violence is used as a means to an end and can be thought of as a strategy to deal or cope with the immediate environment and does not necessarily incorporate an affective anger component (Anderson & Bushman, 2002).

Violence has also been explained in three forms that seemingly overlap (e.g., Miller, Flory, Lynam & Leukefield, 2004): (1) affective versus instrumental violence; (2) impulsive versus premeditated violence, and (3) reactive versus proactive violence. Affective, impulsive, and reactive violence describe behaviours that are often unplanned, automatic, and thoughtless. Reactive violence is often considered a response to a perceived threat or provocation. Instrumental, premeditated, and proactive violence are best described as planned and goal-orientated behaviour occurring without provocation, being deliberate in nature, with little or no arousal or affect (Cornell et al., 1996; Meloy, 2006; Woodworth & Porter, 2002).

Hart and Dempster (1997) suggested that psychopathic individuals can act "impulsively instrumental" in regard to acts of violence, particularly homicides that although are goal-directed also appear to involve little planning but contain expressive or reactive elements.

The critique of the separation of reactive and instrumental violence is not a new concept. Block and Block (1992) argued that there was an idealistic nature to the "instrumental" versus "reactive" notion and suggested that it is unlikely that one person exhibits just one type of violence throughout his/her lifespan. Poulin and Boivin (2000) also suggested that violence may contain both instrumental and reactive components.

Blackburn (1996) highlighted that violent offenders often appear either over-controlled which would define an instrumental act or under-controlled which would be associated with a reactive form of violence. Meloy (2006) differentiates between predatory and affective violence, especially in regard to psychopaths who commit sexually violent offences and specified that predatory violence is not preceded by autonomic arousal or emotion and occurs without a direct threat, whereas affective violence is triggered by a more immediate emotion or threat.

A recent trend in the literature has seen the importance placed on excitement as a motive for criminal behaviour and most significantly, violent offending. Howard (2011) suggested that excitement facilitated by the use of drugs and alcohol reduces the empathy an offender feels for their victim. He argues that it is common in reactive violence and represents a failure of emotional regulation within the individual and an inability to down regulate exhilarated feelings such as excitement.

This extends to the concept of anger and that it can be characterised as an outward projection of emotions that contain both psychological and physiological components. Previous notions were that anger is an emotional syndrome that was manifested as a result of appraisals of events through socially defined roles (Averill, 1982). Later, suggestions were made that anger was an effective stress reaction to a provoking situation that is cognitively mediated (Novaco, 1997). However, Howard (2011) seeks

to go beyond the traditionally accepted view that anger is an experience of negative affect and states that anger can produce a positive affect for some offenders.

Defining keys concepts

The literature has coined many terms that are synonymous with primary and secondary psychopathy subtypes and reactive and instrumental acts. For transparency the author will only refer to “primary” and “secondary” subtypes and “reactive” and “instrumental” acts throughout the thesis.

Aims and objectives of the thesis

The present thesis aims to a) conduct a comprehensive systematic literature review that centres around relevant research on psychopathy and violence; b) undertake, analyse, and evaluate studies that focus on the relationship between primary and secondary psychopathy subtypes and instrumental and reactive violence; c) critically analyse the Multidimensional Personality Questionnaire – Brief Form (MPQ-BF); and d) discuss the overall findings presented in the thesis and comment on practical and future implications of this work.

The rest of the thesis is structured as follows; Chapter 2 will focus on a systematic literature review, which used several databases to locate relevant studies in the area of psychopathy subtypes and violence. The outcome of rigorous searching and quality assessments identified four papers that met the inclusion/exclusion criteria. These papers were analysed in depth and evaluated to gain an insight into previous research in this area.

Chapter 3 presents the author’s own research, which aimed to classify psychopaths under primary and secondary domains, and evaluate the link between psychopathy

subtypes and instrumental and reactive violence. Previous research has identified that primary psychopaths are instrumentally violent and secondary psychopaths are likely to exhibit reactive violence.

Chapter 4 focuses on critiquing and evaluating the MPQ-BF, a personality measure that was used within the present research. To this end, the reliability and validity of the measure were analysed and discussed.

Chapter 5 contains an overall discussion of the work within this thesis. It also suggests future directions, limitations of the work and the implications that research in this area has for professional practice.

Chapter 2 – A Systematic Literature Review of Psychopathy and Violence

Abstract

The aim of this review was to use a systematic approach to review existing studies on psychopathy subtypes and violence. The main objectives of the review were to analyse studies that have focused on primary and secondary psychopathy and determine the link between primary and secondary psychopathy and instrumental and reactive violence. A search of electronic bibliographic databases; PsyINFO, Web of Science, EMBASE and National Criminal Justice References, was conducted using a systematic search strategy including specified keywords. Potential studies were screened by reading the titles and abstracts and subject to pre-defined inclusion/exclusion criteria and quality assessment measures. The studies that met the criteria were selected and the data from those studies were extracted and analysed. Only four studies met the inclusion criteria and were of adequate quality to be included in the review. The results showed that primary and secondary psychopathy are distinct from each other and that primary psychopathy is associated with instrumental violence while secondary psychopathy is closely linked to reactive violence. It is suggested that further studies are required in the UK to facilitate a comparison of the findings of these studies with the findings of studies conducted in the USA, to better inform treatment approaches and risk assessments. It is also suggested that there is a need for research to encompass genetic and neurobiological aspects in order to gain knowledge in a complex framework such as psychopathy and violence.

Psychopathy and instrumental or reactive violence

Several studies have shown that psychopaths were more likely than the non-psychopathic controls to have committed instrumental violent crimes (Cornell et al., 1996; Williamson, Hare & Wong, 1987). Furthermore, it is suggested that psychopaths are likely to demonstrate instrumental and goal-orientated behaviour (Woodworth & Porter, 2002); one of the reasons for this may be because they are motivated by external goals rather than internal emotions (Cleckey, 1976; Serin, 1991). A selective instrumentality has been suggested by Cornell et al. (1996), where reactive and impulsive violence is not very common when the consequences of the act are severe. However, Dempster et al. (1996) found that although psychopaths frequently commit instrumental acts of violence, there is also impulsive behaviour within these acts. This led to the concept "impulsively instrumental" and describes the degree and nature of the violent act. For example, for murder which is a significantly serious offence, it is suggested that there would be less reactive and more instrumental behaviour within this type of offence than in other relatively minor offences; this notion is supported by some studies in the literature (Cornell et al., 1996; Hart & Dempster, 1997).

In regards to the PCL-R there are items within the measure that are associated with reactive violence namely impulsivity, poor behavioural controls, irresponsibility, and proneness to boredom. Conversely, other items on the PCL-R appear instrumental in nature, for example glibness and superficial charm, grandiose sense of self worth, callousness, pathological lying, and manipulation.

Some theories predict that psychopathy subtypes are distinctive in their capacities for different forms of violence (instrumental and reactive) (Blair, 2005; Hicks et al., 2004; Lykken 1995). However, researchers have divergent opinions, with some

believing that psychopaths are capable of displaying both instrumental and reactive violence (e.g., Blair, Mitchell & Blair, 2005) and others suggesting that primary psychopaths are prone to instrumental violence and secondary psychopaths are reactively aggressive (e.g., Hicks et al., 2004). Recent studies on psychopathy subtypes have suggested that secondary psychopaths tend to be reactive and impulsive together with being at a high risk of demonstrating interpersonal violence (e.g., Del Gaizo & Falkenbach, 2008; Hicks et al., 2004; Patrick, Edens, Poythress, Lilienfeld, & Benning, 2006; Swogger & Kosson, 2007). This difference in the subtypes' capacity for alternative violence may reflect separate aetiological pathways (Hicks et al., 2004). Blair's (2005) study proposed that reactive and instrumental violence are controlled by separate neurocognitive systems. He suggested that the increased risk of reactive violence relates directly to the level of frustration the individual is experiencing. Blair (2005) stated that two impairments seen in psychopathy would increase the risk of frustration and thus resulting in reactive violence; impairments in stimulus – reinforcement learning, and reversal learning which impacts on the ability to decision-make effectively. Both of these impairments are located within the ventromedial prefrontal cortex. Blair (2005) also argued that instrumental violence generally appears to be behavioural choices and the individual suffers from impaired emotional learning and as a result they learn a set of antisocial motor programs. If individuals did in fact have separate neurocognitive pathways in relation to psychopathy and violence this would have significant implications for risk assessment and treatment for psychopaths within the forensic field. However, an understanding as to whether the subtypes are responsible for the varying types of violence remains an area that requires empirical support.

Aims and Objectives

The aim of the current review was to systematically identify, appraise, and analyse studies which focused on subtyping psychopathy and violence. Specifically, the main objectives of the review were to a) investigate studies that have focused on subtyping psychopathy into primary and secondary domains, and b) determine if there is a correlation between primary and secondary psychopathy and instrumental and reactive violence.

Method

Sources of literature. Initial search of Campbell Collaboration, Cochrane Database of Systematic Reviews (CDSR), and The Centre of Reviews and Dissemination (DARE) (year 3, completed on 16th March 2013) were conducted to determine whether there were any existing reviews on psychopathy subtypes and violence. No existing systematic reviews were identified. A search of the following electronic bibliographic databases was conducted to identify publications for the current systematic review. These specific databases were utilised as they have wide spread journal articles in the area of psychology and more specifically forensic psychology;

PsyINFO (including Journals@Ovid Full Text) (1985 to 2013)

Web of Science (1990 to 2013)

EMBASE (1988 to 2013)

National Criminal Justice References (1990 to 2013)

Search strategy. The databases were accessed electronically to allow for limits to be put on searches. Searches were limited to articles that were written in English, primarily due to the financial and time constraints involved in translating articles in foreign languages. Because of the time costs of locating papers from the authors, unpublished papers were also omitted. Editorials and opinion papers were also discarded to reduce the bias of individual perspectives unsupported by current research and theory. The reference lists of articles were also scanned for possible studies.

The same search terms were applied to all electronic databases, although they were varied according to specific search tools to acquire the best results. Initial searches were filtered manually and either excluded or saved based on the title and abstract of the study and its relevance to the subject area. Duplicate studies were then deleted and all remaining studies were saved (see Appendix 1 for list of search terms used).

Box 1

Search Terms

(psycho*) OR (psychopath*) OR (psychopathy*) OR (sociopath*) OR (sociopathic*) OR (severe antisocial*) OR (personality disorder*) OR (severe personality disorder*) OR (psychopathic*) OR (severe antisocial personality disorder*) OR (psychopathically*)

AND

(subtypes*) OR (categories*) OR (categorise*) OR (category*) OR (type*) OR (group*) OR (classification*) OR (set*)

AND

(aggression*) OR (aggressive*) OR (violence*) OR (violent*) OR (anger*) OR (angry*) OR (violent behav*) OR (force*) OR (physical force*)

AND

(relationship*) OR (correlation*) OR (correlate*)

Inclusion Criteria

The inclusion/exclusion criteria that were used to assess study eligibility for the present systematic review are shown in Box 2 (see Appendix 2 for detailed inclusion/exclusion criteria).

Box 2

Inclusion/Exclusion Criteria

Inclusion Criteria	
***P**opulation:*	Males aged 18 years or above, with a PCL-R score of ≥25
***I**ntervention:*	Presence of aggressive offending in history
***C**omparator:*	Males who have a low PCL-R score or no comparator
***O**utcome:*	Insight into psychopathy subtypes and aggression
Study design:	Cross-sectional studies
Language:	English only
Exclusion Criteria	
Exclusion:	Case reports, narrative reviews, editorials, commentaries, or any other type of opinion paper; female population studies

If there was sufficient information to assess the eligibility from the title and abstract of the study, then the full text article was downloaded from the appropriate journal resource.

Quality assessment. After the sorting of studies against the inclusion and exclusion criteria, each included study was then quality assessed for methodological

quality and significance of its results. Cross-sectional studies were assessed using specific criteria to ensure that the key fact for each design type was recorded, thereby accurately assessing the validity of each study. Cross sectional studies involves an observation of a population or a representative subset, at one specific point in time (Field, 2009). The aim is to focus on a particular characteristic of the individuals involved in the study with a view to draw inferences about that specific group. The key variables assessed were: 1) hypotheses of the study; 2) study design; 3) representativeness of the sample; 4) validity; 5) reliability of the measures used; 6) attempts made to reduce bias; 6) outcome quality; 7) statistical analyses; 8) reliability and applicability of results, and 9) appraisal of limitations. Each of these key variables were scored in the following way;

0 = item not present at all

1 = item partially present

2 = item fully present

An option for 'unclear' was also available, where extra qualitative information was required but not obtainable. The total quality score was achieved by summing the individual item scores, giving a total score ranging from 0–60 for cross-sectional designs. All scores were transformed into percentages and a cut-off score of 70% was selected to ensure only studies of a reasonable quality were included in the systematic review. Although there is no specific research that supports this cut-off of 70%, previous doctorate students have used this number and therefore it does not represent an arbitrary figure (see Appendix 3 for quality assessment form used).

Data extraction. Relevant data (from each study) that met the quality criteria were extracted and recorded using a data extraction form. This form allowed the

author to record information on a study's design, aims, method of recruitment, population studied, inclusion criteria, methodology, statistical analyses, results, and limitations. The quality score and clarity of reporting score were also recorded on this form. In some instances there was not a sufficient amount of information available to report on specific items on the data extraction form, such as detection bias. If there had been more time available, the authors would have been contacted and more details obtained. However, this was not feasible in the timeframe, thereby affecting the true reliability of the conclusions drawn from the review (see Appendix 4 for data extraction form).

Results

A total of 378 articles were identified using the systematic search strategy previously described, with one additional publication identified from the reference lists of relevant review articles; 373 articles were judged not relevant based on their title or abstract and were excluded, including 79 duplicate articles. Of the remaining five publications, one further paper was excluded at the quality-assessment stage because of poor study quality. The remaining four papers were included in the review. This process is displayed in Figure 1, showing the number of studies excluded at each stage of the selection process. Table 1 presents the characteristics of the included studies.

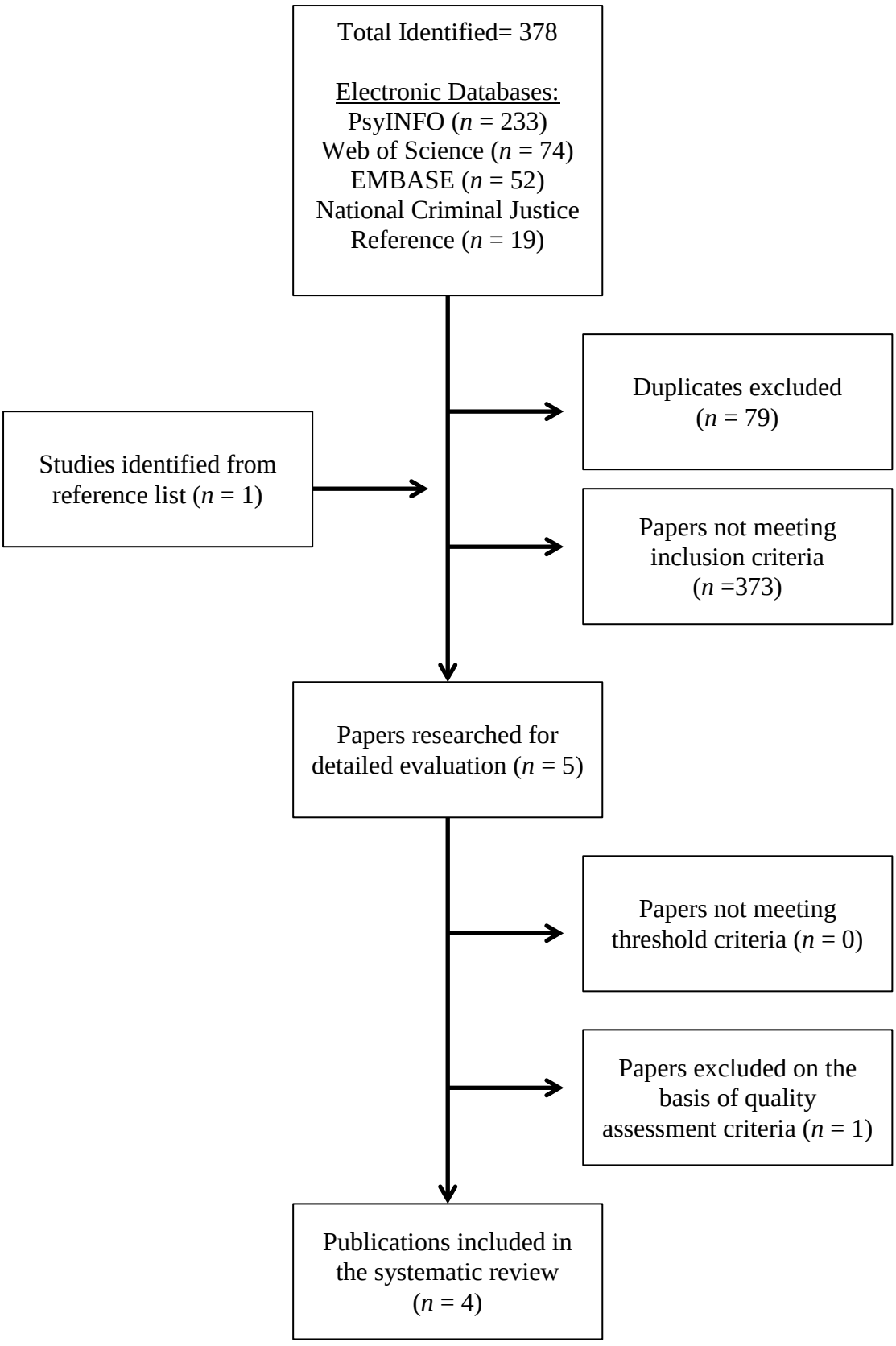

Figure 1. **Schematic Flow of Search Results**

Table 1

Characteristics of Included Studies

Author, Year, and Country of Study	*Aims of Study*	*Participants*	*Measures Used*	*Findings*	*Strengths and Weaknesses*
Hicks, Markon, Patrick, Newman & Krueger (2004) (USA)	To use a model-based cluster analysis to identify subtypes of psychopathy on the basis of differences of personality structure.	96 male prisoners diagnosed as psychopathic with a PCL-R of ≥30 from a low-security prison in Florida and a high-medium security prison in Wisconsin, USA. A second prisoner group containing 125 inmates. This was the control group and contained prisoners who were low scoring on the PCL-	Multidimensional Personality Questionnaire in brief form (MPQ-BF). (Patrick, Curtin & Tellegen, 2002). A model-based cluster analysis using the computer package MCLUST to identify psychopathy subtypes.	They identified that the best fitting model contained two clusters. Psychopaths in the first cluster were characterised by low scores on stress reduction and low trait impulsivity and resembled conceptions of the primary psychopath. Psychopaths in the second cluster	<u>Strengths:</u> A rich perspective in which to investigate a complex clinical phenomena and a valuable framework. Good sample size from two locations. Psychopath subtypes were matched to a control group. <u>Limitations:</u> Only used a prison sample.

		R.		scored low on control and scored very highly on violence.	
Cooper, Blagov, Lilienfield, Phifer, Hudak, Lieb, Patrick, Powers, Venables, Herres & Leigh (2011) (USA)	The exploration of personality constellations in psychopathic incarcerated men.	91 male prisoners from the USA. Age range, 19–55 years.	The MPQ-BF. NEO Five-Factor Inventory. Positive and Negative Affect Schedule-20 (PANAS-20). State Trait Anger Expression Inventory-2 (STAXI-2). Sensation Seeking Scale-V (SSS-V). Emotionally-Activity-Sociability-Impulsivity Survey (EASI). Socialization Scale.	Evidence was found for two psychopathy subtypes (primary and secondary). Secondary psychopathy was found to encompass emotional and violent outbursts.	<u>Strengths:</u> Good sample size. Many measures were used to provide an insight to a variety of factors which increased reliability. <u>Limitations:</u> Interviews were not tailored to the SWAP-II so important additional information relating to relevant items was not captured. Did not use a control group. Difficult to generalise as

			Shedler-Westen Assessment Procedure-II (SWAP-II). Confidence Scale.		the study only used men and only those convicted of committing crime.
Poythress, Skeem, Douglas, Patrick, Edens, Lilienfeld, Frick, Epstein & Wang (2010) (USA)	To determine how different Antisocial Personality Disorder (ASPD) is from psychopathy and identify subtypes. It was hypothesised that the secondary psychopathy group would have higher scores than the primary psychopathy group on internalising psychopathology. It was also hypothesised that secondary psychopaths would express more reactive violence and primary psychopaths would display more	691 men in multiple prisons across the USA were recruited.	The Impulsivity Questionnaire (IMPQ). Assessment of ASPD PCL-R. Harm avoidance scale from the MPQ-BF.	The secondary psychopathy group had higher scores on internalising and externalising psychopathology and impulsivity than the primary psychopathy group. The ASPD group lacked substantial associated features with the psychopathy subtypes.	<u>Strengths:</u> Large prison sample. <u>Limitations:</u> Use of self-report measures. Study did not test for all potential ASPD sub-types.

	instrumental violence.				
Skeem, Kerr, Johansson, Andershed & Louden (2007) (Sweden)	To study if there are variants of psychopathy in violent inmates.	123 male prisoners who had a primary conviction for a violent offence. 243 who scored PCL-R ≤29 were used as a comparison group.	PLC-R. Interview of Personality Questionnaire (DIP-Q). The Karolinska Scales of Personality (KSP). The Historical, Clinical, Risk Management – 20 (HCR-20).	Secondary psychopaths had greater trait anxiety, impulsivity, and violence than the primary psychopaths. Primary psychopaths were described as emotionally stable and dominant.	<u>Strengths:</u> Good sample size. Gave an insight into which traits are more likely to be treatable. <u>Limitations:</u> Only used the male prisoner population.

Quality of the included studies

The quality features and overall quality score of each study are summarised in Table 2. Quality scores of included studies ranged from 75% to 90%. It was not possible to record all information from the study material alone. In such cases, items were recorded as 'unknown' as no further information was available in this regard. Had a more flexible time frame been available, the authors of these studies would have been contacted to provide further clarification of these items. However, this was not feasible and therefore some information was simply recorded as unknown, thereby affecting the true reliability of the conclusions drawn from the review.

Table 2

Quality of Included Studies

Study	*Inclusion Bias*	*Selection Bias*	*Performance Bias*	*Attrition Bias*	*Detection Bias*	*Statistical Analysis*	*Quality Score (%) (no. of unclear)*
Hicks et al. (2004) (USA)	Males with a PCL-R of ≥30. Control group: males with a PCL-R score of ≤20 or below.	Psychopath group included: 46.7% (*n* = 45) African Americans 50.0% (*n* = 48) Caucasians and 3.3% (*n* = 3) Hispanics. Mean age, 31.1 years (*SD* = 6.7 years, range = 18–55 years). Control group: Mean age 30.1 years (*SD* = 7.3 years).	All questionnaires were analysed in the same way.	100% of participants recruited were included in the study.	PCL-R assessments were conducted by trained professionals and videotaped for a second diagnostician to score along with file information. Reliability coefficient for the mean of the two raters was: .95.	Model-based cluster analysis using the MCLUST computer package.	90% (54/60)
Cooper et al. (2011) (USA).	Incarcerated males with a PCL-R of ≥30	Psychopathy group included: 52% White, 35% Black, 10%	All questionnaires were analysed in the same	100% of participants recruited were included in the	No details.	Q-factor analysis.	83.33% (50/60)

		Hispanic, 3% Other. Mean age: 31.1 years (*SD* = 7.6 years).	way.	study.			
Poythres et al. (2010) (USA)	Male prisoners newly admitted to prison. No learning disability present.	34% African American. No other details available. Mean age, 30.03 years.	All questionnaires were analysed in the same way.	1,413 first recruited, 722 were excluded because of missing data or failure to complete questionnaire or interview.	No details.	Cluster-based analysis using MCLUST.	78.33% (47/60)
Skeem, Kerr, Johansson, Andershed & Louden (2007) (Sweden)	Male prisoners with a primary conviction of a violent (non sexual) crime with a long-term sentence and a score of ≤29 on the	Mean age, 30.7 years for the psychopathy group.	All questionnaires were analysed in the same way.	100% of participants recruited were included in the study.	There were no significant Bonferroni-corrected differences between the psychopathic group and the comparison	Cluster-based analysis using the MCLUST.	86.66% (52/60)

	PCL-R.				group in age or index offence.		

Descriptive data synthesis

As Glasziou, Irwig, Bain and Colditz (2001) suggest, it is not advisable, except in rare circumstances, to pool the results of the individual studies together as if they were one common large study. This can lead to significant biases, as the aims, methods and outcomes of each study will differ. The results of the included studies within this review were therefore not statistically combined for quantitative data synthesis because of the particular heterogeneity of the chosen samples, the recruitment procedures, the assessment measures utilised, and varying objectives within each study. In addition, the time restraints of the current review would not allow for such a lengthy procedure. All included studies were instead analysed from a qualitative perspective, thereby allowing for the heterogeneity both within aspects of each study and between all studies individually. Therefore, an understanding of quality was achieved by considering individual qualitative aspects of each study, as shown in Table 2.

Overview of studies

As Table 1 illustrates, three studies were conducted in the USA and one in Sweden. All four studies used a cross-sectional design which focused on associations between factors (see Table 3), three of the four studies used a control group. There is a large difference in the number of participants used across the four studies, ranging from 91 to 691 participants. All four studies included in this review included a sample from a prison population.

Table 3

Overview of Study Designs

Study Design	Studies	Control Group Present
Cross-sectional	Cooper et al. (2011)	No
	Hicks et al. (2004)	Yes
	Skeem et al. (2007)	Yes
	Poythress et al. (2010)	Yes

Assessments

A variety of assessments were used in the studies; however, only those assessing psychopathy subtypes and violence are discussed in this section to reflect the aims and objectives of the current review. All studies in the review used male participants who had a score of ≥29 on the PCL-R. The researchers in these studies conducted PCL-R assessments and all had a second rater to obtain accurate scoring on each item. Table 4 illustrates interrater reliability for the PCL-R total scores for each study. The study by Hicks et al. (2004) proved to have the highest correlation coefficient, at .95.

Table 4

Interrater Reliability for PCL-R Total Scores

Study	Number of Raters	Mean of Intraclass Correlation Coefficient
Hicks et al. 2004	2	.95
Cooper et al. 2011	2	.93
Poythress et al. 2010	2	.88
Skeem et al. 2007	2	.91

As the basis of research in this area heavily relies on being confident of the PCL-R measures of psychopathy in its truest form, it is noteworthy that there have been some criticisms that the PCL-R focuses on criminality and impulsivity and does not capture important factors such as fearlessness and anxiety (Cooke, Michie & Skeem, 2007). However, in many studies, the PCL-R has proved to be the most reliable measure of psychopathy within the offender community and has demonstrated concurrent and predictive validity for forensic purposes (Krupp, Sewall, Lalumiere, Sheffif & Harris, 2012).

The other most common measure used was the MPQ-BF which was used in three of the four studies (Cooper et al., 2011; Hicks et al., 2004; Poythress et al., 2010). The MPQ-BF provided coverage of psychometrically pure traits encompassing domains such as: temperament, behavioural regulation and interpersonal and imaginative style (Patrick, Curtin & Tellegen, 2002). It has also been validated against the MPQ (full form) which consists of 300 items and has item scales that assess the validity of test protocols including the Variable Response Inconsistency (VRIN) and the True

Response Inconsistency (TRIN) which are used to determine if the participant attended sufficiently to the content of the questionnaire. The MPQ-BF increases the feasibility of including the questionnaire in large-scale sample investigations and has reported to be an easy measure to use and interpret. The measure has been validated on a large normative sample (*n*=1639). This instrument has been used successfully to distinguish primary and secondary psychopaths on the basis of different clusters of traits on the 11 primary scales (Reynolds, Ortengren, Richards & Wit, 2006; Rushton & Irwing, 2009).

State Trait Anger Expression Inventory-2 (STAXI-2) (Cooper et al., 2011), The Impulsivity Questionnaire (IMPQ) (Cooper et al., 2011), Interview of Personality Questionnaire (DIP-Q) (Skeem et al., 2007), The Karolinska Scales of Personality (KSP) (Skeem et al., 2007) were all used once. The assessments used rely heavily on self-report information from the participants themselves, although this is often used in conjunction with other measures such as clinical opinion.

Statistical analysis

Three of the four studies used model-based cluster analysis and the MCLUST statistical package (Hicks et al., 2004; Poythress et al., 2010; Skeem et al., 2007). Model-based cluster analysis is a form of mixture modelling, where each observation is believed to come from one of a number of multivariate normal subpopulations. MCLUST is considered a good analysis method as it does not make any a priori assumptions about the model fit (Haughton, Legrand & Woolford, 2009). It is therefore considered a robust method of identifying subgroups within data. This method trials six models of clustering the data, to determine the best fit. Using this analysis, all four studies found that there were two distinct psychopathy subtypes;

primary and secondary. The remaining study (Cooper et al., 2011) used Q-factor analysis (QFA). QFA generates prototypes by intercorrelating participants' item profiles to define subgroups of patients that are similar to and differ from others. However, if research is dealing with an ordinal scale, cluster analysis is undoubtedly a more powerful tool (Haughton, Legrand & Woolford, 2009). QFA is more commonly used where there is no underlying hierarchy to the variables under examination.

Psychopathy subtypes and violence

Table 5 presents the number of participants in the primary and secondary psychopathy groups and their prevalent characteristics for each study. All four studies commented upon and made the distinction between primary and secondary subtypes in psychopathy and all studies discussed the link between psychopathy subtypes and violence, concluding that secondary psychopathy is strongly linked to reactive violence. Two studies went on to state that primary psychopathy is closely associated with instrumental violence. It was also found that primary psychopaths are more emotionally stable than their secondary psychopath counterparts.

Table 5

Number and Characteristics of Primary and Secondary Psychopathy Subtypes

Study	No: of Primary Psychopaths	Characteristics of Primary Psychopaths	No: of Secondary Psychopaths	Characteristics of Secondary Psychopaths
Hicks et al. 2004	30	High on planned violence High on agentic – positive emotionality	66	High on negative emotion Low on control High on reactive violence
Cooper et al. 2011	No details	Displays anger High on positive affect	No details	Tend to be impulsive and aggressive Low on control
Poythress et al. 2010	141	Low on harm avoidance	153	High on violence
Skeem et al. 2007	74	Deficient emotional experience	41	Lack of assertiveness High on impulsivity

Three studies also included a matched control group within their research which made their findings more reliable than those of other studies. Hicks et al. (2004) found that secondary psychopaths differed considerably from the control group and the normative sample on the following 10 of the 11 primary MPQ scales; *Well-Being, Social Potency, Achievement, Social Closeness, Stress Reaction, Violence, Alienation, Control, Harm Avoidance* and *Traditionalism.* Hicks et al. (2004) also found that the normative sample had similar scores to the control prisoners. The study by Skeem et al. (2007) included a control group (violent but non-psychopathic) and found that secondary psychopaths were more emotionally unstable and withdrawn than the

control group. They also concluded that primary psychopaths were less anxious and more assertive or dominant than the control group. This is consistent with previous findings that primary psychopaths are emotionally stable and secondary psychopaths may have experienced significant abuses resulting in emotionally unstable and withdrawn features. The final study that used a control group was that of Poythress et al. (2010). Their control group consisted of non-psychopathic ASPD patients. The study found that the control group lacked substantial associated features to the primary and secondary psychopathy groups and did not exhibit markedly elevated scores on any aspect of the associated features indexed by the PCL-R, including core interpersonal and affective features widely regarded as indexing primary psychopathy.

Methodological considerations

All four studies scored above 75% on the quality assessment, with one study (Hicks et al., 2004) scoring 90% with no items being unclear. The authors' measurement methods were of high quality (e.g., explicit inclusion criteria, highest intraclass reliability rate on the PCL-R scoring, valid assessment of psychopathy subtypes, and correct use of model-based cluster analysis). The study not only included a control group of prisoners (with low scores on the PCL-R) but also incorporated a normative sample of members from the general population which increased the study's validity. Skeem et al's. (2007) study scored 87% with no items being unclear; it included sound measurement methods (high intraclass correlation on PCL-R scoring, good sized comparison groups, and correct use of model-based cluster analysis).

Cooper et al's. (2011) study scored 83% with one item being unclear. This is the most recent study contained within this review. The strengths of the study were its high intraclass reliability rate on PCL-R scoring and the varied assessments used to a gain a holistic perspective on psychopathology. However, the lack of a control group within this study made it weaker compared to the studies that included a control group.

Poythress et al. (2007) scored 78% with one item being unclear. This study had the lowest intraclass correlation at .88. However, this study had the largest sample (n = 691) which may have affected the correlation value. It is certainly the case that the larger the dataset used, the easier it is to find spurious significant correlations and differences due to the increased power of the sample. This can be reduced by increasing the threshold for significance or using model-building (e.g., through regression or multivariate analysis of covariance which would account for correlations that were explained by variance shared with other variables. This study also had a similar number of participants in the primary and secondary subgroups, slightly increasing the validity of the study as more equal sized groups allow for a more comprehensive comparison to be made.

Discussion

Main findings. The aim of this review was to assess current literature on psychopathy subtypes and violence. There were two main objectives:

1) To analyse studies that have focused on subtyping psychopathy into primary and secondary domains

All four studies included in this review made a clear distinction between two subtypes of psychopathy. Three out of the four studies adopted a cluster-based analysis technique to identify subtypes. However, all studies concluded that two subtypes of psychopathy existed and were clearly associated with primary and secondary psychopathy traits. This view is consistent with a breadth of previous research (Vaughn, DeLisi, Beaver & Wright, 2008; Viding, Blair, Moffitt & Plomin, 2005; Wallace & Newman, 2004).

2) To determine if there is a correlation between primary and secondary psychopathy and instrumental and reactive violence

Despite the varying assessment measures, sample sizes and populations, all four studies found a link between psychopathy subtypes and violence in general. This gives more weight to the argument that psychopathy subtypes exist. Specifically, all studies found that secondary psychopathy was closely associated with reactive violence which is characterised by low control and high impulsivity. Two studies then went on to find a correlation between primary psychopathy and instrumental violence, with primary psychopathy characterised by emotional stability and low stress reactions. This again is consistent with previous literature (Cornell et al., 1996; Miller, 2004; Woodworth & Porter, 2002).

Methodological considerations. There are a number of limitations that prevented this current review from being as comprehensive as possible. Inclusion/exclusion criteria were established to extract the most relevant studies for this review and to make the results comparable to one another. However, owing to the strict limitations of the criteria, all studies that did not have a cross-sectional design

were excluded which could have led to biases. It is important to recognise that valuable information could have been excluded due to this constraint. Furthermore, the stringent criteria did not allow for studies that included participants that scored less than 25 on the PCL-R which restricted the number of studies that could have been included in the review. However, by keeping the criteria rigid it meant that the participants in the sample did have clear and present psychopathy traits to a level that would have significance in a clinical setting and therefore could inform treatment programs more effectively.

All studies were subject to a quality assessment before being included in the review. These scores varied, but were relatively high – this strengthened the review. Another limitation of the current review was the use of self-report measures. There was a large-self report assessment battery used throughout some studies and attrition rates may have affected the findings from studies, particularly considering the challenging target group being researched. However, due to the relatively large sample sizes, this is not as concerning as it would have been if the sample size was small. The use of self-report measures relies on precise answers from the participants and may be subject to the participant responding in a socially desirable manner. However, it is important to note that in all studies, collateral information was reviewed and structured interviews with trained professionals did take place. Further, the MPQ-BF, which was used most frequently across the studies, does account for response biases and tests to ensure that the participant has engaged sufficiently with the content of the questionnaire.

Interpretation of findings. All four studies recruited participants from a prison population. Therefore, the population studied is clinically relevant and allows for

some generalisability to other psychopathic prisoners. A clear strength of the studies included was that sample sizes were relatively large. This meant that when the number of participants in the primary and secondary groups was split, there were still a good number of participants in each group, increasing the internal validity of the study.

Although this review found that good quality studies focusing on psychopathy subtypes and violence do exist, only two clearly stated that primary psychopathy is linked with instrumental violence along with secondary psychopathy being linked with reactive violence. In terms of the studies included in this review, there was a more detailed descriptive analysis about violence in secondary psychopathy than in primary psychopathy. There was a lot of information about the personality configurations of psychopaths but a limited amount of studies established the relationship between psychopathy and violence. The inclusion of control groups in three of the four studies all concluded that primary and secondary features differed considerably from control groups providing evidence for the view that primary psychopaths are emotionally stable and secondary psychopaths are emotionally unstable. The studies also showed that psychopathy can be subtyped and further provides evidence that psychopathy does exist as a construct.

Although previous research has focused on psychopathy subtypes and violence and commented on associated links between the concepts, there is a need for further research to be conducted in this area to support previous findings.

Chapter 3 – Empirical Research Study

Abstract

Studies have suggested that primary psychopaths are instrumentally violent, and secondary psychopaths are reactively violent. The aim of the research was to compare subtypes of psychopathy in terms of instrumental and reactive violence. The study subtyped pre-diagnosed psychopaths using a dimensional measure of personality, the MPQ-BF (Patrick, Curtin & Tellegen, 2002). A total of 40 participants with a high psychopathy score and a history of violent offences were recruited from two high secure forensic hospitals and one therapeutic community prison. Results were analysed using model-based cluster analysis which replicated previous findings regarding two distinct psychopathy groups. Findings suggested the primary psychopath group (n =12) had a trend towards instrumental violence, while the secondary psychopath group (n = 28) were evenly distributed amongst instrumental and reactive violence subtypes. This is broadly consistent with previous findings in terms of the characteristics of psychopathy subtypes and, to a lesser extent, in terms of their expected propensity for different types of violence. The study supports further investigation using large sample sizes with a control group.

Introduction

Models of violence. As discussed in Chapter 1, many researchers believe that violence cannot be accurately dichotomised (Anderson & Bushman 2002). For example, an opportunistic robbery can be impulsive and emotional with feelings of excitement. Anderson and Bushman (2002) stated that due to this, violence could be defined in relation to the ultimate goals of the behaviour. This lead to the development of a typology based on the ultimate goals for alcohol-related violence

(McMurran, Jinks, Howells & Howard, 2011). They proposed three types of alcohol-related violence; one that was carried out in the pursuit of material gain; another for social dominance goals; and finally one for defensive goals. However, this even more differentiated typology did not do justice to the motivationally heterogeneous nature of violence, which can be carried out in a state of exhilaration and sometimes appears to be motivated by a quest of excitement (Howard, 2011). Furthermore, anger has historically been viewed as a negative affect by emotion theorists, but has recently been recognised as a positive emotion.

These considerations led to the development of the quadruple violence typology (QVT) (Howard, 2009, 2011). QVT draws on important distinctions in psychology: that between impulsive and controlled acts; and that between appetitively and aversively motivated behaviours. With regard to the first distinction, it has been proposed that there are three characteristics of an impulsive act. First, it is based on a minimal or automatic cognitive appraisal of some environmental trigger, such as a threat. Second, the act is accompanied by the experience of, and failure to control, strong emotional impulses. This affect may be either positive or negative. Third, because of the lack of control, the act is carried out recklessly and without forethought to long-term consequences. The second distinction is between appetitively and aversively motivated behaviour. Appetitively driven acts, accompanied by positive emotions, are motivated by a desire for something, while aversively driven acts, accompanied by negative emotions, are motivated by fear or hate (Howard, 2011). According to QVT, violence may be either impulsive or controlled, and within each of these categories, may be either appetitively or aversively motivated. In addition, each type of violence is said to be associated with a distinct type of anger; explosive/reactive, vengeful/ruminative, thrill-seeking and coercive respectively. The

traditional distinction between instrumental and reactive violence is contained within QVT: instrumental violence corresponds in QVT to that which is both controlled and appetitive; reactive violence to that which is both aversively motivated and impulsive.

Gudjonsson and Sigurdsson (2007) were also able to identify excitement seeking as an important motive for criminal offending in British males. Consistent with QVT, Gudjonsson and Sigurdsson (2007) found that the excitement motive was associated with high scores on measures of impulsivity and anger. QVT has been adopted in some studies with an array of offenders (e.g., Bjørnebekk & Howard, 2012; Ching, Daffern & Thomas, 2011).

The present study has included the use of the QVT for several reasons. First, disaggregating violence into meaningful subtypes would be helpful in identifying the type or types of violence that are associated with particular deficits in personality disordered offenders, in this instance, psychopaths. Second, since the QVT has only been utilised on a few occasions, the use of the measure will provide a much-needed first step in validating the effectiveness of the measure. Third, the QVT has presented a unique model that is furthered by recent advances in the area of arousal and violence which are unparalleled to other measures (i.e., Impulsive/Premeditated Aggression Scales, Stanford et al., 2003; Reactive and Proactive Aggression Scale, Roland & Idsoe, 2006; The Aggression Questionnaire, Buss &Perry, 1992). Fourth, the ease of administrating the measure is straightforward and only requires information on the individual's previous offences.

However, a limitation to adopting the QVT is that the measure requires the researcher to subjectively identify which category of violence the individual has exhibited. To overcome this weakness, and to increase validity, studies can use two researchers to rate the violence and - where there are discrepant views - another

researcher can decide on the overall violent category. Another apparent complication arises when the individual has displayed various types of violence or when there is not enough detailed information pertaining to the offence itself. Furthermore, the authors have not published a coding guide for the QVT which leaves the interpretation of scoring to the researchers. This can severely affect the reliability of this measure to be used for research purposes in subtyping violence.

The view that violence may contain both instrumental and reactive elements is not a recent development within the literature. A model of instrumental and reactive violence was proposed by Cornell et al. (1996) which was developed from the view that violence may be best understood by considering the external goals of the perpetrator. In their study, Cornell et al. (1996) examined the relationship between psychopathy and violence in 106 male offenders from a medium-security prison in the USA. The authors operationalised instrumental violence as an act that was goal driven and required planning without an antecedent of provocation. Reactive violence was defined by an absence of planning or goals, and instead involved a dispute or interpersonal conflict with the victim. They found that, across their criminal histories, psychopaths (as classified using the PCL-R) were more likely to have committed instrumental violence than non-psychopaths (who were more likely to have committed reactive violence). Instrumental violence was most commonly associated with a self-reported lack of arousal or anger during the commission of the offence. Furthermore, the victim of instrumental violence was typically a stranger, whereas reactive violence often was associated with high emotional arousal and a close relationship with the victim. Cornell et al's. (1996) coding criteria for their model consisted of four categories; purely reactive, which describes an act that is highly impulsive with no external goal other than to harm the victim; reactive/instrumental,

to qualify for this rating the violence had to contain both reactive and instrumental elements, but the primary quality of the act had to be reactive; instrumental/reactive, which describes an act that has both instrumental and reactive components, but the primary act had to be instrumental, and purely instrumental which is where an act is goal-specific and had no situational provocation immediately prior to the act.

Cornell et al's. (1996) instrumental versus reactive coding criteria for violent offending has also been used within the present study. This is because the measure had a clear coding guide freely available to researchers with detailed descriptions of each of the categories listed above. This made the scoring of violent acts not only simple but also accurate. The measure was also used because it was important to utilise two measures of aggression that could be compared to each other and evaluated for effectiveness within a research setting. Although Cornell et al's. (1996) measure has been used in numerous studies across varying forensic populations, (i.e., Declercq, 2012; Hodges, 2007; Walsh, Swogger, Walsh & Kossen, 2007) its factor structure has never been subjected to confirmatory factor analysis (CFA) and so its construct validity remains largely unexplored (Vitacco, Neumann, Caldwell, Leistico & Van Rybroek, 2006). Both aggression measures used within the present study require substantial validity and reliability testing to increase their popularity within the forensic research field.

Aims of this Study

The present research attempts to; assign a subtype to pre-diagnosed psychopaths (on the PCL-R) using the MPQ-BF, following Hicks et al's. (2004) method; analyse the differences in MPQ-BF personality traits between psychopath subtypes; to rate the sample of subtypes on violence, and analyse the relationship between psychopath

subtype and violence subtype, hypothesising that primary psychopaths are prone to instrumental violence and secondary psychopaths to reactive violence. The author will also comment on the correlation of total PLC-R scores on the MPQ-BF traits and sexual and non- sexual index offences and their correlations with types of violence; however, no hypothesis was made in relation to this analysis.

Method

Participants. The sample for this study consisted of 40 men with PCL-R scores of 25 or above aged between 23 and 66 years. Participants were recruited from Broadmoor High Secure Hospital, Rampton High Secure Hospital, and HMP Grendon. All participants were required to be serving a sentence for a current violent offence or have a history of violent offences (including sexual offences with a violent element). For the purposes of the study, psychopathy was defined as a PCL-R score of >25 generally considered a sufficient cut-off point for research purposes (Cooke & Michie, 2001; Craissati, 2005; Kirsch & Becker, 2007).

Measures

The Multidimensional Personality Questionnaire Brief Form (MPQ-BF) (Patrick, Curtin & Tellegen, 2002). This is a 155-item self-report measure where respondents answer true or false to all questions. The MPQ-BF encompasses domains such as temperament, behavioural regulation, and interpersonal and imaginative style (Patrick, et al., 2002). It has been validated against the MPQ (full form) which consists of 300 items. The measure has been validated on a large normative sample (*n* = 1639). This instrument has been used successfully to distinguish primary and secondary psychopaths on the basis of different clusters of traits on the 11 primary

scales and four high-order factor scales (Hicks et al., 2004). The primary scales are labelled *Well-Being (WB),* a high scores would describe an individual as cheerful and having a happy disposition, *Social Potency (SP),* a high score would mean an individual can be forceful, decisive and enjoy leadership roles, *Achievement (ACH),* a high score would indicate an individual is hard working and a perfectionist, *Social Closeness (SC),* a high score would mean an individual takes pleasure in and values close personal ties, *Stress Reaction (SR),* a high score would describe an individual as tense and nervous, *Alienation (AL),* a high score would indicate an individual has having a belief that others wish to harm them and that they are a victim of false rumours, *Aggression (AG),* a high score would mean an individual is physically aggressive and takes pleasure in frightening others, *Control (CON),* a high score on this scale would infer that an individual is reflective, cautious and rational, *Harm Avoidance (HA),* a high score would describe an individual that would not want to partake in dangerous activities, *Traditionalism (TRA),* a high score would mean an individual endorses high moral standards, and *Absorption (AB),* a high score on this scale would mean an individual is responsive to evocative sights and sounds. The four high-order scales are as follows; *Agentic Positive Emotion (Agentic PEM)* which is made up by the primary scales of; *Well-Being, Social Potency* and *Achievement,* and a high score would mean an individual has an inclination to experience positive emotion through active engagements in one's environment, *Communal Positive Emotion (PEM)* which is constituted by the following primary scales; *Well-Being* and *Social Closeness,* a high score would describe an individual as seeking pleasurable experiences through their relationships with others, *Negative Emotion (NEM)* which is made up by the following primary traits; *Stress Reaction*, *Alienation* and *Aggression,* a high score would indicate that the individual has a reduced threshold of

experiencing negative emotions such as anger and anxiety, they view the world as hostile and are willing to hurt others to get what they want, and *Constraint (CoN)* which is made up the following primary traits; *Control, Harm Avoidance* and *Traditionalism*, a high score on this higher order scale would describe an individual as cautious, avoiding thrills and endorsing conservative values (Hicks et al., 2004) (see Appendix 6 for a copy of the MPQ-BF).

Psychopathy Checklist – Revised (PCL-R) (Hare, 2003). The PCL-R consists of 20 items that encompass aspects of psychopathy. Each item is rated either 0 for not present, 1 for partially present, or 2 for fully present giving a total psychopathy score between 0 and 40, with scores equal or greater than 25 used as a threshold for psychopathy in the UK for research. A PLC-R assessment is conducted by evaluating all collateral information available to the assessor together with a semi-structured interview with the client. For the purposes of the present research, archival PCL-R data was used and access to PCL-R subscales was unobtainable. The PCL-R has been normed on the UK populations for comparison purposes. Table 6 presents the 20 items on the PCL-R and the factor and facets within the construct of the measure.

Table 6

PCL-R Items

Factor 1	Factor 2	Other items
Facet 1: Interpersonal	Facet 3: Lifestyle	19) Promiscuous sexual
1) Glibness and superficial	9) Need for stimulation	behaviour
charm	10) Parasitic lifestyle	20) Many short-term marital
2) Grandiose sense of self worth	11) Lack of realistic long term	relationships
3) Pathological lying	goals	
4) Conning and manipulative	12) Impulsivity	
	13) Irresponsibility	
Facet 2: Affective	Facet 4: Antisocial	
5) Lack of remorse or guilt	14) Poor behavioural controls	
6) Shallow affect	15) Early behavioural problems	
7) Callous/lack of empathy	16) Juvenile delinquency	
8) Failure to take responsibility	17) Revocation of conditional	
for own actions	release	
	18) Criminal versatility	

Assessment of instrumental/reactive violence (Cornell et al., 1996). The degrees of instrumentality and reactivity associated with violence within this study were firstly assessed using Cornell et al's. (1996) coding criteria for instrumental and reactive violence as used in Woodworth and Porter (2002) (see Appendix 5). In anticipation of difficulties in differentiating between instrumental and reactive violence, two blind assessors, the author and other (PM) independently rated violence as instrumental or reactive. In the case of discrepant views, a meeting between the assessors took place to allocate the information to a violent subtype. The scale was

rated on a Likert system with possible ratings ranging from 1 to 4 (i.e., 1 = Purely Reactive, 2 = Reactive/Instrumental, 3 = Instrumental/Reactive and 4 = Purely Instrumental):

***Purely Reactive**:* Purely reactive violence requires very strong evidence for a high level of spontaneity/impulsivity and a lack of planning surrounding the commission of the offence. Reactive violence was coded if there was evidence for spontaneity or impulsivity, a rapid and powerful affective reaction prior to the act, and no apparent external goal other than to harm the victim immediately following a provocation/conflict. A clear example of a purely reactive violence is if an unknown victim verbally insulted the perpetrator, who in a rage immediately started a fight and proceeded to stab the victim with a weapon of "convenience" (e.g., a broken bottle in a bar).

***Reactive/Instrumental**:* To qualify for this rating, the act of violence had to show evidence for both reactive and instrumental violence. However, the primary quality of the violence had to be reactive. For example, using the example above, the reactive/instrumental description would apply if after or during the unplanned fight the perpetrator elected to rob the victim as well. Thus, the evidence would suggest that the violence was unplanned/reactive but that there was also a secondary instrumental, opportunistic component.

***Instrumental/Reactive**:* To qualify for this rating, the act of violence had to show evidence for both instrumental and reactive violence. However, the primary quality of the violence had to be instrumental. For example, an instrumental/reactive offence would be coded if the offender started to commit a bank robbery but in the process proceeded to murder a bank cashier after becoming agitated when the cashier picked

up a phone. In this case, a crime occurred for an obvious external gain, and the murder was part of this instrumental act. However, the violence occurred as a reaction to unplanned events within the context of the crime.

Purely Instrumental*:* For a violent act to be rated as purely instrumental, the offence had to have been clearly goal-oriented in nature with no evidence of an immediate emotional or situational provocation. The violence had to have been committed for a clearly identifiable purpose other than being the result of "hot-blooded" spontaneous anger or a response to an immediate frustration. Therefore, a purely instrumental offence was coded if there was strong evidence that the offence had been intentional, premeditated (non-impulsive), motivated by a clear external goal such as drugs, money, to obtain sex or revenge, and not immediately following a potent affective reaction.

Reactive violence was identified as **primary** when its main purpose was to inflict harm on an individual (e.g., revenge) and not to serve some other purpose such as material gain (e.g., drugs, money). In contrast, instrumental violence was considered **secondary** when the main purpose was not to inflict pain on the victim but to achieve a clear goal (e.g., drugs, money), and violence was committed only as a means by which to achieve these goals (see Appendix 5 for the Cornell et al., violence scoring template).

Quadripartite typology of violence (Howard 2009, 2011). Howard's (2009) quadripartite typology of violence was used as a secondary measure. The violent act was rated on a Likert system with possible ratings ranging from 1 to 4 (i.e., 1 = Impulsive Appetitive, 2 = Impulsive Aversive, 3 = Controlled Appetitive, and 4 = Controlled Aversive). Table 7 illustrates the quadripartite typology of violence. This

quadripartite model also assesses additional motivational features of violence not typically considered by the standard reactive/instrumental dichotomy.

Table 7

Quadripartite Typology of Violence

		APPETITIVE	AVERSIVE
IMPULSIVE	**Goal**	Enhancement of positive affect by infliction of harm and suffering	Reduction of negative affect through removal of interpersonal threat
	Affect	Positive	Negative
	Emotion	Exhilaration/ Excitement; desire to maximise excitement	Fear, distress, desire to eradicate threat
	Anger type	Thrill-seeking anger	Explosive/reactive anger
CONTROLLED	**Goal**	Achievement of positive outcome/reinforcement	Removal of interpersonal threat/ grievance by considered, premeditated action
	Affect	Positive	Negative
	Emotion	Pleasant anticipation; desire for positive outcome	Vengefulness; desire to "get even" with source of grievance.
	Anger type	"Coercive anger"	Vengeful/ruminative anger

Procedure

Due to differences in local policies and protocols, access to and recruitment of participants varied at each location. At Broadmoor Hospital access was arranged by a psychologist who was also responsible for selecting patients that met the inclusion criteria. Access throughout Broadmoor Hospital and to each ward was gained with the help of an undergraduate psychology student. Identified participants at Broadmoor hospital were given an explanation of the research, an information sheet, and asked to participate on a voluntary basis, confirmed by signature on a consent form. West London National Health Service approved the incentive of £10 for each participant that took part. This was the only site that gave approval for a monetary incentive.

At Rampton Hospital, the research was facilitated by the responsible clinicians and the lead forensic researcher. Identified participants at Rampton Hospital were written to initially and then approached in their wards. If participants agreed, they were then asked to complete the MPQ-BF. At all sites, the questionnaire was administered by the researcher on a one-to-one basis; each participant took up to half an hour to complete the questionnaire.

At HMP Grendon, access and identification of possible participants was arranged by the lead psychologist and an assistant psychologist. The lead psychologist identified possible participants and they were approached by the assistant psychologist who ascertained if they wished to take part. After initial consent from the participants, permission was gained through their clinical teams; this procedure took two weeks. Subsequently, the author formally recruited participants and after signing the consent form, the participants were asked to complete the MPQ-BF. It was agreed that the author would return to HMP Grendon to present the research and the results to all participants after the study had been completed.

At each location, participants' offence histories were analysed from file-based information. This involved an analysis of their index offences (where this was a violent offence) and their most recent violent offence (up to a maximum of five) were rated. All information collected was anonymised and recorded for the raters to assess at a later date. A detailed account of their index offences was recorded with particular attention being paid to motivation behind the offence and the events surrounding the violent incidents. Participants' PCL-R scores were also recorded together with their dates of birth and ethnicities. Participants were allocated a unique code and their consent forms were separated from their questionnaires and locked in a safe location. It is important to note that the statistical analysis on the data took place after the violence had been scored, thus meaning the author was unaware of each participants' subtype at the time their violence was rated. All coded data were then entered into SPSS (version 21) for statistical analysis (see Appendix 7-12 for participants information sheets, consent forms and debriefing forms for both healthcare and prison sites).

Ethics

The study received ethical approval from the South London National Health Service and the local research and development department approved site access to Broadmoor and Rampton Hospital. The National Offender Management Service approved the research to be conducted at HMP Grendon. The University of Birmingham also gave ethical approval for the research to be carried out. Appropriate ethical standards were maintained by ensuring the following:

- Potential participants were written to by the researcher before being approached.

- The participants were provided with an information sheet and asked to provide informed consent.
- Participants had the opportunity to ask the researchers questions about their involvement in the research.
- Participants were informed that they are able to withdraw their consent to participate at any time.
- Participants involved in the study were treated with complete confidentiality. Data obtained were stored safely to ensure that confidentiality was protected.
- Involvement in the study did not affect the participants' care or treatment in any way. No information regarding the research was recorded in their medical notes.
- Should they desire it, all participants were provided with brief written feedback on their completed personality profiles (as reflected by the MPQ-BF). As the MPQ-BF is a non-pathological measure and has no established links to risk, it was anticipated that passing this information on to participants should not cause any issues.

Treatment of data

The author rated the file information containing details of previous violent and aggressive actions using Cornell et al's. (1996) measure and Howard's (2009) measure. The data was entered into SPSS. The data was analysed using a model-based cluster technique in the computer package MCLUST (Fraley & Raftery, 1998), to classify psychopathic individuals into subtypes (i.e., the 40 participants with a total PCL-R score of >25). MCLUST is a software package that was developed for cluster and discriminant analysis written in Fortran and interfaced with the S-PLUS

commercial software package which is freely available. Model-based cluster analysis is a form of mixture modelling in which each observation is believed to come from one of a number of multivariate normal subpopulations. MCLUST was selected for this study as it does not make any *a priori* assumptions about the model fit. It is therefore considered a robust method of identifying subgroups within the data. This method trials six models of clustering the data, to determine the best fit; this is done by determining characteristics relating to the volume, shape, and orientation of the covariance matrix. Figure 2 is a graphical depiction of each model as an example using *Stress Reaction* and *Aggression* scales from the MPQ-BF. The cluster is the upper right quadrant of each panel represents high scores on *Aggression* and somewhat elevated scores on *Stress Reaction*. The cluster in the lower left quadrant of each panel represents low scores on *Stress Reaction* and slightly below-the-norm scores on *Aggression*.

The raw data was then converted into *T* scores for analysis so a comparison could be conducted against the data from Hicks et al's. (2004) study. After the cluster analysis, a multivariate analysis of variance (MANOVA) was performed to compare the identified subtypes of psychopathy.

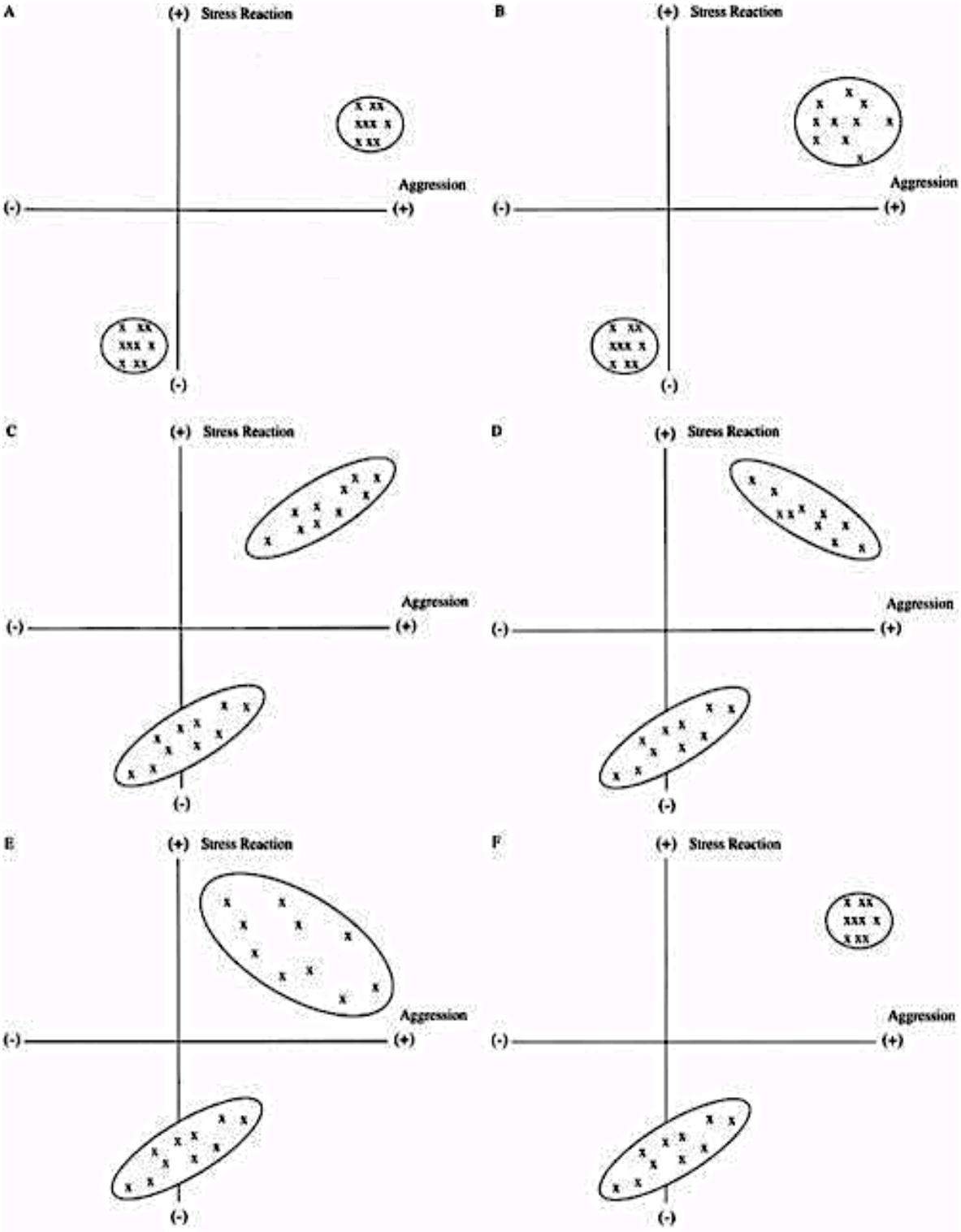

Figure 2. **Example of Cluster Analysis Model Configuration.**

Each panel depicts the different assumptions of the models for a hypothetical example of the simplest possible scenario: A data set with two subpopulations clustered on two

variables, in this case the *Stress Reaction* and *Aggression* scales of the MPQ-BF. The two personality dimensions intersect at the average for the combined sample, such that a minus sign indicates a score below the total sample mean and plus sign indicates a score above the total sample mean. A: Model 1 (spherical shape, equal volume). B: Model 2 (spherical shape, unequal volume). C: Model 3 (equal shape, volume, and orientation). D: Model 4 (equal shape and volume, different orientation). E: Model 5 (equal shape, different volume and orientation). F: Model 6 (different shape, volume, and orientation). Adapted from Hicks et al. (2004).

Results

Descriptive statistics. A total of 40 participants took part in the study. The sample had a mean age of 43 years (*SD* = 10.8 years, 23-66 years in range). The majority were of White British ethnicity (90%) and the rest were Afro-Caribbean (10%). Index offences of the sample included sexual violent offences (40%) and non-sexual violent offences (60%). Participants were recruited from hospital sites (82%) and a prison site (18%).

Cluster analysis. The strength of the model-based cluster analysis for determining psychopathy subtypes is that it does not make any prior assumptions about the number of clusters or elements that exist within the sample. In the present study, a non-hierarchical cluster analysis method was chosen over hierarchical methods. A limitation of the latter is participants either start or are placed in their own cluster, whereas non-hierarchical methods place participants in clusters without any prior information (Everitt, Landau & Leese, 2001). The results from the model-based cluster analysis are presented in Table 8. The fit of each model tested is evaluated using Bayesian Information Criterion (BIC) which specifies the odds that one model

is the best fit compared to others models. The results indicated the best-fitting model, according to value, contained two clusters (BIC = -2203.44). Figure 1 presents the (BIC) values for the alternative psychopath models. This shows that the dataset contains more than one cluster, as none of the models corresponded to the hypothesis that the sample is composed of one single cluster (equivalent to the null hypothesis). The best-fitting model is EVC which comprised the greatest values.

Table 8

Bayesian Information Criterion (BIC) Values for Clusters

Cluster Characteristic				Number of Clusters		
Model	Shape	Volume	Orientation	1	2	3
1	Equal	Equal	-	-2288.23	-2262.17	-2758.96
2	Variable	Equal	-	-2288.23	-2264.82	-2280.47
3	Equal	Equal	Co-ordinate	-2298.21	-2285.94	-2298.94
4	Variable	Equal	Co-ordinate	-2298.21	-2288.38	-2302.40
5	Equal	Variable	Co-ordinate	-2298.21	**-2203.44**	-2340.53
6	Variable	Variable	Co-ordinate	-2298.21	-2303.36	-2341.81

Note. Values represent BIC values; greater values indicate a better fit. The best fitting model is in bold. Shape, volume, and orientation refer to geometric characteristics of the clusters' distributional shape in a multivariate context. Shape is proportional to the relative magnitudes of the Eigenvalues of each cluster's covariance matrix. Volume refers to the absolute magnitude of the matrix and orientation is specified by Eigenvectors of the covariance matrix.

The first cluster (Secondary psychopath subtype) (n = 28) had a mean age of 42 (SD = 10.7) years. The second psychopath cluster (Primary psychopath subtype) (n =

12) had a mean age of 46 (*SD* = 10.8) years. The sample had a mean PCL-R score of 30 (*SD* = 3.8). The primary psychopathy subtype had a mean PCL-R score of 30 (*SD* = 3.3) and a range of 25–38 and the secondary subtype had a mean PCL-R score of 30 (*SD* = 5.1) and a range of 25–34.

Characteristics of the psychopath subtypes. Table 9 presented below illustrates the MPQ-BF mean scores and standard deviations for the psychopath subtypes on the primary and high-order factor scales of the MPQ-BF. Psychopaths in the first cluster (*n* = 12), had the most extreme scores on the *Stress Reaction* scale (in a negative direction), these were termed as *primary psychopaths*; they also scored highly on *Control, Social Closeness* and *Harm Avoidance*. Psychopaths in the second cluster (*n* = 28) scored the highest on the *Aggression* scale, so they were referred to as *secondary psychopaths*. They also scored highly on *Stress Reaction*, *Alienation,* and *Absorption*. On the high-order scales, the secondary psychopath group scored higher than the primary psychopath group on *Constraint* and *Negative Emotion*.

Comparison of psychopathy subtypes on the MPQ-BF scales. Table 9 also illustrates the one-way between-groups multivariate analysis of variance (MANOVA) that was performed to examine the differences between the 11 primary traits and four high-order scales and psychopath subtypes. The dependent variables were the primary-trait scales. The independent variable was the psychopath subtypes. Preliminary assumption testing was conducted to check for covariance matrices and multicollinearity, with no violations noted.

There was a significant difference between the subtypes (F [15,24] = 8.74; $p <$ .001, Pillai's trace = 8.45). This indicated that primary and secondary psychopathy

subtypes were significantly different on most of the subscales, the largest difference established on the following trait scales; *Social Closeness, Stress Reaction, Aggression* and *NEM*. There was also a large effect size of .85 but due to the small sample size this has to be viewed with some degree of caution (Field, 2009).

Table 9

Differences between the Subtypes on Personality Subscales of the MPQ-BF

	Primary psychopath subtype (n = 12)	Secondary psychopath subtype (n = 28)	F	p	Partial η
Primary scale					.
Well-Being	50.7	49.7	4.4*	.043	104
M	10.6	9.9			
SD					
Social Potency	47.3	51.1	1.37	.71	.004
M	10.7	9.7			
SD					
Achievement					
M	51.1	49.5	1.05	.311	.027
SD	8.1	10.8			
Social Closeness					
M	55.8	47.5	22.55*	.<.001	.372
SD	9.4	9.4			
Stress Reaction					
M	39.4	54.6	41.01*	.<.001	.519
SD	6.3	7.5			
Alienation					
M	42.1	53.4	11.46*	.002	.232
SD	9.2	8.3			
Aggression					
M	40.9	54.9	26.88*	.<.001	.414
SD	4.3	9.2			
Control					
M	55.9	47.5	6.16*	.018	.140
SD	6.3	10.3			
Harm Avoidance					
M	53.7	48.4	1.73	.196	.044
SD	12.2	8.6			
Traditionalism					
M	51.8	49.2	2.22	.145	.055
SD	10.6	9.8			

Absorption					
M	44.1	52.5	9.33*	.004	.197
SD	7.9	9.9			
Higher order scale					
Agentic – PEM					
M	49.9	50.0	1.67	.204	.042
SD	10.4	10.0			
Communal – PEM	53.6	49.5	12.43*	.001	.246
M	10.2	18.18			
SD					
NEM					
M	39.9	66.8	40.25*	.<.001	.514
SD	4.2	15.20			
Constraint					
M	55.7	77.2	7.41*	.010	.163
SD	10.7	11.85			

Note. MPQ-BF = Multidimensional Personality Questionnaire-Brief Form; PEM = positive Emotionality; NEM = Negative Emotion. Personality scores have been transferred from raw scores into *T* scores (i.e., *M* = 50, *SD* = 10). • indicates a significant difference between primary and secondary psychopathy subtypes.

Correlation between PCL-R scores and the MPQ-BF. Table 10 presents the results from a correlation between total PCL-R scores and the MPQ-BF personality traits. As indicated the following personality traits have a negative correlation with PLC-R scores; *Well-Being, Social Closeness, Stress Reaction, Aggression, Absorption* and *Communal PEM*. However, of the remaining personality traits on the MPQ-BF, *Social Potency, Achievement, Alienation, Control, Harm Avoidance* and *Constraint* all had a small correlation (r=.10 to .29). The results did not find any medium correlations (r=.30 to .49) or large correlation (r=.50 to 1.0) as defined by Cohen (1988, pp. 79-81).

Table 10

Pearson Correlations Between MPQ-BF Traits and Total PCL-R Scores

	MPQ-BF traits	PCL-R (n = 40)
Well-Being	*r*	-.126*
	Sig.	*.437*
Social Potency	*r*	.120
	Sig.	*.460*
Achievement	*r*	.117
	Sig.	*.473*
Social Closeness	*r*	-.008*
	Sig.	*.960*
Stress Reaction	*r*	-.091*
	Sig.	*.575*
Aggression	*r*	-.095*
	Sig.	*.562*
Alienation	*r*	.240
	Sig.	*.135*
Control	*r*	.195
	Sig.	*.227*
Harm Avoidance	*r*	.145
	Sig.	*.371*
Traditionalism	*r*	.021
	Sig.	*.898*

Absorption	*r*	-.120*
	Sig.	*.463*
Agentic PEM	*r*	0.61
	Sig.	*.709*
Communal PEM	*r*	-.020*
	Sig.	*.904*
NEM	*r*	.057
	Sig.	*.725*
Constraint	*r*	.173
	Sig.	*.285*

Note. MPQ-BF = Multidimensional Personality Questionnaire-Brief Form; PEM = positive Emotionality; NEM = Negative Emotion. * indicates a negative correlation between PCL-R scores and MPQ-BF personality traits.

Types of violence and psychopathy subtypes. Table 11 presents the results from Cornell et al's. (1996) study on instrumental and reactive violence subtypes. The results suggested that the primary psychopath group had a higher tendency towards instrumental violence than towards reactive violence. The secondary psychopath group were spread across all subtypes of violence.

Table 11

Using Cornell et al's. (1996) Method of Instrumental/Reactive Violence Psychopathy Subtypes Compared to Subtypes of Violence using Cornell's (1996) Method

Cornell's Violence Typology	Primary Psychopath Subtype (n = 12)	Secondary Psychopath Subtype (n = 28)
Purely Reactive	3	9
Reactive/Instrumental	1	4
Instrumental/Reactive	7	6
Purely Instrumental	1	9

Table 12 presents the results using Howard's (2009, 2011) method for clarification. Primary psychopaths were motivated equally by aversive and appetitive goals (6:6) and were equally controlled or impulsive. Secondary psychopaths were motivated by both aversive and appetitive goals (12:16). The results suggest that the secondary psychopaths are both impulsive (n = 10) and controlled (n = 18).

Table 12

Psychopathy Subtypes Compared to Subtypes of Violence Using Howard's (2009, 2011) Method

Howard's Violence Typology	Primary Psychopath Subtype (n = 12)	Secondary Psychopath Subtype (n = 28)
Impulsive Appetitive	4	3
Impulsive Aversive	2	7
Controlled Appetitive	2	13
Controlled Aversive	4	5

Tables 13 and 14 present psychopathy subtypes by index offences and violence subtype using both Cornell et al. (1996) and Howard's (2009, 2011) classification. Regarding Cornell et al's. (1996) typology, almost all participants with a sexual index offence were rated as purely or primarily instrumentally violent and participants with a non-sexual index offence displayed a large spread across violence types; however, they did show a higher propensity to reactive elements than instrumental violence. This indicates that sexual offences have a more controlled and instrumental element.

Table 13

The results from Index Offences and Types of Violence Using Cornell et al's. (1996) Method of Instrumental/Reactive Violence

	Sexual Index Offence		Non-Sexual Index Offence	
	Primary Subtype (n = 5)	Secondary Subtype (n = 11)	Primary Subtype (n = 7)	Secondary Subtype (n = 17)
Reactive	8%	4%	42%	43%
Instrumental	33%	36%	17%	18%

Table 14 presents the results using Howard's (2009, 2011) classification. The results did not suggest that there was a correlation between index offence type and psychopathy subtype. However, this could be due to the small sample size and varying sample sizes between groups.

Table 14

The Results from Index Offences and Types of Violence in Howard's (2009, 2011) Quadripartite Typology of Violence

	Sexual Index Offence		Non-Sexual Index Offence	
	Primary Subtype (n = 5)	Secondary Subtype (n = 11)	Primary Subtype (n = 7)	Secondary Subtype (n = 17)
Impulsive	25%	7%	25%	29%
Controlled	17%	32%	33%	32%

Discussion

The aim of this study was to subtype psychopaths using the MPQ-BF, analyse the personality traits between the subtypes, and determine the relationship between psychopathic subtypes and violence. To this end, a model-based cluster analysis was performed to identify subtypes in psychopathic criminal offenders detained in both hospital and prison settings. Using the BIC index, a best-fitting model contained two clusters. These clusters were compared for personality traits, as defined by the MPQ-BF. The participants' file information was analysed to determine violence subtypes and to determine if particular subtypes showed a trend towards particular types of violent behaviours.

Discussion of subtyped psychopaths using the MPQ-BF. A model-based cluster analysis was conducted to ascertain whether the sample could be separated into meaningful subtypes. The findings of the present study replicated a two-cluster solution providing further support for two subtypes of psychopathy, differentiated according to traits best described as primary and secondary psychopathy. This distinction has been widely researched and is supported by existing literature (e,g., Del Gaizo & Falkenbach, 2008; Gao, Raine & Schug, 2011; Hancock, Woodworth & Porter, 2013; Hicks, Markon, Patrick, Krueger & Newman, 2004; Patrick, Edens, Poythress, Lilienfeld, & Benning, 2006; Swogger & Kosson, 2007).

Psychopaths in the first cluster (n = 12), had the most extreme scores on the *Stress Reaction* scale (in a negative direction), they also scored highly on *Control*, *Social Closeness* and *Harm Avoidance*. These specific characteristics indicated that these individuals were closely correlated with the theoretical distinctions of primary psychopathy (Del Gaizo & Falkenbach, 2008; Hicks, Markon, Patrick, Krueger &

Newman, 2004). Therefore, this group were termed *primary psychopaths*. Psychopaths in the second cluster (n = 28) scored the highest on the *Aggression, Stress Reaction, Alienation,* and *Absorption* scales, so they were referred to as *secondary psychopaths*. The characteristics exhibited by the secondary psychopathy group were consistent with previous studies suggesting that this group of individuals experience higher levels of stress and aggression compared to primary psychopaths (Gao, Raine & Schug, 2011; Hancock, Woodworth & Porter, 2013; Vaughn, DeLisi, Beaver & Wright, 2008). However, one inconsistency that arose from the present research is that the secondary group had a considerably elevated score on the higher order scale, *Constraint*. This was unexpected and did not replicate previous findings as primary psychopaths are considered to be more cautious and less impulsive than secondary psychopaths (Swogger & Kosson, 2007). This skewed finding could be due to the MPQ-BF being a self-report measure and secondary psychopaths believing that they are more constraint then reality would suggest.

Although there is no criterion in cluster analysis regarding sample sizes or the number of variables used (Mooi & Sarstedt, 2011), the present study did have a small sample size and therefore the classification should be interpreted cautiously and merits further investigation with larger datasets drawn from similar populations.

The ratio of primary psychopaths to secondary psychopaths was similar to that in Hicks et al's. (2004) study and is consistent with the literature which states that the primary psychopath or classic psychopath is less common than its secondary psychopath counterpart.

Analysis of the differences in MPQ-BF personality traits between psychopath subtypes. Psychopaths in the primary psychopath group were

characterised by high scores on *Social Closeness*, *Control*, and *Harm Avoidance* and low scores on *Stress Reaction* and *Negative Emotion*. This was broadly consistent with findings from the Hicks et al's. (2004) study. The primary psychopathy subtypes demonstrated a capability for strategic action (high *Control*), avoided taking risks and avoided dangerous adventures or activities (high *Harm Avoidance*), and interestingly defined themselves as having close attachments, being sociable, and taking pleasure in and valuing close relationships (high *Social Closeness*). Further, those in the primary psychopathy group had high scores on *Communal Positive Emotionality* which encompasses the primary scales of *Well-Being* and *Social Closeness*. Elevated scores on this high-order factor suggested that individuals in this group seek pleasurable experiences through relationships with others, which is consistent with findings from the Hicks et al's. (2004) study.

Psychopaths in the secondary psychopathy group displayed high scores on *Stress Reaction*, *Alienation*, *Aggression*, and *Absorption* and low scores on *Control* and *Social Closeness*. The most distinctive feature of this group was the high score on *Aggression* and the profile of its members in general seemed to reflect psychological maladjustment in terms of under-controlled or externalising behaviour. They tended to be distressed by minor irritants (high *Stress Reaction*), respond readily with aggressive action and enjoy upsetting and frightening others, as well as enjoying scenes of violence (high *Aggression*); they were also likely to view the world as populated by potential enemies or believed they have been betrayed, used, and deceived by others (high *Alienation*); they tended to be disinhibited and under-controlled (low *Control*), with a small number of close attachments (low *Social Closeness*), and were found to be responsive to evocative sights and sounds (high *Absorption*). Furthermore, the secondary psychopathy subtypes had elevated scores

on *Negative Emotion*, suggesting that individuals in this group were prone to feelings of anxiety, anger, and related emotional and behavioural negative engagement. They also had high scores on *Constraint* which indicated that these individuals had a tendency to inhibit and restrain impulsive expressions and unconventional or risk-taking behaviour. This is inconsistent with other aspects of this subtype as well as findings from Hicks et al's (2004) study – it is a surprising finding with no obvious theoretical explanation. It would be interesting to see if these characteristics are found in a larger sample. The secondary psychopathy subtypes, were characterised largely by scales related to high emotional arousal and low capacity for control and attachment. This is consistent with the findings of Miller, Flory, Lynam and Leukefield (2004) and the view that secondary psychopaths display a heightened emotional arousal at the time of offending compared to the instrumental subtypes who are more in control and display little or no arousal.

A MANOVA comparing the two subtypes on the MPQ-BF personality scales was conducted which concluded that the groups differed significantly on the following personality scales: *Social Closeness*, *Stress Reaction*, *Aggression* and NEM. This finding gives further support to distinguishing two subtypes in the sample as three of the four scales listed above are directly used to ascertain whether an individual is placed in the primary or secondary psychopathy group. The fact that those particular scales differ considerably indicates that that there is a clear personality difference between the two groups, a finding consistent with that of previous literature (Cooper et al., 2011; Skeem et al., 2007).

Within the present research, unadjusted *p* values have been reported throughout, however, following a Bonferroni correction, a "true" significance threshold of $p < .003333$ should be considered (Coid, Freestone & Ullrich, 2012).

A correlation between total PLC-R scores and the MPQ-BF traits was also conducted and showed either a negative correlation between personality traits and PCL-R scores or a very small correlation. This suggested that there is no apparent relationship between the two factors. However, the small sample size may have been a contributing factor to these results.

Discussion of the relationship between violence subtypes and psychopathy subtypes. The present research subtyped violence using Cornell et al's. (1996) method of instrumental/reactive violence and Howard's (2009, 2011) quadripartite typology of violence. As per Cornell et al's. (1996) method, primary psychopaths had a higher tendency towards instrumental violence than towards reactive violence. This is consistent with previous literature stating that primary psychopaths are highly likely to commit instrumental and goal-orientated violence (e.g., Novaco, 1997; Woodworth & Porter, 2002). The secondary psychopathy group was spread across all violent subtypes, with no specific inclination towards one type of violence. It provides evidence for the notion put forward by Block and Block (1992) and McEllistrem (2004) who claim it is unlikely that one person exhibits just one type of violence and argues that violence should be viewed in dimensional terms as some violent acts contain both instrumental and reactive aspects. The key finding here is that psychopaths, whether primary or secondary, are capable of instrumental violence. However, those under the primary psychopathy subtype are less likely to commit reactive violence than those under the secondary psychopathy subtype. This may be because they presumably have more capacity for restraint and are less emotionally reactive. This finding is inconsistent with Blair's (2005) findings; he argues that two separable neurocognitive systems exist, and according to his theory, secondary

psychopaths find it difficult to control their anger when they feel frustration leading to reactive violence, whereas primary psychopaths make a set of behavioural choices which are in keeping with their goals and objectives.

The results using Howard's (2009, 2011) method show that primary psychopaths are motivated equally by aversive and appetitive goals and are evenly distributed along controlled and impulsive domains. The findings suggest that secondary psychopaths are also motivated by both aversive and appetitive goals and are both impulsive and controlled. There is little distinction to be made regarding violence using Howard's (2009, 2011) measure and this finding is not consistent with the predictions. Indeed, the findings appear to be in an unexpected direction.

The mixed nature of findings in the secondary psychopathy subtype indicates that psychopaths in this group are capable of multiple types of violence; however, this finding could not be generalised because of the relatively small sample size.

In the evaluation of the two methods used to define violence subtypes, it would initially seem that Cornell et al's. (1996) method was a more reliable tool as it supported previous literature in determining that primary psychopaths are indeed more instrumentally violent than secondary psychopaths. However, Howard's (2009, 2011) method that encompassed the individual's emotions, affect, and anger type provided an insight into the feelings experienced by the individual at the time the offence took place. Cornell et al. (1996) did not consider the emotional state of the individual and therefore their method lacks the depth that Howard's (2009, 2011) method possesses. Although findings using Howard's (2009, 2011) method were not expected, it is a more up-to-date and comprehensive assessment of violence and certainly incorporates more recent advances in this area encompassing arousal and excitement theories of violent offending. It makes a clear distinction between

impulsive and controlled acts and that between appetitively and aversively motivated behaviours and effectively incorporates a further dimension in the assessment of violence.

A further analysis was conducted that focused on the index offence of the participants using Cornell et al. (1996) and Howard's (2009, 2011) typologies. Interestingly, 16 participants had an index offence of a sexual nature, both against adults and children. As per Cornell et al's. (1996) method, most participants with a sexual index offence displayed purely instrumental violence and conversely participants with a non-sexual index offence displayed purely reactive violence. Similarly, on Howard's (2009, 2011) measure, most participants that committed a sexual index offence exhibited controlled appetitive violence, indicating that they experienced a positive effect and positive emotion whilst offending. The findings suggest that sexual offences are a controlled and planned type of violence. This supports the view from Cornell et al. (1996) and Dempster et al. (1996) that impulsive violence is less likely to occur when the offence is more serious. In relation to sexual offending, which is considered a serious crime, violence is more likely to be instrumental, as evidenced in the current study. However, it is important to note that not all sexual offences are violent, for example, voyeurism and indecent exposure. The findings here did not suggest a correlation between psychopathy subtypes and type of index offence but this could be due to varying sample numbers between groups. The present research findings support the findings of Meloy (2006) who differentiated between predatory violence and affective violence in sexual offending and argued that sexual offending is an instrumental act.

This study hypothesised that primary psychopaths would be highly prone to instrumental violence and secondary psychopaths, to reactive violence. Although the

secondary psychopathy group was not distinguishable into a particular violence subtype, there was a trend towards less reactive violence from the primary psychopathy group. This latter finding is consistent with literature in this area that describes primary psychopaths as committing more offences of an instrumental nature because of being motivated by external goals rather than internal emotions (Cleckly, 1976; Sirin, 1991). The study supported previous findings that two psychopathy subtypes scoring highly on the PCL-R, can be separated into groups that resemble primary psychopaths and secondary psychopaths.

Limitations. Although two groups were distinguished by the analysis in the research study, there may have been certain aspects of the methodology that restricted the reliability and generalisability of the conclusions. First, the sample size was relatively small (n = 40), therefore the sample numbers in each group was limited. However, every effort was made to obtain a large sample and all three high secure forensic hospitals were approached, as well as five maximum-security prisons, local prisons within the London area and four local health services. The difficulty for many of the sites approached was limited resourcing and it was made apparent that another psychopathy study had recruited high PCL-R scoring participants recently and they did not want the same individuals to be approached again so soon for research purposes. The trends from both the psychopathy subtyping and the violence comparisons encourage further data collection to determine whether these trends become significant.

Second, it was difficult to obtain detailed file information especially in the prison setting where information relating to specific offences was not available. This meant there was a reliance on participants' accounts of their offences which could have been

inaccurate and unreliable. Therefore, the subtyping of violence was difficult, even though two clinicians rated the violence separately. This could have had an effect on the varying results of violence subtyping; however, it is important to note that as much information as possible was collected. It would have been interesting for the participants to rate their own violence subtype and compare those results to the raters. This would have shown the level of insight the participants have in relation to their own offending and could have been compared between hospital and prison sites. It would also have enhanced the reliability of the violence rating by supporting file-based analysis with self-report. Furthermore, the presence of sexual offences possibly skewed the data and may have had an effect on Howard's (2009) typology of violence as it incorporated an aversive and appetitive element.

Third, it would have been useful to obtain individual factor and facet scores on the PCL-R; however, locating this information was not possible at any of the sites used for this research. Acquiring this information would have enabled the author to separate the individuals based on their factor scores and in turn determine what relationship, if any, existed between violence and the two factors on the PCL-R: affective and interpersonal aspects and aggressive and irresponsible interpersonal style. It may also have been valuable to obtain information pertaining to the participants' mental health status. This would have provided an insight into the relationship between comorbid mental illness and personality traits on the MPQ-BF.

Fourth, as the use of the MPQ-BF was a self-report measure and as this was the only test used to distinguish between subtypes, it is important to recognise that the findings could have been distorted. Further from this, the measure did not encompass any scales that focused on deception or socially desirable responding meaning that elevated scores on *Social Closeness* and *Harm Avoidance* were likely. However, the

author made it clear to the participants that they should answer the questionnaire honestly and that no feedback would be given to their clinical teams regarding their results. Nevertheless, self-report measures wholly rely on the participants' responses which may be affected by cognitive biases, poor memory, or limited self-knowledge (for example, psychoanalysts would argue that many feelings and much information is unconscious and protected by defence mechanisms) therefore this should be considered when interpreting the results (Field, 2009).

The final and most important shortcoming of this research is the absence of a control group that represent participants who have low scores on the PCL-R. This is important as findings related to MPQ-BF subtypes could be reflective of a general difference in the wider population and not just in psychopathy. However, the results from this research are broadly consistent with those of Hicks et al's. (2004) study which used a control group, and therefore, it is reasonable to consider these results may be specific to psychopathy. Particular attention needs to be paid to the suggested methodological changes highlighted above; however, the key to obtaining findings that can be generalised and contribute to the existing literature in this area is a focus on a larger sample size and the presence of a control group.

The next chapter will examine the use of the MPQ-BF, the measure used in this research study. Although the MPQ-BF has successfully established personality trait differences in primary and secondary psychopaths, a critical analysis of the measure will reveal more about its reliability and validity and more importantly its significance within this area of research.

Chapter 4 – Critique of the Multidimensional Personality Questionnaire (MPQ)

Introduction

This review examines Patrick, Curtin and Tellegan's (2002) *The Multidimensional Personality Questionnaire*, in terms of its scientific properties, its applicability to personality traits in psychopathy, and its research uses. The MPQ comprises 300 items and is a test of "normal" personality employing a dimensional approach. Under such a model, individuals are characterised by their relative standing on a wide range of normally distributed personality characteristics. The brief form of the MPQ (MPQ-BF) is recommended as a tool for studying the genetic, neurobiological, and psychological substrates of personality. The MPQ-BF consists of 155 items, where participants have to answer "true" or "false" to all items. It covers psychometrically pure traits encompassing domains such as temperament, behavioural regulation, and interpersonal and imaginative style (Patrick et al., 2002).

The MPQ-BF is an abbreviated measure that was developed from the MPQ for several reasons. First, the brief form increases the feasibility of inclusion in large sample studies (e.g., longitudinal studies, cross-sectional studies and epidemiological studies). Investigations of this kind are important for studying the links between personality and clinical phenomena. Second, the MPQ-BF is suitable for single-session laboratory studies focusing on individual differences in psychological functioning and physiological processing. Third, it would also provide ongoing research between the MPQ primary traits and other self-report measures investigating personality and temperament. To this end, the goal of Patrick et al. (2002) the authors was to develop a tool which consisted of relatively pure indices of trait disposition, incorporating and extending the range of personality constructs identified within existing literature.

Mischel's (1968) influential critique on the existence of "personality" and the problems associated with trait assessment of personality led to a re-emergence of research in the field. This has been furthered by the identification of the basic dimensions of personality and psychopathological conditions, including disorders of personality and severe clinical syndromes (Krueger, McGue & Iacono, 2001). Because of the size of the area being studied, there are varying levels of methodological assessments and analysis. A key issue is how traits assessed by self-report personality measures are linked to phenomena at other levels. A significant number of studies have utilised the MPQ-BF, establishing that it is an appropriate measure when focusing on personality traits (e.g., Miller, Greif & Smith, 2003; Reynolds, Ortengren, Richards & Wit, 2006; Rushton & Irwing, 2009; Staggs, Larson & Bourgen, 2007).

Overview of the MPQ-BF

Currently, the MPQ-BF does not have a published manual. However, the measure has been validated on a large normative sample (n = 1639). The measure is based on different clusters of traits on 11 primary scales. These are labelled *Well-Being (WB), Social Potency (SP), Achievement (ACH), Social Closeness (SC), Stress Reaction (SR), Alienation (AL), Aggression (AG), Control (CON), Harm Avoidance (HA), Traditionalism (TRA),* and *Absorption (AB).* The remaining scales are high-order scales: *Agentic Positive Emotion (Agentic PEM), Communal Positive Emotion (PEM), Negative Emotion (NEM),* and *Constraint (CoN).* The MPQ-BF focuses on positive and negative emotional temperaments. Positive emotional temperament consists of the following primary scales; *WB, SP, ACH, and SC.* Negative emotional temperament consists of the following primary scales; *SR, AL, and AG.* The higher-

order *Constraint* scale comprises *CON, HA, and TRA* from the primary trait scale. The last trait, *AB*, is distinct from the high-order factors and taps into the propensity for imaginative and self-involving experiences. This is illustrated in Table 15.

Table 15

Construct of the MPQ-BF

PET	NET	Constraint	Absorption
Well-Being	Stress Reaction	Control	Imaginative states
Social Potency	Alienation	Harm Avoidance	
Achievement	Aggression	Traditionalism	
Social Closeness			

Note. PET = Positive Emotional Temperament, NET = Negative Emotional Temperament.

The MPQ-BF thus covers a range of psychometrically traits incorporating facets of temperament, interpersonal, and imaginative style and behavioural processes. The MPQ has item scales that assess the validity of test protocols including the Variable Response Inconsistency (VRIN) and the True Response Inconsistency (TRIN) which are used to determine if the participant attended sufficiently to the content of the questionnaire, however, the MPQ-BF does not include these scales. The MPQ-BF will now be examined in detail.

Critique of the MPQ-BF

The characteristics of a good test. Any psychometric assessment can be described as a good test only if it has certain characteristics. Having a measure normed appropriate sample is one of these. This information is vital for any concise interpretation to be carried out at an individual or group level (Rust & Golombok, 1999). Reliability focuses on the replication of the measure to yield consistent findings and measures internal consistency within the test itself. Finally, validity is associated with determining if the test is measuring what it has set out to measure (Field, 2009). To determine this, a number of different types of validity can be addressed.

Appropriate norms. The samples used for test validation and norming must be of adequate size and must be sufficiently representative to substantiate validity statements, to establish appropriate norms, and to support conclusions regarding the use of the instrument for the intended purpose (Hogg & Vaughan, 2005). The MPQ-BF was normed on a sample of three mixed-gender community groups, obtained from the Minnesota, USA Twin Registry (see Appendix 13 for normed results). The development sample, used for initial item selection, consisted of 1,639 participants (717 men, 922 women) with a mean age of 37.7 years. An independent cross-validation sample consisting of 558 participants (258 men, 300 women), with a mean age of 42 years, was used to assess performance of the abbreviated MPQ-BF scales and to evaluate the underlying factor structure of the psychometric measure. Further, the normative sample of the MPQ included a total of 1,350 participants (675 men, 675 women) with a mean age of 40 years, served as the reference sample for deriving *(T)* scores and establishing invalidity criteria for the MPQ-BF. *T* scores are standardized

scores on each dimension, a score of 50 represents the mean and a difference of 10 from the mean indicates a variance of one standard deviation. This normative sample was formed from a subset of participants from the development and cross-validation samples. In all, 549 participants produced valid MPQ profiles in the independent cross-validation sample. This was used to examine the performance of the new abbreviated MPQ-BF measure against its full length MPQ counterpart. Unfortunately, the MPQ-BF has not been validated on a forensic sample. However, recent studies have used the MPQ-BF in a range of forensic settings (Cooper at al., 2011) and as validity is an ongoing process, it has added to our existing knowledge on the measure.

Reliability. A fundamental part of evaluating any instrument is the degree to which the outcome scores are free from measurement error and consistent from one occasion to another when the test is used with the target group (Field, 2009). Factors that can affect measurement error contributing to an individual's score, thereby resulting in a low test reliability include participant fatigue, content sampling, misinterpreting test instructions, guessing, and random answering (Langdridge & Hagger-Johnson, 2009). Different models of testing reliability are available depending on the type of measure being analysed. To measure the reliability of the MPQ-BF and MPQ primary traits in the cross-validation sample, Cronbach's alpha was computed to examine internal consistency. Alpha coefficients for the 12-item MPQ-BF primary trait scales ranged from .74 to .84, compared to the alpha coefficients for the MPQ which ranged from .81 to .91 (see Table 16). Coefficients at or above 0.80 are often considered sufficiently reliable to make decisions about individuals based on their observed scores, although a higher value, perhaps 0.90, is preferred if the decisions have significant consequences (Webb, Shavelson & Haertel, 2006). The somewhat lower

reliabilities on the MPQ-BF can be attributed to the reduced number of items on each primary trait scale. To test this assumption, the Spearman-Brown formula (Anastasi, 1988) was utilised to determine what the alpha coefficients would have been if the scales were full length. These estimates of reliabilities ranged from .83 to .91 and exceeded actual reliabilities for the full MPQ scores in 10 of 11 scales. This indicates that the items selected for the MPQ-BF scales optimise internal consistency while preserving content coverage.

Table 16

Internal Consistency Estimates (Cronbach's α) for MPQ-BF and MPQ Primary Trait Scales in Cross-Validation

Scale	MPQ-BF	MPQ
Well-Being	.81	.88
Social Potency	.80	.91
Achievement	.80	.83
Social Closeness	.82	.86
Stress Reaction	.84	.90
Alienation	.82	.86
Aggression	.75	.81
Control	.74	.83
Harm Avoidance	.76	.86
Traditionalism	.78	.83
Absorption	.76	.88

Note. Sample (n = 549); MPQ-BF = Multidimensional Personality Questionnaire – Brief Form; MPQ = Multidimensional Personality Questionnaire.

The relationship between the MPQ-BF and MPQ primary trait scales was computed using Pearson product – moment correlations. The relationship between the two measures was uniformly high, ranging from .92 to .96.

Overall test constitution. An analysis was conducted on the MPQ-BF and MPQ broad-trait factor scores. Correlations in this instance were also high, ranging from .94 to .98 (see Table 17). The high-order factor structure of the MPQ-BF scales was examined through principal-components analysis (PCA). Three-factor solutions for the MPQ-BF and MPQ were derived and compared to the cross-validation sample. Parallel analysis within the larger development sample (n = 1,622) was conducted to obtain estimates for factor loadings. Within the cross-validation sample, the three-factor solution accounted for 49.9% and 50.7% for the variance in primary-trait scale scores for the MPQ-BF and MPQ, respectively. For the MPQ-BF, primary loading on *WB*, *SP*, *ACH*, and *SC* on PEM all exceeded .40. Similarly, primary loadings of *SR*, *AL*, *AG* on NEM and loadings of *CON*, *HA*, and *TRA* on CoN were all above .40.

Table 17

Pearson Correlations between MPQ-BF and MPQ Scales in Cross-Validation Sample (N = 549)

Scale	*r*
Primary trait	
Well-Being	.93
Social Potency	.96
Achievement	.95
Social Closeness	.95
Stress Reduction	.96

Alienation	.96
Aggression	.95
Control	.93
Harm Avoidance	.93
Traditionalism	.93
Absorption	.92
Broad trait	
Positive Emotionality (PEM)	.97
Negative Emotionality (NEM)	.98
Constraint (CoN)	.94
Agentic Positive Emotionality (PEM-AG)	.97
Communal Positive Emotionality (PEM-CO)	.97
Agentic Negative Emotionality (NEM-AG)	.96
Alienated Negative Emotionality (NEM-AL)	.96

Note. MPQ-BF = Multidimensional Personality Questionnaire-Brief Form; MPQ = Multidimensional Personality Questionnaire.

PCA results for the MPQ-BF in the larger development sample yielded similar results. The three-factor solution accounted for 50.3% of the variance among the MPQ-BF primary-trait scales (verses 51.4% for the full MPQ measure) and the pattern of factor loading was similar to that of the cross-validation sample.

As it is not possible to achieve the high scores on the MPQ-BF scales compared to the MPQ, the overall variability of the brief scales reduces. However, no reduction of this kind was evident from the broad-trait scores, which reflected weighted sums of primary-trait scores in both the MPQ and MPQ-BF.

Validity. Validity refers to the extent to which a measure tests what it is suppose to test (Field, 2009). There are different types of validity; face, content, construct, and criterion (concurrent/predictive).

Content validity refers to the extent to which the test measures all aspects of the subject under consideration. Content validity for MPQ-BF appears to be strong. The authors developed the MPQ-BF from the MPQ, following a rational approach that ensured the content of the MPQ-BF was not only representative of the full version of the MPQ but also measured a broad range of personality traits encompassing high-order scales (Patrick et al., 2002).

An important factor to assess when focusing on validity is the test construct and how it relates to the way the measure tests aspects that are hypothesised about. As mentioned earlier, the MPQ-BF has been used in a number of previous studies analysing personality traits of individuals. A study by DiLalla, Gottesman, Carey and Vogler (1993) assessed aspects of the construct validity of the MPQ and the Minnesota Multiphasic Personality Inventory (MMPI) through joint factor analysis. The MPQ's primary scales and high-order factors were found to have meaningful associations with MMPI scales that served as construct markers. Furthermore, the MPQ contained a *Constraint* measure that is relevant to the study of psychopathy which was not represented among the MMPI clinical scales.

Another significant area of importance in assessing the suitability of a measure is concurrent validity which focuses on the extent to which the MPQ-BF correlates with other measures purporting to measure the same construct (Langdridge & Hagger-Johnson, 2009). Specifically, correlations between matching MPQ-BF and MPQ primary and broad-trait scales and also the reproducibility of the full length MPQ from the MPQ-BF. The MPQ-BF was correlated to eight other self-report personality

measures and multiple correlations (*R*s) for the prediction of these other measures using all MPQ trait scales in concert. The measures that correlated with the MPQ-BF were as follows: Emotionality Activity Sociability Temperament Survey (EAS) (Buss & Plomin, 1984); Manifest Anxiety Scale (MAS) (Taylor, 1953); Fear Survey Schedule III (FSS) (Arrindell, Emmelkamp & Van der Ende, 1984); Emotional Empathy Scale (EE) (Mehrabian & Epstein, 1972); Narcissistic Personality Inventory (NPI) (Raskin & Terry, 1988); Sensation Seeking Scale (SSS) (Zuckerman, 1979); Socialisation Scale (SS) (Gough, 1957); and the Questionnaire on Mental Imagery (QMI) (Sheehan, 1967). The results indicated three significant findings: first, each of the non-MPQ measures showed a meaningful pattern of univariate correlations with the 11 MPQ-BF trait scales. For example, the EAS showed a positive correlation with the MPQ-BF scale of *SR*, *AG*, *SP*, and *SC*. Second, all the non-MPQ trait measures were predicted to a significant degree by a weighted sum of MPQ-BF trait scales, with most relationships exceeding .60. This finding illustrates a broad coverage of the MPQ and its constructs. Third, the MPQ-BF correlated highly with the MPQ (full version). This supports interchangeability of the short and long forms of the MPQ in terms of their relationship with external phenomena. This final point is also supported by data which focuses on relationships between self-report scores of the MPQ-BF and MPQ and the trait ratings of the same participants by knowledgeable observers. The observers were mother, father, and a close peer of the participant. It was found that the relationship between the self-report trait scores and the external criteria scores were similar for the MPQ-BF and MPQ. It is valuable to note the less significant relationship for some trait scales (i.e., *Alienation* and *Absorption)* in comparisons to others.

Several studies (Cooper et al., 2011; Hicks, Markon, Patrick & Krueger, 2004;

Poythress et al., 2010) that have used the MPQ in psychopathy research have supported the theory that psychopathy can be subtyped into two distinct groups. This has an affect on the measure's predictive validity because if the MPQ-BF can subtype psychopaths as the literature suggests, then it can aid in separating reactive psychopaths from instrumental psychopaths. This distinction would have important implications in practice for risk assessment and development of treatment programmes.

Conclusion

The MPQ-BF is an abbreviated measure developed from the full version of the MPQ. The authors wanted to develop a measure that would be used extensively and provide researchers with the ease of administering a simple self-report personality measure whilst maintaining coverage of the distinct facets of each trait construct. They also wanted to go beyond the popular five-factor model by encompassing positive and negative personality dimensions. However, the correlations between the MPQ and the five-factor model are widely evidenced (Church, 1994; Rushton & Irwing, 2009). This gives rise to the argument that there is no need for another personality measure and indeed the authors have not attempted to explain the need for this measure fully. Although the measure has aided in understanding the construct of two distinct types of psychopathy, there are other personality measures that have greater validity and reliability that could be used for the same purpose.

The MPQ-BF is a self-report measure which is vulnerable to participants not answering honestly or fully understanding the statements, and the absence of the inbuilt response inconsistency scales used within the MPQ but not adopted for the MPQ-BF is a major weakness when utilising this self-report measures in research.

There was a high correlation between the MPQ and MPQ-BF's primary scales. With respect to the MPQ-BF, internal consistency was also high despite the attenuation that would occur by reducing items on a measure. Furthermore, within the cross-validation sample, correlations between true MPQ values and regression-based MPQ-BF estimates were very high across all broad-trait factors. The measure also incorporates high-order factors, which makes the MPQ-BF suitable for use in multi-inventory studies of the structural basis of personality.

It was also observed that there was close correspondence between the MPQ-BF and MPQ in terms of predicting other self-report personality measures. Multiple correlations for prediction ranged from .42 to .78 (M = .64) for the MPQ-BF. Further, the MPQ-BF also showed a similar correlation of observer ratings of the same trait/construct (Patrick et al., 2002). The predictive relationships between the MPQ-BF and other personality measures highlighted their ability to encompass multidimensional approaches and interpret complicated trait constructs. However, it would be useful to focus on more recent personality measures to ensure that the MPQ-BF can stand up to the scrutiny of recent psychometric developments.

A limitation of the MPQ-BF became apparent when comparing its standard score ranges with those of the MPQ scales. Owing to the smaller item sets in the MPQ-BF, the range of possible T scores was reduced resulting in a compressed distribution of scores and discriminations at the extremities. This can lead to a potential weakness in administering the MPQ-BF in individual assessments and counselling settings, where the aim is to differentiate individuals on the basis of trait scale elevations. However, it can be argued that for the purpose of individual assessments the MPQ full version can be utilised to ensure increased validity.

Owing to the absence of a published manual on the MPQ and MPQ-BF, it has been difficult to fully evaluate its validly and reliability. Further analysis could focus on test-retest reliability to establish the measure's consistency from one time to another as well as further analysis reliability, validity and test constitution in a number of different forensic samples. However, the measure has been normed on a large population and has undergone a comprehensive development stage. The measure has also been used in a number of studies which have been evaluated in Chapter two. Although the measure does not have a manual, the MPQ-BF is easy to access and administer. Its "true" or "false" format within the questionnaire and simple statements make it easy to use for many different types of populations. However, further advances in the MPQ-BF could focus on testing the measure in different cultural contexts to increase its validity and usability. The analysis of the MPQ and MPQ-BF showed that although the MPQ-BF may not be the most reliable and extensively tested measure of personality, and indeed its place within personality research is yet to be determined, however, it can be used as a reliable self-report personality measure, as evident in the psychopathy research in this instance.

Chapter 5 – Discussion

The present thesis has highlighted a number of important features within the area of psychopathy and violence which will be discussed in chapter sequence.

Chapter two – A systematic literature review of psychopathy and violence

Findings from the current systematic literature review are consistent with previous research in the area. Firstly, with distinguishing primary and secondary psychopathy subtypes and secondly, by attributing the primary pathology to instrumental violence and the secondary pathology to reactive violence.

While conducting this review it was required for the author to contact the authors of several studies as - whilst completing the inclusion/exclusion criteria and quality assessment - it became apparent that a lot of important information was not included within the research article. On many of these occasions the author of the thesis was not contacted further about the details that were required to complete initial vetting of the article and therefore studies were excluded due to a lack of information. This was a time consuming process which resulted in the reviews completion being delayed. However, on reflection, this comprehensive process is vital to source every article that exists within the area of psychopathy and violence.

While completing this review it quickly became apparent that very few studies had been conducted in the UK, with the majority of research taking place in the USA. Although resourcing and access issues for psychopathy research in England have been discussed, it is imperative that more research is conducted in Britain. This advance would enable cultural distinctions to be made which could have an impact on the development of treatment programmes.

Chapter three – Empirical research study

The present research successfully subtyped the sample into primary and secondary domains using the MPQ-BF through cluster analysis. The primary psychopathy group was characterised by high *Control*, high *Harm Avoidance* and defined themselves as having many close personal relationships. The secondary subtypes were characterised largely by scales related to high emotional arousal, low capacity for control and attachment which is consistent with previous literature.

The research also focused on identifying and analysing a link between violence and psychopathy using two distinct measures of violence. On the Cornell et al's. (1996) measure, primary psychopaths were more likely to engage in instrumental violence, whereas secondary psychopaths were spread across all violent subtypes and had no inclination towards one type of violence. On the Howard (2009, 2011) measure, the findings suggested that primary and secondary psychopathy subtypes were motivated by both aversive and appetitive goals and both equally exhibited impulsive and controlled violence. Therefore, there was little distinction to be made regarding violence and this finding was not consistent with the predictions made nor previous research.

Further research in this area should include large sample sizes together with a comparable control group. Longitudinal investigations into psychopathy subtypes and risk of further violence or responsiveness to available intervention would be a valuable addition to the existing literature. This may provide a detailed insight into the clinical resources needed for successful treatment outcomes for both primary and secondary psychopaths. Further research on the genetics and neurobiological components of psychopathy would be a beneficial contribution to the existing literature as it may provide alternative treatments to mediate severe psychopathy

traits, for example, Mitchell et al. (2013) found that intranasal administration of oxytocin could increase trust and empathy in psychopathic individuals.

It is certainly the case that conducting research with psychopaths can be challenging and demanding. First, access to this group of individuals can be difficult. Psychopathy is a popular area of investigation and many responsible clinicians do not want their patients/prisoners approached continually to take part in research. Furthermore, high numbers of psychopaths reside within high secure institutions which are difficult to gain access to due to resourcing issues. These methodological challenges limit high sample numbers unless a considerable amount of time can be given to research in this area. Second, it is sometimes argued that psychopaths cannot reliably complete self-report measures, as it is believed that they are less likely to be honest. However, lying is common human behaviour that serves functions of self-presentation (DePaulo, Kash, Kirkendol, Wyer, Epstein, 1996). Personality assessment through self-report is less concerned with eliciting verifiable facts than with beliefs about the kind of person one is. Furthermore, self-presentation is present in any assessment and therefore, self-reports should be considered as a guide to a person's identity (Hogan & Nicholson, 1988).

Chapter four – Critique of the MPQ-BF

A detailed analysis of the MPQ-BF evaluated that it had been developed from the MPQ which had been normed on a large population. The measure proved to have good content and concurrent validity - however there were various aspects of validity that were not assessed due to the lack of analytical data that existed. Furthermore, due to the absence of a published manual, it is essential that the measure be used in research with a number of different populations to establish stronger external validity.

A limitation to the measure is that self-report can be unreliable and an inaccurate representation of an individual's personality (Field, 2009). This has been accommodated for in the MPQ with scales in Variable Response Inconsistency (VRIN) and True Response Inconsistency (TRIN), however; these scales are not included in the MPQ-BF which is a weakness to the measure. The present research (Chapter 3) took this into consideration and ensured the participants had the cognitive facilities to answer the questionnaire sufficiently. Individuals who had learning difficultis, as inferred from an IQ of below 70, were excluded as part of the criteria. However, the more significant issue here was not the participants' cognitive ability, but their willingness to engage in deceitful and manipulative behaviour.

As discussed, the MPQ-BF has been used for a wide variety of studies, highlighting its importance within personality trait research. Although the measure has not been normed on a forensic population, the number of forensic studies using the MPQ-BF has increased. The MPQ-BF is a useful measure for forensic research for a number of reasons. First, it encompasses a *Constraint* element which is a valuable element to psychopathy research. The scales under the *Constraint* factor are *Control*, *Harm Avoidance*, and *Traditionalism*. The *Control* and *Harm Avoidance* scales are important when focusing on subtyping psychopathy and specifically scores on scales such as *Control* as it identifies those who are particularly cautious and these individuals may be more inclined to exhibit instrumental acts of violence. This is very important when considering secondary psychopaths and their characteristics. Second, it has been concluded by several studies that the MPQ-BF distinguishes between primary psychopaths and secondary psychopaths. This supports the theory that psychopathy can be subtyped into primary and secondary domains – a much debated area of psychopathology (Reynolds et al., 2006). Third, the time restrictions,

resources and cost associated with research in forensic settings are all important considerations. The ease of administrating a simple self-report measure such as the MPQ-BF allows large populations to be assessed easily. Finally, the measure allows a cluster-based analysis to take place using the BIC. This approach does not predetermine the number of clusters and selects the best-fitting model. This approach, when applied to subtyping psychopaths using the MPQ-BF, is detailed extensively (Hicks et al., 2004; p279) and is used to make further conclusions regarding the personality traits associated with primary and secondary psychopaths.

Practical and theoretical implication

Research that focuses on defining personality characteristics of psychopathy subtypes is valuable in many ways. If primary psychopaths do indeed have distinctive personality profiles compared to secondary psychopaths - which this research has evidenced - it could have an effect on designing treatment programmes in the future. Currently interventions that primarily focus on psychopathy subtypes do not exist, however, the Chromis programme is an accredited intervention that was developed seven years ago and aims to reduce violence in offenders whose level and combination of psychopathic traits disrupts their ability to engage in treatment and change. Interventions that are specific to the target group are more likely to achieve positive treatment outcomes, (Del Gaizo & Falkenbach, 2008) and the Chromis programme has incorporated the Risk, Need and Responsivity principles, outlined by Andrews and Bonta (2003). These components are designed to meet the needs of the psychopathic participants by being challenging and stimulating, whilst enabling them to develop a number of skills that can fulfil their life goals without the use of threats and violence (Tew, 2012). There has been no evaluation of the programme's success

to date, however, this is a priority for the developers and may act as a good foundation for incorporating psychopathy subtypes within the intervention model in the near future.

It is certainly well evidenced that psychopathic groups differ in their emotional responsiveness and information processing (Kosson & Newman, 1995). This is an important distinction when considering treatment programmes in more detail. Furthermore, it remains plausible that psychopathic subtypes diverging in personality and clinical status differ not only in terms of amenability to treatment, but also in receptiveness to available treatment methods (Tew, 2012). It is suggested that secondary subtypes may more easily form a therapeutic alliance and may have treatment needs that are more amenable to traditional psychotherapy interventions compared to primary subtypes (Skeem et al., 2007). Additionally, secondary subtypes might benefit from interventions addressing anger control and impulsivity but treatment should also be aimed at arousal/anxiety reduction, slowing response latencies, assimilation of distal cues, checking self-schema bias and cognitive rehearsal (Serin & Kuriychuk, 1994). Treatment for secondary psychopaths around this area should assist offenders to better regulate their behaviour and therefore become less reactively violent.

Primary subtypes would require a more structured approach that focuses on cognitions and behaviours that precipitate violence, thus, providing constructive outlets for meeting goals rather them attempting a personality change, much like the Chromis programme have incorporated. Due to the challenges of working with individuals with traits of psychopathy, for example, the possibility of manipulation, it may be necessary to keep treatment groups small with several therapists assisting. It is imperative to have useful de-briefing sessions with the assisting therapists to ensure

any important issues are discussed openly.

The distinction of psychopathy subtypes and violence could also have an effect on the design and administration of risk assessment tools. For example, the inclusion of the instrumental and reactive dichotomy on the assessments such as the Historical, Clinical, Risk Management - 20 (HCR-20) (Webster, Douglas, Eaves & Hart, 1997) and the Risk of Sexual Violence Protocol (RSVP) (Hart, Kropp, & Laws, 2003) to further assess risk would provide a detailed focus on what types of violence the individual would be more likely to engage in. This would be a beneficial advance in the areas of psychopathy and violence.

As personality has proved to be such a risk factor for psychopathology and offending (Caspi, 2000) it is important for research to continue in this area so treatment programmes can be advanced and recidivism can be reduced. Furthermore, to examine psychopathy subtypes in greater detail, research will need to focus on genetic, neurobiological, and psychobiological areas which may aid in developing new strategies for preventing crime.

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Appendix 1 – Search Syntax

Embase & psycINFO

1. psychopath$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
2. sociopath$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
3. psycho$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
4. severe personality diorder$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
5. ASPD. [mp=title, original title, abstract, name of substance word, subject heading word]
6. severe antisoc.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
7. 1 or 2 or 3 or 4 or 5 or 6
8. grouping.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
9. subtype.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
10. groups.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
11. classification$.mp. [mp=title, original title, abstract, name of substance word, subject heading word]
12. 8 or 9 or 10 or 11

13. aggression.mp. [mp=title, original title, abstract, name of substance word, subject heading word]

14. reactive aggression.mp. [mp=title, original title, abstract, name of substance word, subject heading word]

15. instrumental aggression.mp. [mp=title, original title, abstract, name of substance word, subject heading word]

16. aggressive.mp. [mp=title, original title, abstract, name of substance word, subject heading word]

17. violent.mp. [mp=title, original title, abstract, name of substance word, subject heading word]

18. violence.mp. [mp=title, original title, abstract, name of substance word, subject heading word]

19. 13 or 14 or 15 or 16 or 17 or 18

20. remove duplicates from 19

Web of Science & National Criminal Justice Reference

(psycho*) OR (psychopath*) OR (psychopathy*) OR (sociopath*) OR (sociopathic*) OR (severe antisocial*) OR (personality disorder*) OR (severe personality disorder*) OR (psychopathic*) OR (severe antisocial personality disorder*) OR (psychopathically*)

AND

(subtypes*) OR (subtype*) OR (categories*) OR (categorise*) OR (category*) OR (type*) OR (group*) OR (grouping*) OR (classification*) OR (set*)

AND

(aggression*) OR (aggressive*) OR (violence*) OR (violent*) OR (anger*) OR (angry*) OR (violent behav*) OR (force*) OR (physical force*)

AND

(relation*) OR (relationship*) OR (correlation*) OR (correlate*)

Appendix 2 – Inclusion and Exclusion Criteria

	Inclusion	Exclusion
Population	Male population Aged 18+	Female studies Juvenile studies
Exposure	Males with a PCL-R score of ≥25 A focus on psychopathy subtyping	No PCL-R conducted.
Comparator	Low scoring PCL-R males or those with ASPD	No links drawn to psychopathy subtypes and aggression
Outcomes	Insight into psychopathy subtypes and aggression	N/A
Study Design	Cross-sectional	Experimental studies, reviews, opinion papers, commentaries, editorials, non-English papers, non-published papers.

Appendix 3 – Quality Assessment Form

Cross-sectional

QUESTION	Y	P	N	U	COMMENTS
INITIAL SCREENING					
Are hypotheses/ aims clearly stated?					
Is the study addressing psychopathy subtypes and aggression?					
STUDY DESIGN					
Has the study addressed the question being asked?					
Is a cross-sectional study an appropriate way of answering the question under the circumstances?					
SELECTION BIAS					
Were the participants representative of the defined population?					
Was a sufficient sample size used?					
Were the groups similar at base line?					
Were the groups comparable in all important confounding variables?					
Were potential confounding variables controlled for (by matching or through					

statistics)?					
MEASUREMENT AND DETECTION BIAS					
Has psychopathy subtypes been clearly defined and measured?					
Have the assessments used been clearly defined, measured and standardised?					
Were self report measures used?					
Was blinding incorporated where feasible?					
Were the measurements for outcome objective?					
Was the outcome measure validated?					
Was the outcome assessed in the same way across groups?					
ATTRITION BIAS					
Were reasons explained for those refusing to participate in the study?					
Were attrition rates similar across groups?					
OUTCOME BIAS					
Was outcome measured in a correct way?					
Were the measures valid and reliable for the defined population?					
STATISTICS					
Was the statistical analysis used correctly?					
Were there statistical attempts to deal with					

missing data?					
ARE THE RESULTS BELIEVABLE?					
Are results unbiased?					
Are the results significant?					
Is the size of effect reasonable?					
Are methods and design reliable?					
Have results been clearly reported?					
Have limitations been discussed?					
APPLICIABILITY OF FINDINGS					
Can results be applied to population sample regardless of culture and size?					
Do the results of this study fit with other available evidence?					

Appendix 4 – Data Extraction Form

General information	
Date of extraction	
Author(s)	
Title of article	
Title of journal	
Quality score	
Clarity score	

Re-verification of eligibility	
Is the study eligible? - *Population* - *Exposure* - *Comparator* - *Outcome*	Y / N
Study design	

Detailed information	
Study aims	
Target population - *No. of offenders* - *Demographic information*	

Control population - *Type of participant* - *No. of participants* - *Demographic information*	
Recruitment procedures	
Setting	
Inclusion criteria	
Exclusion criteria	
Methodology - *File review and interviews* - *Validity and reliability*	
Attrition rates	
Statistical tests used	

Results	
Other notes/limitations	

Appendix 7: Participant Information Sheet – Healthcare

Information sheet for participants (date: 01.10.10, version 3)

(Research Ethics Committee registration number: 10/H0805/44)

You are being asked to participate in a research project. The following information sheet explains what the research is about, why it is being carried out and what will be asked of you if you agree to take part. *If you do not want to take part then you do not have to*. If you decide not to take part and you are a patient, then this will not affect your current or future treatment in any way. If you have any questions about the research, then please feel free to ask.

You can keep this information sheet.

Title of research
Assessing normal personality functioning and comparing two types of aggression.

Aim of research
This research looks at the differences between people who have been diagnosed using the psychopathy checklist – revised. It aims to investigate whether different groups of people with this diagnosis are more or less likely to be aggressive in different ways. This helps with treatment planning and managing risk.

What would you have to do?
If you decide to take part then you will be asked to fill out one questionnaire which takes approximately 20-30 minutes to complete. The questionnaire consists of 155 true or false statements. We have no reason to believe that you will experience any difficulties as a result of taking part.

This research does *not* involve any physical examinations or medications. Whatever you decide will not affect the care you receive in any way. Nothing will be recorded in your notes, whether you choose to participate or not. All information gathered in this research remains confidential to the research project.

If you experience any distress from taking part in this research, please tell a member of your clinical team who will be available to offer support. If you disclose information that relates to risk to yourself or others, then the researcher will be obliged to inform your clinical team.

Taking part in this research is entirely voluntary. If you decide you do not want to take part, you can withdraw from the research at any time.

Appendix 8: Participant Consent Form – Healthcare

Participant consent form (date: 04.08.11, version 2)

(Research Ethics Committee registration number: 10/H0805/44)

Title of research:
Assessing normal personality functioning and comparing two types of aggression.

Names of researchers:
Khyati Patel and Philip Minoudis.

I confirm that I have read and understood the information sheet dated 1st October 2010 about the above research and that I have been given the opportunity to ask questions.

I understand that taking part in this research is voluntary and I am free to withdraw at any time, without having to give a reason. Withdrawing from the research will not affect my treatment or rights in any way.

I understand that sections of my medical and psychology notes may be looked at by the researchers where it is relevant to taking part in the research. I give permission to the researchers to have access to my medical and psychology notes.

I agree to take part in this study.

I understand that if I tell the researcher anything that suggests a risk of harm to myself or others or an intention to leave the hospital without permission, the researcher will inform the clinical team.

Name of participant	Date	Signature
……..	…….	……..
Name of researcher	Date	Signature
……..	…….	……..

REMEMBER THAT YOU MAY WITHDRAW FROM THE RESEARCH AT ANY TIME WITHOUT ANY CONSEQUENCE

Appendix 9: Participant Debrief Sheet – Healthcare

Debrief Sheet (date: 03.01.11, version 1)

(Research Ethics Committee registration number: 10/H0805/44)

Thank you for taking part in this research. Your contribution has been kindly appreciated.

If you are feeling distressed and would like to speak to someone regarding this, please speak to your allocated psychologist.

Thank you again.

Appendix 10 – Participant Information Sheet – Prison

Information sheet for participants (date: 20.12.11, version 2)

(Research Ethics Committee registration number: 10/H0805/44)

You are being asked to participate in a research project. The following information sheet explains what the research is about, why it is being carried out and what will be asked of you if you agree to take part. *If you do not want to take part then you do not have to*. If you decide not to take part and you are a prisoner, then this will not affect your current sentence or treatment through the criminal justice system in any way. If you have any questions about the research, then please feel free to ask.

You can keep this information sheet.

Title of research
Assessing normal personality functioning and comparing two types of aggression.

Aim of research
This research looks at the differences between people who have been diagnosed using the psychopathy checklist – revised. It aims to investigate whether different groups of people with this diagnosis are more or less likely to be aggressive in different ways. This helps with treatment planning and managing risk.

What would you have to do?
If you decide to take part then you will be asked to fill out one questionnaire which takes approximately 20-30 minutes to complete. The questionnaire consists of 155 true or false statements. We have no reason to believe that you will experience any difficulties as a result of taking part.

This research does *not* involve any physical examinations or medications. Whatever you decide will not affect the care you receive in any way. Nothing will be recorded in your notes, whether you choose to participate or not. All information gathered in this research remains confidential to the research project.

If you experience any distress from taking part in this research, please tell a member of your clinical team who will be available to offer support. If you disclose information that relates to risk to yourself or others, then the researcher will be obliged to inform your clinical team.

Taking part in this research is entirely voluntary. If you decide you do not want to take part, you can withdraw from the research at any time.

Appendix 11 – Participant Consent Form – Prison

Participant consent form (date: 20.12.11, version 2)

(Research Ethics Committee registration number: 10/H0805/44)

Title of research:
Assessing normal personality functioning and comparing two types of aggression.

Names of researchers:
Khyati Patel and Philip Minoudis.

I confirm that I have read and understood the information sheet dated 20th December 2011 about the above research and that I have been given the opportunity to ask questions.

I understand that taking part in this research is voluntary and I am free to withdraw at any time, without having to give a reason. Withdrawing from the research will not affect my treatment through the criminal justice system or my rights in any way.

I understand that sections of my medical and psychology notes may be looked at by the researchers where it is relevant to taking part in the research. I give permission to the researchers to have access to my medical and psychology notes.

I agree to take part in this study.

I understand that if I tell the researcher any of the following information, they have a duty to divulge the details to my allocated prison officer.

This includes:

i. Behaviour that is against prison rules and can be adjudicated against
ii. if an individual discloses information that either indicates a risk of harm to themselves or others or refers to a new crime that they have committed or plan to commit.
iii. Undisclosed illegal acts
iv. Behaviour that is harmful to the research participant (e,g., intention to self-harm or commit suicide)

Name of participant Date Signature

……..	…….	……..
Name of researcher	Date	Signature
……..	…….	……..

REMEMBER THAT YOU MAY WITHDRAW FROM THE RESEARCH AT ANY TIME WITHOUT ANY CONSEQUENCE

Appendix 12 – Participant Debrief Sheet – Prison

Debrief Sheet (date: 03.01.11, version 1)

(Research Ethics Committee registration number: 10/H0805/44)

Thank you for taking part in this research. Your contribution has been kindly appreciated.

If you are feeling distressed and would like to speak to someone regarding this, please speak to your allocated prison officer or psychologist.

Thank you again.

Appendix 13 – MPQ-BF Normative Sample

MPQ-bf
Descriptive Statistics Normative Sample – Linear T Scores, N = 1350

	Mini	Max	Mean	SD
TVRINbf	33.97	87.07	50.00	10.00
TTRINbf	17.68	91.29	50.00	10.00
TWBbf	19.49	61.68	50.00	10.00
TSPbf	36.59	70.15	50.00	10.00
TACbf	27.73	66.23	50.00	10.00
TSCbf	25.42	63.52	50.00	10.00
TSRbf	33.71	68.46	50.00	10.00
TAGbf	39.62	88.86	50.00	10.00
TALbf	43.45	95.48	50.00	10.00
TCNbf	16.90	63.42	50.00	10.00
THAbf	18.72	61.70	50.00	10.00
TTRbf	21.34	63.03	50.00	10.00
TABbf	32.03	71.20	50.00	10.00
TUVbf	36.00	86.20	50.00	10.00
TPEMbf	16.80	73.55	50.00	10.00
TNEMbf	33.73	95.43	50.00	10.00
TCONbf	14.42	69.20	50.00	10.00
TPEMAGbf	22.60	71.75	50.00	10.00
TPEMCObf	18.98	70.80	50.00	10.00
TNEMAGbf	32.45	87.78	50.00	10.00
TNEMALbf	36.63	91.86	50.00	10.00
Age	18.00	70.00	40.28	12.20

Descriptive Statistics on 4 Normative Subsamples
Normative Men – Linear T Scores, N = 675

	Min	Max	Mean	SD
TVRINbf	33.97	80.43	50.01	9.92
TTRINbf	17.68	91.29	50.26	10.76
TWBbf	19.49	61.68	50.13	9.79
TSPbf	36.59	70.15	51.97	10.03
TACbf	27.73	66.23	50.97	10.00
TSCbf	25.42	63.52	48.79	10.00
TSRbf	33.71	68.46	48.47	9.49
TAGbf	39.62	88.86	52.29	10.55
TALbf	43.45	95.48	50.53	10.51
TCNbf	16.90	63.42	49.12	9.97
THAbf	18.72	61.70	46.09	10.37
TTRbf	21.34	63.03	49.72	9.91
TABbf	32.03	71.20	48.92	9.93
TUVbf	36.00	86.20	50.48	10.10
TPEMbf	16.80	72.18	50.71	10.02
TNEMbf	33.73	95.43	50.44	10.43

TCONbf	14.42	68.51	47.61	9.96
TPEMAGbf	24.70	71.75	51.61	9.88
TPEMCObf	19.66	70.80	49.58	9.99
TNEMAGbf	33.13	85.08	51.24	10.38
TNEMALbf	36.63	91.86	49.63	10.35
age	18.00	70.00	40.32	12.12

Normative Women – Linear T Scores, N = 675

	Min	Max	Mean	SD
TVRINbf	33.97	87.07	49.98	10.08
TTRINbf	17.68	91.29	49.74	9.18
TWBbf	19.49	61.68	49.88	10.22
TSPbf	36.59	70.15	48.03	9.58
TACbf	27.73	66.23	49.03	9.91
TSCbf	25.42	63.52	51.21	9.86
TSRbf	33.71	68.46	51.53	10.26
TAGbf	39.62	88.86	47.71	8.85
TALbf	43.45	95.48	49.47	9.45
TCNbf	16.90	63.42	50.88	9.95
THAbf	18.72	61.70	53.91	7.87
TTRbf	21.34	63.03	50.28	10.09
TABbf	32.03	71.20	51.08	9.96
TUVbf	36.00	82.02	49.52	9.88
TPEMbf	20.22	73.55	49.29	9.93
TNEMbf	33.73	90.68	49.56	9.54
TCONbf	15.11	69.20	52.39	9.46
TPEMAGbf	22.60	71.75	48.39	9.87
TPEMCObf	18.98	70.80	50.42	10.00
TNEMAGbf	32.45	87.78	48.76	9.45
TNEMALbf	37.32	91.17	50.37	9.63
age	18.00	70.00	40.23	12.29

Normative Participants Age LE 40 – Linear T Scores, N = 765

	Min	Max	Mean	SD
TVRINbf	33.97	87.07	50.23	9.75
TTRINbf	17.68	91.29	50.13	10.06
TWBbf	19.49	61.68	49.26	10.28
TSPbf	36.59	70.15	51.15	9.84
TACbf	27.73	66.23	49.69	10.02
TSCbf	25.42	63.52	50.19	9.91
TSRbf	33.71	68.46	50.32	9.98
TAGbf	39.62	88.86	51.68	10.57
TALbf	43.45	95.48	50.74	10.75
TCNbf	16.90	63.42	49.13	10.22
THAbf	18.72	61.70	48.48	10.20
TTRbf	21.34	63.03	47.52	9.98
TABbf	32.03	71.20	50.60	10.14
TUVbf	36.00	82.02	48.34	9.41
TPEMbf	16.80	72.87	50.20	10.14

TNEMbf	33.73	95.43	51.13	10.61
TCONbf	14.42	69.20	47.75	10.03
TPEMAGbf	22.60	71.75	49.94	10.19
TPEMCObf	18.98	70.80	50.26	10.04
TNEMAGbf	32.45	87.78	51.42	10.45
TNEMALbf	36.63	91.86	50.52	10.62
Age	18.00	40.00	30.82	4.23

Normative Participants Age GT 40 – Linear T Scores, N = 585

	Min	Max	Mean	SD
TVRINbf	33.97	87.07	49.69	10.32
TTRINbf	17.68	91.29	49.84	9.93
TWBbf	19.49	61.68	50.97	9.54
TSPbf	36.59	70.15	48.50	10.02
TACbf	27.73	66.23	50.40	9.96
TSCbf	25.42	63.52	49.75	10.12
TSRbf	33.71	68.46	49.59	10.02
TAGb	39.62	88.86	47.81	8.74
TALbf	43.45	95.48	49.03	8.83
TCNbf	16.90	63.42	51.14	9.60
THAbf	18.72	61.70	51.99	9.37
TTRbf	21.34	63.03	53.25	9.06
TABbf	32.03	71.20	49.22	9.77
TUVbf	36.00	86.20	52.18	10.33
TPEMbf	19.54	73.55	49.74	9.81
TNEMbf	34.41	94.07	48.52	8.94
TCONbf	19.96	69.20	52.94	9.17
TPEMAGbf	24.70	71.75	50.08	9.76
TPEMCObf	19.66	70.80	49.65	9.94
TNEMAGbf	33.13	82.38	48.14	9.06
TNEMALbf	37.32	91.17	49.32	9.09
Age	41.00	70.00	52.65	7.06