An Empirically Based Typology of Psychopathic Offenders

by

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Abstract

Many clinicians would agree that psychopathic offenders share many similarities, however these professionals would also agree that no two psychopaths are identical. The current study attempts to determine whether different types of psychopaths exist. This typology was created using archival data for 100 federally sentenced male offenders with scores of ≥ 27 on the Hare Psychopathy Checklist – Revised (Hare, 1991). Using both hierarchical and nonhierarchical clustering techniques 4 different types of psychopaths emerged. The utility of these 4 types of psychopaths was assessed using criminal behaviour information and assessment variables. Results indicated that the ‘callous’ psychopaths are the high-risk group as they are more likely to recidivate violently. Furthermore, the ‘adult criminality’ psychopaths could be identified as the low-risk group as they possess fewer antisocial attitudes, beliefs and values, have fewer intervention needs and present as the lowest risk for recidivism.

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And finally, I would like to thank my husband, Rob, and my daughter Jessica. Thanks for all of your support and patience and for reminding me to smell the flowers along the way. And yes Jessica, mommy can now come to the park too!

Dedication

I would like to dedicate this thesis to my mother. Well mom – I did it! I told you I would and you never doubted me for a minute. You have always encouraged me to follow my dreams and you have helped make many of them come true. Even when I thought they were unattainable you found a way to convince me otherwise. You always knew just what to say and just how to say it. You made the tough times seem easier and the fun times much more enjoyable. You were always there to offer guidance and support and have always encouraged me to do my best at whatever I am doing. Well mom, I am not sure where I will go from here but one thing is for sure – you will be right there with me. You are my strength and my courage. You are my inspiration. I love you mom and I miss you very much.

EFFIE MARY DIXON (nee MACLEOD)
MAY 1938 – JULY 2001

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An Empirically Based Typology of Psychopathic Offenders

In the latter half of the 20th century the construct of psychopathy has received a great deal of attention from both researchers and clinicians. However, it is clear that individuals' who exhibited psychopathic behaviour were around long before this. In fact, the concept of psychopathy has been evolving since the beginning of the 19th century. As early as 1812, psychiatric patients have been described as exhibiting "innate preternatural moral depravity" (Rush, 1812). Later, those individuals would come to be known as exhibiting a "psychopathic personality" (Kraepelin, 1907, as cited in Lykken, 1998) and finally as "psychopaths" (Cleckley, 1976).

In an attempt to identify psychopathic individuals, the English Mental Health Act (1959, as cited in Blackburn, 1975) included a psychopathic disorder category which classified individuals who exhibited "...abnormally aggressive or seriously irresponsible conduct" (Blackburn, 1975, p. 457). Then in 1983 the English Mental Health Act expanded upon these criteria so that psychopathic disorder was defined as "a persistent disorder or disability of mind (whether or not including significant impairment of intelligence), which results in abnormally aggressive behaviour or seriously irresponsible conduct" (Thomas-Peter, 1992, p.337).

Within today's society, psychopathy is commonly viewed as a personality disorder that is characterized by a combination of affective, interpersonal, and behavioural symptoms. Affectively, psychopaths are unable to develop long-lasting relationships with others, their emotions appear shallow and they lack the ability to empathize with others. Further, they do not express a genuine sense of guilt or remorse for their actions. Interpersonally, psychopaths are manipulative, grandiose, egocentric,

and generally cold-hearted. Behaviourally, they tend to be impulsive, sensation-seeking individuals who have a tendency to violate social norms (Hare, 1996; Hart, Hare, & Harpur, 1992). These symptoms emerge in childhood (Forth, Hart, & Hare, 1990; Frick, 1998), and appear to characterize the individual throughout his/her entire life (Harpur & Hare, 1994). As a result, a thorough understanding of the construct of psychopathy would be quite useful for professionals working with offenders. Therefore, in an attempt to provide a greater understanding of the psychopathy construct, the following sections will provide an overview of how psychopathy is assessed and conceptualized and how such a diagnosis relates to criminal behaviour.

The Assessment of Psychopathy

Over the years, the construct of psychopathy has been assessed in a number of different ways. Some researchers and clinicians have relied on self-report questionnaires, whereas others have used diagnostic manuals, such as the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 1994) to identify psychopathic individuals.

Two well-known self-report measures that have been used to assess psychopathy are the Minnesota Multiphasic Personality Inventory (MMPI) and the California Psychological Inventory (CPI; Gough, 1964). The MMPI is a self-report measure containing ten subscales that combine to provide a personality profile of an individual. One of these ten subscales, the Psychopathic Deviate (Pd) scale, was actually constructed to differentiate between psychopaths and nonpsychopaths. This 50-item true-false scale was developed based on characteristics (e.g. lying, stealing, chronic delinquency, etc.) displayed by male and female psychiatric patients that resembled those of psychopaths as

outlined by Cleckley (1976). Commonly, high elevations on the Pd scale combined with high elevations on the Hypomania (Ma) scale are used to distinguish psychopathic individuals from their nonpsychopathic counterparts (Blackburn, 1993).

The CPI is another well-known self-report measure that has been used to assess psychopathy. This instrument identifies psychopaths by low scores on the Socialisation (So) scale (Blackburn, 1993). This 54-item true-false scale was designed to assess the extent to which an individual internalizes social values and takes into consideration the effect that his/her behaviour will have on others. Therefore, according to this scale psychopaths internalize social values less than nonpsychopaths and are also less likely to consider the impact that their behaviour has on others (Simourd, 1990).

More recently, two other self-report measures have been used to assess psychopathy: the Personality Assessment Inventory (PAI; Morey, 1991 as cited in Edens, Hart, Johnson, Johnson & Olver, 2000) and the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996). The PAI is a self-report measure that is comprised of 344 items, which are broken down into 22 different scales. One of these scales, the Antisocial Features (ANT) scale, was actually created to assess both the behavioural and personality features that are believed to be central to the concepts of psychopathy and antisocial personality disorder. This scale consists of three different subscales: the ANT-Antisocial Behaviours (ANT-A); the ANT-Egocentricity (ANT-E); and the ANT-Stimulus Seeking (ANT-S). The ANT-A subscale assesses antisocial behaviour and early conduct problems. The ANT-E subscale measures callous, self-centered and remorseless behaviour and the ANT-S subscale assesses an individual's risk-taking behaviours and low tolerance for boredom (Edens et al., 2000).

The PPI is another self-report instrument that has been used to measure psychopathy. This instrument was developed using a sample of undergraduate students at an American University and was designed to identify psychopathy in noncriminal populations. During the construction of this instrument, an extensive review of the empirical and theoretical literature on psychopathy identified a number of constructs that were thought to be central to the construct of psychopathy. This literature review identified 24 constructs from which the current 187-item self-report measure arose (Lilienfeld & Andrews, 1996).

In addition to providing an overall score, the PPI is also subdivided into eight subscales that tap the personality characteristics commonly associated with psychopathy. The first subscale has been labeled the Machiavellian Egocentricity subscale and assesses an individual's narcissistic attitudes. The second subscale has been labeled the Social Potency subscale and measures the individual's ability to charm and influence others. The Coldheartedness subscale is the third subscale of the PPI and assesses an individual's tendency toward callous, unsentimental, guiltless behaviour. The fourth subscale of the PPI has been termed the Carefree Nonplanfulness subscale and identifies a lack of planning and forethought. The fifth subscale has been labeled the Fearlessness subscale and identifies a lack of anxiety surrounding harmful behaviours and a willingness to take risks. The Blame Externalization subscale is the sixth subscale of the PPI and identifies a tendency to rationalize one's misbehaviours and blame others for any difficulties. The Impulsive Nonconformity subscale measures a general lack of concern for societal rules and values. The final subscale identified by the PPI, the Stress Immunity subscale,

identifies the absence of any noticeable reactions when confronted with situations that typically provoke anxiety in others (Lilienfeld & Andrews, 1996).

Currently, the most popular measure of psychopathy is the Hare Psychopathy Checklist-Revised (PCL-R; Hare, 1991). The PCL-R was originally developed for research with forensic populations and does not rely on self-report information to determine the presence or absence of psychopathy. The PCL-R is a 20-item clinical rating scale that is completed using information gathered from a semi-structured interview and collateral sources (e.g. detailed file information). The individual items are scored on a 3-point scale (0= item doesn't apply, 1= item applies somewhat, 2= item definitely applies) according to specific criteria that are outlined in the PCL-R manual (Hare, 1991). The individual items are then added to obtain a total score, which can range from 0-40. The individual's total PCL-R score identifies how well he/she fits the image of the prototypical psychopath exemplified by Cleckley (1976), with higher scores representing the presence of more psychopathic traits. While the PCL-R provides a dimensional score, frequently a cut-off score is imposed to differentiate the psychopaths from the non-psychopaths. The PCL-R manual (Hare, 1991) recommends a score of 30 be used to distinguish the psychopaths from the nonpsychopaths. However, a variety of cut-off scores have been used, especially when the scale is used for research purposes (Salekin, Rogers, & Sewell, 1996).

The research to date has demonstrated good psychometric properties for the PCL-R when focusing on male offenders and forensic psychiatric patients. Many authors have reported that the PCL-R has achieved high internal consistency and interrater reliability (Hare, 1996; Hare, Hart, & Harpur, 1991; Rogers, Duncan, Lynett, & Sewell, 1994). For

example, Hart et al. (1992) found the internal consistency (as measured by Cronbach's alpha) of the PCL-R to be .87 for male inmates ($N=1192$) and .85 for male forensic patients ($N=440$). They also found the interrater reliability (as measured by intraclass correlation coefficients) for male inmates ($N=385$) to be between .83 and .86. For the male forensic patients ($N=90$) the interrater reliability was between .91 and .93. Similarly, when Hare et al. (1990) combined the PCL-R item scores for 5 samples of male prison inmates and 3 samples of male forensic patients, they found that the internal consistency of the PCL-R ranged from .85 to .89. Further, they found the interrater reliability ranged from .78 to .94.

From a clinical standpoint, psychopathy is a personality disorder that is commonly viewed to be comprised of affective, interpersonal and behavioural symptoms. Furthermore, the construct of psychopathy has commonly been broken down into two factors. The first factor representing the interpersonal/affective personality traits of psychopathy and the second factor reflecting lifestyle variables, such as the chronic antisocial behaviour, exhibited by psychopaths (Hare et al., 1990; Harpur, Hakstian, & Hare, 1988; Harris, Rice, & Cormier, 1991; Hart et al., 1992; Templeman & Wong, 1994; Windle & Dumenci, 1999).

More recently, research has pointed to the possibility that this two-factor solution may not accurately represent the psychopathy construct. Simourd and Hoge (2000) identified a six-factor solution for the PCL-R using a sample of 321 federal inmates serving time in a medium security facility in Ontario. In this six-factor solution, factor 1 signified the lifestyle instability experienced by many psychopaths. Factor 2 represented their egocentric personality style while factor 3 identified the emotional deficits

frequently experienced by psychopaths. Factors 4 and 5 tapped the criminal behaviour of psychopaths, with factor 4 capturing early antisocial conduct and factor 5 representing the criminal element that is characteristic of many psychopaths. Finally, factor 6 represented a marital relationship component of psychopathy.

Cooke and Michie (2001) present a hierarchical three-factor model of psychopathy that was developed on 2,067 North American correctional and forensic psychiatric subjects. Within these factors, items with a high association to each other have been combined to form testlets. Therefore, a testlet is merely a sub-group of PCL-R items that seem to be highly related to each other. As a result, this hierarchical model breaks down the higher order construct of psychopathy into three-factors and six testlets based on 13 of the 20 PCL-R items.

The first factor has been referred to as an 'Arrogant and Deceitful Interpersonal Style' and is comprised of two testlets. The first testlet contains the PCL-R items glibness/superficial charm and grandiose sense of self-worth and the second contains the items pathological lying and conning/manipulative. The second factor has been described as 'Deficient Affective Experience' and also consists of two testlets. The first testlet contains the PCL-R items shallow affect and callous/lack of empathy and the second contains the items lack of remorse or guilt and failure to accept responsibility. The third factor is also comprised of two testlets and has been referred to as an 'Impulsive and Irresponsible Behavioural Style'. The first testlet is defined by the PCL-R items need for simulation/proneness to boredom, impulsivity, and irresponsibility while the second testlet contains the items parasitic lifestyle and lack of realistic long-term goals (Cooke & Michie, 2001). This three-factor solution seems to be more in line with

the clinical conceptualization of the psychopathy construct as it identifies an interpersonal, affective and behavioural component to the construct of psychopathy.

Psychopathy and Antisocial Personality Disorder

In order to get an accurate assessment of the psychopathy construct a distinction must be made between those offenders who merely have a long and productive criminal career and those offenders who are actually psychopathic. Unfortunately this is not always an easy task given that the terms psychopathy, antisocial personality disorder (APD) and sociopathy have often been used interchangeably when referring to offenders (American Psychiatric Association, 1994; Haapasalo & Pulkkinen, 1992; Hare, Strachan, & Forth, 1993; Skilling, Harris, Rice, & Quinsey, 2002).

One of the fundamental differences between these terms lies in the characteristics used to define the disorders. A diagnosis of sociopathy or APD, as measured by the DSM, is based almost entirely on the presence of antisocial or criminal behaviours. Psychopathy, as measured by the PCL-R, on the other hand taps both social deviance and affective components of personality in arriving at a diagnosis (Hart et al., 1992). Therefore, a diagnosis of APD fails to consider the affective and interpersonal characteristics of psychopaths that differentiate them from other offenders (Hare, 1996; Hare et al., 1993).

The constructs of APD and psychopathy also differ in the way they are assessed. Even though both constructs outline several items to be considered when making an assessment, the presence or absence of all of the items are only taken into consideration when making a diagnosis of psychopathy. The assessment of APD, using the DSM-IV, is merely a categorical measure resulting from the presence of a pre-determined number of

assessment criteria (American Psychiatric Association, 1994). With these differences in mind, it is not surprising that when the constructs of APD and psychopathy are measured following the current diagnostic guidelines, one as a categorical construct and one as a multi-item scale, there is only a moderate correlation between them ($r = .68$; Skilling et al., 2002). However when the construct of APD is measured as a multi-item scale, the relationship between the PCL-R total score and DSM-IV APD score is much stronger ($r = .84$; Skilling et al., 2002).

Since the diagnostic criteria for both APD and psychopathy include social deviance, it is not surprising that these constructs overlap. However, based on the current diagnostic techniques, only a modest relationship between these constructs has been identified. In addition, this relationship appears to be an asymmetrical one. In other words, while most offenders who meet the diagnostic criteria for psychopathy will also meet the diagnostic criteria for APD, the reverse is not true. The majority of criminals who are diagnosed as APD are not psychopathic. In fact, only 15%-25% of forensic populations are psychopathic, whereas 50%-75% receive a diagnosis of APD (Hare, 1996, 1998a). Furthermore, of those offenders diagnosed with APD, only about 20%-30% would also meet the PCL-R criteria for psychopathy (Hart & Hare, 1989).

For members of the criminal justice system who are trying to identify an offender's risk level and amenability to treatment, a diagnosis of psychopathy may still be more useful than one of APD. A psychopathy diagnosis, as measured by the PCL-R, will provide more precise and reliable information regarding an offender's risk for general and violent recidivism than will a diagnosis of APD (Cunningham & Reidy, 1998). Therefore, when making decisions about offenders, it is important for all members of the

criminal justice system along with psychologists and psychiatrists, to be mindful of the distinction between psychopathy and APD as they are currently assessed. At the present time, using these terms interchangeably could lead to misleading and possibly erroneous conclusions about the offender in question.

The Conceptualization of Psychopathy

While there appears to be general agreement that psychopathic individuals exist, the construct of psychopathy is one that over the years has been conceptualized in many different ways. Blackburn (1975) identified primary and secondary psychopaths using the MMPI. He administered the MMPI to offenders who had been diagnosed with Psychopathic Disorder under the British Mental Health Act of 1959. A cluster analysis of this self-report data identified four different profiles of offenders, two of which were associated with psychopathy. These groups of psychopathic offenders were referred to as primary and secondary psychopaths. Impulsivity, undersocialization, aggression and a lack of anxiety characterized the primary psychopaths, whereas, impulsivity, aggression, hostility, and a high level of social avoidance, anxiety, and depression were found to be characteristic of the secondary psychopaths. These findings suggest that there may be more than one group of offenders who demonstrate psychopathic traits (Blackburn, 1993).

Not surprisingly then, many who come in contact with psychopathic individuals wonder whether "...psychopaths differ from the rest of us in degree or in kind" (Hare, 1998a, p. 194). In other words, do psychopaths represent a discrete class of individuals or do they merely possess some characteristics to a greater degree than other people? In North America, offenders are typically categorized as psychopaths or nonpsychopaths

based on their overall score on the PCL-R (Hare, 1991). While the PCL-R can be used to obtain a dimensional conceptualization of psychopathy, a cut-off score is more commonly used to identify whether an individual is psychopathic or not. Using a cut-off score on the PCL-R to measure psychopathy, both Harris, Rice, and Quinsey (1994) and Cooke (personal communication, November 21, 1994 as cited in Hare, 1998a) have found that psychopaths are indeed a discrete class of individuals. However Salekin et al. (1996) feel that there is evidence to support the dimensional nature of the concept of psychopathy. Their meta-analysis identified that a range of cut-off scores have been used to define psychopathy, thus indicating some overlap between the psychopathic and nonpsychopathic groups. So while there appears to be agreement that psychopathic individuals exist, whether "... psychopaths differ from the rest of us in degree or in kind" (Hare, 1998a, p. 194) appears unclear. However, here in North America psychopathy is generally thought of as a categorical concept.

Psychopathy and Crime

Psychopaths, due to the nature of their disorder, lack many of the characteristics that serve to inhibit aggressive and antisocial behaviours in other individuals such as guilt or remorse, close emotional bonds, empathy, and fear of punishment. They also possess characteristics such as impulsivity and a need for stimulation, which may actually serve to make aggressive and antisocial behaviours more attractive. Subsequently, it is not all that surprising that psychopaths who engage in aggressive and antisocial activities do so from a very young age. In fact by the age of 15 or 16, many psychopaths have had formal contact with the criminal justice system (Hare, Forth, & Strachan, 1992).

Not only do the criminal careers of psychopaths start earlier, but these psychopathic offenders also tend to commit about twice as many crimes as their nonpsychopathic counterparts. In fact, the criminal careers of psychopaths are not only characterized by substantially more nonviolent crimes than nonpsychopathic offenders during their early adulthood, but they also continue to commit more violent and nonviolent offences than nonpsychopathic offenders for roughly three decades (Porter, Birt, & Boer, 2001). In addition to committing more crimes, the criminal careers of psychopaths are characterized by a great deal of versatility (Hare, 1991; Kosson, Smith, & Newman, 1990; Simourd & Hoge, 2000). In other words, compared to nonpsychopathic criminals, the criminal careers of psychopaths are often characterized by charges for a wider variety of crimes ranging from property offenses to violence (Hare & McPherson, 1984; Kosson et al., 1990). As a result, it is not surprising that psychopaths have a greater number of convictions and incarcerations than their nonpsychopathic counterparts (Haapasalo, 1994; Simourd & Hoge, 2000) and are responsible for a significant proportion of the aggressive and antisocial behaviour, and a disproportionate amount of crime in today's society (Hare & Jutai, 1983; Kosson et al., 1990; Porter et al., 2001).

Not only are psychopathic offenders responsible for a substantial amount of the overall criminal activity that takes place in our society, but they are also accountable for a disproportionate amount of the violence. When compared to other criminals, psychopaths engaged in physical violence and aggression much more readily than their non-psychopathic counterparts (Hare & McPherson, 1984). They were also more likely to have received a conviction for a violent offence (Hare & McPherson, 1984; Serin,

1991; Simourd & Hoge, 2000) and more willing to use threats and weapons during their violent outbursts (Hare & McPherson, 1984; Serin, 1991). Furthermore, the psychopaths' violent acts are often instrumental and predatory in nature (Cornell et al., 1996; Serin, 1991), usually exhibited against male strangers and motivated by anger, retribution, greed, vengeance and/or money (Hare, 1998b; Williamson, Hare, & Wong 1987). However, this is not always the case for psychopathic rapists. The findings of Brown and Forth (1997) demonstrated that psychopathic rapists were no more likely to offend against strangers than their nonpsychopathic counterparts and in fact it was the nonpsychopathic rapists who were more likely to commit crimes of a vindictive or sadistic nature. Regardless of the circumstances surrounding the offence, the substantial amount of violence committed by psychopaths is of great concern to society.

The violence frequently displayed by psychopaths does not disappear when they enter a correctional institution. Hare and McPherson (1984) found that incarcerated psychopaths exhibited more fighting, verbal threats, verbal abuse and were generally more belligerent than their non-psychopathic counterparts. In addition, psychopathic inmates have demonstrated more aggression and have admitted to the use of instrumental aggression against their fellow inmates (Serin, 1991). In fact, Wong (1984) found that not only did the psychopaths engage in more acts of violence and threatening behaviour while incarcerated, but they actually accounted for almost four times as many institutional offences than did the non-psychopathic inmates.

Not only are there differences between psychopathic and nonpsychopathic offenders on the number and types of crimes they commit, but the conviction rates for these offenders also differ over time. Hare, McPherson, and Forth (1988) found that

while the conviction rate for psychopathic offenders remained high until the age of 35, the conviction rate decreased steadily after the age of 20 for the nonpsychopathic offenders. A recent study by Porter et al. (2001) expanded on these findings and demonstrated that not only do the conviction rates of offenders change over time but so do the types of offences being committed. While the nonviolent criminal behaviour of both psychopaths and nonpsychopaths declined after their late twenties, the violent behaviour of psychopathic offenders actually increased in their late thirties and remained high until their mid forties. As a result, the criminal behaviours exhibited by psychopaths both in and out of prison are of great concern to society.

Psychopathy and Recidivism

Considering the amount of disruption that psychopaths create both inside and outside of prison, it is not surprising that they tend to serve more of their correctional sentence than other criminals before being released back into society (Serin, Peters, & Barbaree, 1990). Once these psychopathic criminals are released, it is not only the types of crimes that they commit that are of concern to society but it is also the frequency at which they violate the conditions of their release and commit new crimes. Serin et al. (1990) found that psychopaths released on unescorted temporary absences and parole violated the conditions of their release more than the nonpsychopaths released on the same conditions. Similarly, Seto and Barbaree (1999) found that psychopathic sex offenders were more likely than nonpsychopathic sex offenders to violate their conditions of parole once being released back into society. Porter et al. (2001) also found differences on the offender's performance while on conditional release, however these differences appeared to be related to the age of the offenders. For the nonpsychopathic

offenders, their performance while on conditional release improved with age.

Unfortunately the same was not true for the psychopaths.

Psychopathic offenders not only violate the conditions of their release more often but they also commit new crimes at a faster rate than their nonpsychopathic counterparts (Hart, Kropp, & Hare, 1988; Porter et al., 2001; Serin, 1996). In fact, when compared to nonpsychopathic offenders, psychopaths have been known to commit more than twice as many offences for each year they spend in the community (Wong, 1984). It is not surprising then, that psychopaths are convicted of a new crime and sent back to prison sooner than the nonpsychopathic offenders who are released into the community (Serin et al., 1990). In fact, in as few as three years, 65% of the psychopathic offenders who had been released from prison had been convicted of a new crime (Serin & Amos, 1995) and close to 80% had been returned to prison (Hart et al., 1988).

The alarming rate at which psychopaths commit new offences is not restricted to nonviolent crimes. Upon their release from prison, psychopathic offenders not only commit more crimes than nonpsychopathic offenders, but they also receive considerably more violent convictions for each year that they are in the community (Hare & McPherson, 1984). While Grann, Långström, Tengström, and Kullgren (1999) found psychopaths to be twice as likely to be reconvicted of a violent offence, Harris et al. (1991) and Hemphill, Hare, and Wong (1998) found the recidivism rate for violent offences were almost four times greater for psychopaths than nonpsychopaths. Similarly, Serin and Amos (1995) found that within three years of release roughly 40% of the psychopaths had been convicted of a violent offence, compared to only 10% of the nonpsychopaths.

Psychopathy is a personality disorder that is linked to an increased risk for both violent and criminal behaviour in male offenders (Salekin et al., 1996). In fact, the connection appears strong enough that the presence or absence of psychopathy, as measured by the PCL-R, can offer guidance for predicting recidivism (Hart et al., 1988; Serin et al., 1990) and future violence (Grann et al., 1999; Harris et al., 1991; Harris, Rice, & Quinsey, 1993; Hemphill et al., 1998; Serin & Amos, 1995; Seto & Barbaree, 1999) while guiding decisions regarding treatment, release, and the placement of offenders (Hart et al., 1992). As a result, a thorough understanding of psychopathic offenders is of the utmost importance for members of the criminal justice system.

As a result, the current study will attempt to identify different types of psychopaths. Such a typology would not only increase the understanding of the psychopathy construct but it could also guide clinical decisions. Before moving to the present study an overview of the different types of offender typologies presented in the literature, along with some examples of each, will be provided. Prior to this, some criteria for a useful typology will be reviewed.

Offender Typologies

Classification is viewed as a fundamental cognitive process (Knight & Prentky, 1990), which serves to increase an individual's understanding of the stimuli of interest. However, some classification systems offer a very broad description of who can be included in each group and subsequently, they may not provide much information about the individual characteristics of the items within each group. Classifying individuals as criminals or noncriminals is a good example. To classify individuals as criminals or noncriminals would merely identify which individuals have broken the law and which

ones have not. With the widely held belief that offenders are not all alike (Clements, 1996; Warren, 1971; Widom, 1978) it would be more beneficial to subdivide this heterogeneous group into smaller, more meaningful groups (e.g., violent offenders, sex offenders, psychopathic offenders). By doing so, information could be obtained regarding the management and treatment (Clements, 1996) of an offender while providing a better theoretical understanding (Blackburn, 1993) of the offender at hand.

Over the years, many different types of classification schemes and typologies have emerged in an attempt to obtain a complete understanding of criminal behaviour. While some of these typologies are based on subjective, clinical descriptions of behaviour, others have evolved from objective, empirical analyses (Blackburn, 1993; Clements, 1985; Widom, 1978). Furthermore, these typologies may focus on the type of offence that an offender has committed, or on different personality types of offenders (Widom, 1978). Therefore, while all typologies group individuals according to similar characteristics, the characteristics that are used, and the way that the relevant characteristics are identified may differ. In addition, the usefulness of a given typology will vary. Subsequently, it is important to investigate how well a typology meets the goals it was originally designed to achieve and then to compare it against a standard set of criteria to determine its utility.

Criteria for a Useful Typology

According to Gibbons (1975), a typology of offenders must meet certain criteria in order for it to be useful. The first requirement of a good typology is that it is clear and objective. In other words, the criteria that are used to categorize the offenders need to be clearly stated so that different people can use the typology and reliably assign offenders

to the appropriate category. In addition to being clear and objective, a good typology should also identify mutually exclusive categories. Using the typology, it should not be possible to classify an offender into more than one group. While it may be possible for an offender to be classified in different groups over time, at any given time an offender should not meet the criteria for more than one group. Furthermore, a useful typology should be comprehensive enough to classify all, or at least the majority, of the population of interest. The final requirement of a good typology outlined by Gibbons (1975) is parsimony. In order to be useful, the typology should have relatively few categories.

Offense-Based Typologies

Offense-based typologies are typologies of offenders that focus on the offender's crime. Generally speaking, these typologies have covered areas such as: an offender's criminal "career", his/her current offence, and the repetitive crime patterns that the offender has exhibited (Simourd, 1992). While on the surface, offense-based typologies appear to be a quick and objective way to group offenders, they may actually lead to the misclassification of a number of offenders. The plea bargaining process, which is commonplace in today's court system, is one of the greatest hurdles to achieving an accurate offense-based offender typology. Often times the offender's conviction does not accurately reflect the offense that has been committed. In other words, as Megargee (1977) so eloquently put it "...the offense for which an individual is committed is often as much a product of plea bargaining as it is of the offender's behaviour" (p.108). As a result, when attempting to classify offenders into homogeneous groups that provide accurate offender information, the utility of offense-based offender typologies is limited.

Offender-Based Typologies

Offender-based typologies are typologies of offenders that classify individuals based on characteristics of the offender rather than his/her crime. The ability to accurately classify an offender according to characteristics of his/her personality is useful for a number of reasons. Not only do these offender-based classification systems assist members of the criminal justice system in assessing the offender's needs and risk level (Motiuk, Motiuk, & Bonta, 1992), but they also provide useful information for correctional management and issues regarding offender treatment (Megargee & Bohn, 1979). Furthermore, they offer a theoretical understanding of criminal behaviour (Blackburn, 1993).

Offender-based typologies often incorporate information obtained from the offender when deciding on the appropriate classification. While this can make the offender-based typologies somewhat subjective, many offender-based classification tools that are currently in use (e.g. The Level of Service Inventory-Revised (LSI-R), Andrews & Bonta, 1995; The Psychopathy Checklist-Revised (PCL-R), Hare, 1991) require the information that is provided by the offender to be corroborated by external sources before placing a great deal of weight on it. As a result, the information received by the offender can be used to enhance the classification process.

Heuristic Typologies

Heuristic typologies are constructed by grouping individuals according to characteristics that have been identified in a particular theory. Typically these typologies have not undergone empirical validation and as a result are generally quite subjective in nature (Winch, 1947).

Empirical Typologies

Empirical typologies are typologies that have undergone empirical validation and as a result are considered to be much less subjective than their heuristic counterparts.

The construction of an empirical typology begins with a data set from which the variables of interest are identified and subjected to a statistical analysis. Individuals are then grouped based on the statistical relationship of the variables of interest (Winch, 1947).

Therefore, as Skinner (1981) points out, empirically derived typologies, will likely lead to a more objective and reliable classification of individuals.

Typologies of Offenders

Both heuristic and empirical typologies of offenders exist. A classic example of a heuristic typology that is present in the correctional literature is that of Sheldon's body types (Sheldon, Stevens, & Tucker, 1940, as cited in Bartol, 1995). Sheldon's typology identifies three different body types: endomorph, mesomorph, and ectomorph. The body type of the individuals in the endomorph group is described as round and soft.

Furthermore, these individuals seek affection and approval and tend to have a comforting temperament. Individuals in the mesomorph group are characterized by a muscular build and are drawn to adventure and excitement while presenting as socially insensitive and callous. The body type of the individuals in the ectomorph group tends to be quite linear and fragile. Often these individuals desire privacy, are introverted and are in control of their emotions. Not surprisingly it is the mesomorph physique that has been associated with criminal behaviour. However, it is somewhat surprising that even though Sheldon's body types were originally identified in an attempt to classify personality temperament,

and the link between body type and criminality has not been empirically validated, this typology is commonly seen in many criminology textbooks.

A classic example of an empirical typology that has been well documented in the correctional literature is the Megargee MMPI-based offender typology (Megargee, 1977; Megargee & Dorhout, 1977; Meyer & Megargee, 1977). This typology classifies offenders according to their personality profiles on the MMPI. Its development took place in two stages and was based on data obtained from a sample of 300 American federally sentenced offenders between the ages of 18 and 27. In the first phase, the sample was divided into three groups, each containing 100 offenders. Each of these three groups was subjected to statistical analyses to determine the presence of naturally occurring subgroups in the data. In the second phase, the subgroups that emerged within each sample were matched to create larger groups and rules were written to describe these groups. While the results of this study indicated the presence of nine distinct MMPI profiles among the offender sample (Meyer & Megargee, 1977), Megargee and Dorhout (1977) expanded this typology to include a tenth offender profile.

Since its development, the Megargee MMPI-based offender typology has undergone extensive empirical investigation to determine the typology's ability to generalize to other criminal populations. These investigations have demonstrated the replicability of the 10 subtypes with other male federal offender samples (Edinger, 1979; Louscher, Hosford, & Moss, 1983), forensic psychiatric patients (Edinger, Reuterfors, & Logue, 1982), and state prisoners (Booth & Howell, 1980; Edinger, 1979). However, this typology has not demonstrated good predictive utility for aggressive and antisocial behaviour within a prison (Louscher et al., 1983) or halfway house setting (Motiuk,

Bonta, & Andrews, 1986), or for determining which offenders were likely to engage in future criminal behaviour (Moss, Johnson, & Hosford, 1984). As a result, the usefulness of the Megargee MMPI-based offender typology within correctional settings appears to be limited.

In the late 1980s the Megargee MMPI-based offender typology was revised based on more recent norms and a more representative national sample of offenders (MMPI-2; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989, as cited in Megargee, 1994). In addition to replicating the 10 subtypes identified by the MMPI-based offender typology on both male (Megargee, 1994) and female (Megargee, 1997) offender samples, the MMPI-2 has also demonstrated the ability to differentiate between offenders and non-offenders for both males and females (Megargee, Mercer, & Carbonell, 1999).

Another example of an empirically derived typology that is present in the correctional literature is the typology of sexual offenders presented by Knight and Prentky (1990). This typology is known as the Massachusetts Treatment Center: Rapist Typology, Version 3 (MTC:R3) and was developed on all of the rapists who were admitted to the Massachusetts Treatment Center between the years of 1958 and 1981. The MTC:R3 discriminated rapists based on the motivation for the sexual offence (opportunistic, pervasively angry, sexual gratification and vindictiveness), the level of social competence (marital status and financial independence), and the type of aggression displayed by the offender. Using this criteria, the MTC:R3 identified nine different types of rapists: the high social competence opportunistic rapist; the low social competence opportunistic rapist; the pervasively angry rapist; the overtly sadistic sexual gratification rapist; the muted sadistic sexual gratification rapist; the high social competence non-

sadistic sexual gratification rapist; the low social competence non-sadistic sexual gratification rapist; the low social competence vindictive rapist; and the moderate social competence vindictive rapist. For a detailed description of these subtypes refer to Knight and Prentky (1990).

The correctional literature also presents examples of empirically based offender typologies that have been developed using young offenders. One example is the typology presented by Simourd, Hoge, Andrews, and Leschied (1994), which was developed on 256 Canadian male young offenders between the ages of 12 and 18. While the sample included offenders who were serving time in open custody and secure custody the majority of subjects were on probation. The typology was developed in three stages: 1) a cluster analysis was performed using the subtotal scores on the Youth Level of Service Inventory (YLSI; Andrews, Robinson, & Hoge, 1984 as cited in Simourd et al., 1994); 2) the identified clusters were replicated by separating the data into two cross-validating samples and cluster analyzing each sample; and 3) the emerging clusters were validated on a variety of external criteria (e.g., offence-based criteria).

The typology presented by Simourd et al. (1994) identified five reliable and valid types of young offenders. The first offender type was characterized by low scores across all of the YLSI variables. Simourd et al. (1994) tentatively labeled this group as “low risk”. The YLSI profile pattern that was depicted in the second cluster of offenders was much more severe than that in the first cluster. This group of offenders had noticeable elevations in the areas of Attitudes, Family and Delinquent History, combined with slightly elevated scores in the areas of Companions, Leisure, Personality and Parents. This subgroup was tentatively labeled “Generalized High Risk/Need” type. The third

cluster presented a YLSI profile pattern that was much more variable than the first two. While these offenders had noticeable difficulties in the areas of Education and Leisure, their profile elevations were lower in the areas of Personality and Companions and even less severe in the areas of Family Finances and Parents. The tentative label that Simourd et al. (1994) presented for this subtype was "Difficulties in Community" type. Cluster four was tentatively labeled "Family and Personal Distress" type and was characterized by noticeable elevations in the YLSI areas of Family, Parents, Family Finances, Education and Personality. Finally, the fifth cluster identified a YLSI profile pattern that was characterized by elevations in the areas of Accommodations and Family Finances. This led Simourd et al. (1994) to tentatively label this profile as the "Economically Disadvantaged" type.

One of the benefits of this offender typology is that it was derived from an instrument that was developed on an offender population. Unfortunately the utility of this typology for other offender samples and its usefulness in clinical practice has not been explored. Furthermore, the YLSI subtotal scores that were used in this study were based entirely on information obtained from the offender's file. As a result, additional information obtained during an interview may alter these scores, subsequently altering the types of offenders identified. Therefore, until future research has been conducted, the utility of this typology remains somewhat limited.

Harris and Jones (1999) presented another more recent example of an empirically based typology of young offenders. This typology was developed on a sample of 2,738 offenders, with an average age of 15.5 years. The sample was comprised of offenders from both genders, although only 10.9% were female offenders. All of the offenders had

been convicted of a crime and committed to a treatment program. In creating their typology, Harris and Jones (1999) wanted to develop a typology that would be useful for those who offer services to antisocial youth. As a result, they chose to use self-report data obtained from standardized scales measuring school bonding, family bonding, values and self-esteem. All of these scales were administered to the youth when he/she was admitted to a program. When Harris and Jones (1999) subjected their data to a cluster analysis, a five-cluster solution emerged.

While this offender typology may prove useful for those offenders who are entering a treatment program in the State of Philadelphia, its generalizability to other juvenile offenders is unknown. Furthermore, all of the scales that were used in this study were based on self-report data obtained from each offender. Subsequently, the resulting cluster solution may change if collaborative information is included. As a result, the usefulness of this typology seems somewhat limited.

In summary, there are a number of offender typologies presented in the literature. These typologies are both heuristic and empirical in nature and typically focus on the characteristics of the offender or the characteristics of his/her crime. Since the goal of the present study is to create a typology of psychopathic offenders, prior to describing the current study, a review of the typologies that focus on psychopathic offenders will be presented.

Typologies of Psychopaths

Many clinicians who have worked with psychopathic offenders would agree that these offenders share many similarities. However these professionals would also agree that no two psychopaths are identical. Therefore it is not surprising that both heuristic

and empirical typologies of psychopathic offenders exist. Unfortunately the vast majority of these typologies are heuristic in nature.

Heuristic typologies of psychopaths date back to the early 1900s. One of the original typologies presented by Kraepelin (1915) viewed psychopaths to be lacking in either volition or affect (Millon, Simonsen, & Birket-Smith, 1998). This typology divided psychopaths into two main types: the morbid disposition psychopaths and the peculiar personality psychopaths (Kraepelin, 1915, as cited in Millon et al., 1998). The morbid disposition psychopaths were further divided into three groups: the impulsive, the obsessive, and the sexually deviant. Whereas the psychopaths who exhibited peculiar personalities were divided into seven groups: the unstable, the eccentric, the antisocial, the excitable, the impulsive, the liars and swindlers and the quarrelsome. Therefore, through clinical experience and observation Kraepelin (1915) divided psychopaths into ten different subtypes (Millon et al., 1998).

Then in the late 1920s Wimmer (1929) felt that there were in fact six main psychopathic diagnoses that could be made: the explosive psychopath, the sexually perverted psychopath, the instable psychopath, the asocial psychopath, the hysterical psychopath and the antisocial psychopath. Like Kraepelin, Wimmer (1929) identified these categories based on his work with psychiatric patients (Millon et al., 1998).

Another typology of psychopathy identified two different types of psychopaths: the idiopathic and the symptomatic (Karpman, 1941, as cited in Millon et al., 1998). The idiopathic psychopaths were believed to be the true psychopaths and they were characterized by a lack of concern for the feelings of others, a lack of guilt and the tendency to act aggressively. The symptomatic psychopaths on the other hand were felt

to be neurotic individuals whose actions were merely the result of unresolved unconscious difficulties rather than true psychopathic characteristics (Karpman, 1941, cited in Millon et al., 1998).

A more recent heuristic typology by Millon and Davis (1998) identified ten sub-types that they felt accounted for the majority of individuals identified as psychopaths. According to Millon and Davis (1998) psychopaths could be categorized as unprincipled, disingenuous, risk-taking, covetous, spineless, explosive, abrasive, malevolent, tyrannical, or malignant. These sub-types were derived from characteristics of other personality disorders identified by classification systems such as the DSM (American Psychiatric Association, 1994) and arose out of clinical experience, clinical observation, clinical lore, and the research literature.

The above-mentioned typologies of psychopaths attempt to provide information that would be useful to obtain a clearer understanding of the concept of psychopathy. However, all of these typologies were heuristically derived and are lacking any empirical validation. As a result, they are quite subjective in nature and subsequently their utility appears to be somewhat limited. Furthermore, it appears that in all cases the psychologists arbitrarily chose which characteristics they felt best described the construct of psychopathy and used these to develop their typology. While the typologies presented by Kraepelin (1915), Wimmer (1929) and Karpman (1941) relied strictly on clinical experience to pinpoint the different characteristics of psychopaths (Millon et al., 1998), the more recent typology by Millon and Davis (1998) focused its attention on instruments that measure personality disorders, such as the DSM. Regardless of whether these typologies relied on clinical experience or on instruments that measured personality

disorders, all of them were heuristic in nature. Therefore, as previously mentioned these typologies have not undergone any empirical validation and appear to be quite subjective in nature thus limiting their utility.

The correctional literature also presents some examples of empirically based offender typologies that have been developed in an attempt to identify different types of psychopaths. One example is the typology presented by Wong and Templeman (1988). This typology was developed on 315 adult male federal offenders using the 22-item Psychopathy Checklist (an earlier version of the PCL-R; Hare & Frazelle, 1980) to assess psychopathy. This study demonstrated that offenders tend to fit into one of three groups: 1) those with low scores on the PCL (≤ 20); 2) those with high scores on the PCL (≥ 30); and 3) those with medium scores on the PCL (21-29).

Hervé, Hui Ling, and Hare (2000) presented another example of an empirically based typology of psychopaths. This typology was developed by cluster analyzing the offender's score on the three facets of psychopathy outlined by Cooke and Michie (2001). The sample was comprised of 202 adult male offenders all with a PCL-R score of 27 or higher. Five different hierarchical clustering techniques were applied to the data yielding a 4-cluster solution. The first cluster presented by Hervé et al. (2000) was characterized by offenders who scored below the standard cut-off of 30 on the PCL-R. While these offenders appeared to possess some of the lifestyle and interpersonal characteristics of the disorder, they seemed to be lacking the emotional deficit that is thought to be fundamental to the construct of psychopathy. Hervé et al. (2000) felt that this group of psychopaths could be referred to as "sub-threshold psychopaths". The second cluster that emerged was comprised of offenders who received high scores across all of the three

facets of psychopathy. As a group, these offenders displayed the highest PCL-R scores and thus the offenders in this cluster were referred to as the “prototypical psychopaths”. Hervé et al. (2000) described the third cluster as the “manipulative psychopaths”. These psychopaths obtained relatively low scores on the lifestyle facet and high scores on both the affective and interpersonal facets. The fourth and final group of psychopaths identified by Hervé et al. (2000) was referred to as “macho psychopaths”. This cluster was comprised of individuals who obtained high scores on the lifestyle and affective facets with relatively low scores on the interpersonal facet.

A recent study by Hervé and Hare (2001) expanded on the above findings. While the four groups of psychopaths identified by Hervé et al. (2000) were developed using multiple clustering techniques, all of the techniques were hierarchical in nature. As a result, Hervé and Hare (2001) explored the possibility that different clusters may emerge if a nonhierarchical clustering technique was used on the same sample. Using this clustering technique the same four clusters were identified, thus indicating a stable and reliable cluster solution for this data set.

Hervé and Hare (2001) then proceeded to assess the reliability of this four-cluster solution using two independent adult male offender samples. Both of these samples produced the same four-cluster solution that was identified by Hervé et al. (2000). Finally Hervé and Hare (2001) explored the generalizability of these four different types of psychopaths using samples of adult male African-American inmates, North American female inmates and adult male European psychiatric patients. In all cases the same cluster solution emerged suggesting that there may in fact be four distinct types of psychopaths.

By acknowledging that different subtypes of psychopaths exist, it becomes clear that not only are there a number of different personality characteristics that combine to make someone a psychopath, but that these characteristics can be combined in numerous ways. According to Rogers (1995, as cited in Salekin et al., 1996) there are more than 15,000 possible combinations of PCL scores that would lead someone to be diagnosed as psychopathic using the standard cutoff score of 30. As a result, it may be rather presumptuous to assume that all individuals, who are diagnosed as psychopathic, based on a score of ≥ 30 on the PCL-R, pose the same level of risk to society. To take this a step further, perhaps there are certain combinations of PCL-R item scores that lead some psychopaths to present a greater risk to society than other psychopaths.

While the studies by Hervé et al. (2000) and Hervé and Hare (2001) provide an initial step in the investigation into the presence of different types of psychopaths, the usefulness of the four-cluster solution is questionable. The four-cluster solution that emerged from these studies was based on the three facet scores that were derived from 13 of the 20 PCL-R items (as outlined by Cooke & Michie, 2001). Even though this three-factor solution seems to be in line with the clinical conceptualization of the psychopathy construct (identifying an interpersonal, affective and behavioural component), more research is needed confirming the ability of these 13 items to accurately represent the construct of psychopathy. Therefore, until such research has been done it would be beneficial to identify different types of psychopaths using the entire PCL-R scale.

The current study will attempt to enhance the understanding of the psychopathy construct by further investigating the existence of different types of psychopaths as defined by the PCL-R. In addition, this study will explore the predictive utility of the

clusters that emerge in an attempt to determine how the different types of psychopaths compare in their level of risk. In other words, which group of psychopaths is more likely to recidivate and which group is more likely to recidivate in a violent manner? It is believed that this information will not only enhance the understanding of the psychopathy construct but it will also provide clinicians with a more accurate account of the psychopathic individuals they come in contact with.

When the goal is to develop an empirical offender typology, cluster analysis is one of the most commonly used statistical techniques. Therefore, before proceeding with the current study, an overview of cluster analysis will be given.

Cluster Analysis

The term 'cluster analysis' refers to a number of different statistical techniques that are used to categorize similar objects. It is a heuristic procedure that ultimately produces empirically derived groups, often referred to as clusters, that are comprised of similar entities (Aldenderfer & Blashfield, 1984; Lorr, 1983; Romesburg, 1990).

While the general purpose of cluster analysis is to identify homogeneous subgroups within a data set (Blashfield & Aldenderfer, 1978; Lorr, 1983) a researcher might choose to use cluster analysis techniques for a number of different reasons. First, he/she may be interested in identifying similar entities in the data set in an attempt to develop a useful typology or classification scheme. Second, cluster analysis may be used to explore the data and generate hypotheses regarding subgroups that have been identified in the data. Third, clustering techniques can be used when a researcher is trying to determine whether or not groups that have been defined by other methods do actually exist in the data (Aldenderfer & Blashfield, 1984; Lorr, 1983; Hair & Black, 2000).

Clustering techniques may also be used to reduce the amount of data a researcher must focus on. This is particularly helpful when the data set consists of a large number of cases, which are comprised of many measures. By clustering this data, the sample is reduced from the number of cases to the number of groups identified by the cluster analysis. Finally, clustering techniques, which identify homogeneous subgroups within a sample, are potentially useful in the area of prediction (Lorr, 1983). While the most common reason for performing a cluster analysis is to develop a useful typology or classification scheme, researchers are not restricted to focusing on one area and thus frequently explore all of the above areas within a study (Aldenderfer & Blashfield, 1984).

Clustering Methods

Since the ability to classify entities is of interest to scientists from many different disciplines, it is not surprising that the cluster analysis literature spans a number of academic areas and that a number of different clustering techniques have emerged. Not only have a number of clustering techniques materialized but a number of subsets within these techniques have also surfaced. As a result, only the techniques and their subsets that have been identified as playing a key role in the area of psychology will be discussed. Blashfield and Aldenderfer (1988) have identified five clustering methods that are relevant to the area of psychology: (1) factor analysis variants; (2) hierarchical agglomerative; (3) hierarchical divisive; (4) density search; and (5) iterative partitioning methods.

(1) Factor Analysis Variants

These clustering techniques, which are also commonly referred to as inverse factor analysis or Q-type factoring, are quite popular in the area of psychology. They are clustering techniques that adapt the standard methods of factor analysis thus enabling the researcher to create clusters. When using a factor analysis to identify clusters the focus is on the correlations between individuals or cases rather than correlations between variables (Blashfield & Aldenderfer, 1988; Everitt, 1974). The first step is to construct a correlation matrix of similarities for the cases. Then a factor analysis is performed on this $N \times N$ correlation matrix. This factor analysis identifies the different factors that are present in the data allowing the individual cases to be assigned to clusters on the basis of their factor loadings (Aldenderfer & Blashfield, 1984; Everitt, 1974).

Despite their popularity in the field of psychology and the behavioural sciences in general, these clustering techniques have been criticized for a couple of reasons. One criticism surrounds the use of a linear model for grouping cases rather than variables. This may result in data that is not linear, to be analyzed using a model that assumes linearity. Another problem with these clustering methods surrounds the issue of multiple factor loadings. In other words, how do we decide which cluster a case belongs to if that case has high factor loadings on a number of different factors? (Blashfield & Aldenderfer, 1988).

(2) Hierarchical Agglomerative Methods

While the hierarchical agglomerative clustering methods are considered to be the most popular method of clustering (Blashfield & Aldenderfer, 1988; Lorr, 1983), the bulk of their use has been in the biological sciences (Aldenderfer & Blashfield, 1984). These

methods start with each case being defined as an individual cluster. Then a similarity matrix is computed and searched to identify similarity among different clusters. Clusters are merged based on their similarity, with the two most similar clusters merging at each step. This process continues until all of the clusters are combined in one group. The sequence of mergers is most commonly represented in a tree dendrogram, where each of the branches represents the joining of two clusters (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988; Everitt, 1974; Lorr, 1983). However, since the hierarchical agglomerative methods merge the entities until all are included in one cluster, the tree dendrogram would be built downwards starting with the branches and ending with the root (Lorr, 1983).

Once a cluster is formed using any of the hierarchical agglomerative methods it cannot be changed. In other words, once a case has been assigned to a group it must remain in that group even if it is later determined to have been poorly assigned to that group (Everitt, 1974; Lorr, 1983). As a result, it is important to carefully consider which strategy would best suit the case at hand. Within the hierarchical agglomerative methods, there are four commonly used clustering techniques. They are single linkage; complete linkage; average linkage; and, Ward's method (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988). These clustering techniques have also been referred to as linkage rules (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988) or sorting strategies and outline different ways of defining similarity or dissimilarity between the clusters (Lorr, 1983).

Single Linkage

Under the single linkage method, groups for which all members are more similar to at least one other member of that group than to any member of another group is called a cluster (Blashfield & Aldenderfer, 1988). Using the single linkage method, two clusters are merged when at least one case from the existing cluster demonstrates the same level of similarity with one of the members of another cluster. Thus, two clusters will be combined if there is a single link between cases or clusters.

This method is useful because it is not affected by transformations to the data as long as these transformations do not affect the relative ordering of values in the similarity matrix. However, one of the drawbacks to the single linkage method is its tendency to chain (i.e., form elongated clusters) (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988). As a result, this method may not be useful for much more than identifying multivariate outliers in a data set (Blashfield & Aldenderfer, 1988).

Complete Linkage

Under the complete linkage method, a cluster is defined as ‘...a group of entities in which each member is more similar to all members of the same cluster than it is to all members of any other cluster’ (Blashfield & Aldenderfer, 1988, p.451). This linkage rule states that two clusters may merge only if there is a high level of similarity among all of the members of each cluster (Sokal & Michener, 1958, as cited in Blashfield & Aldenderfer, 1988). Compared to the single linkage rule outlined above, the rules for merging clusters under the complete linkage rule are much more restrictive. As a result, rather than forming elongated clusters, the clusters that are formed are much more

compact and are comprised of highly similar entities (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988).

Average Linkage

This linkage rule differs from the two described above in that it focuses on the average of the similarities between entities. According to the average linkage rule two clusters will merge if the arithmetic average of the similarities among entities of one group is highly similar to the arithmetic average of the similarities among entities of another group (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988; Speece, 1995). From this it is understood that a cluster refers to a group of entities where the mean similarity among each member of that group is greater than with all members of any other group (Blashfield & Aldenderfer, 1988).

Ward's Method

The last of the commonly used linkage rules is Ward's method. While many of the hierarchical agglomerative techniques have been exclusively used in the biological sciences, Ward's method is one that has received considerable use within the social sciences (Lorr, 1983). According to this method, a group that has a small amount of variance among its members is referred to as a cluster. Ward's method is designed to create clusters with minimal within-cluster variance (Speece, 1995). Therefore, the focus is on the within-groups sum of squares or the error sum of squares. At the initial stage of the clustering process, before any merging of clusters takes place, the error sum of squares is zero. According to Ward's method, the two groups that result in the smallest

increase in the error sum of squares will be joined to form a new cluster (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988).

(3) Hierarchical Divisive Methods

In contrast to the hierarchical agglomerative methods, hierarchical divisive methods start with all of the cases belonging to one group. This group is initially divided in half and then into successively smaller subsets. Similar to the hierarchical agglomerative methods, these divisions are commonly represented in a tree dendrogram (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988; Everitt, 1974; Lorr, 1983). However, since the hierarchical divisive methods partition the entities to form N clusters, the tree dendrogram would begin at the root and work upwards, building branches to represent each division (Lorr, 1983).

When hierarchical divisive methods are used to create clusters, the resulting clusters are permanent. In other words, once a case has been assigned to a cluster it must remain in that cluster even if it is determined that it has been poorly assigned to that cluster (Everitt, 1974; Lorr, 1983). As a result, it is important to carefully consider which of the divisive methods would best suit the case at hand. There are two hierarchical divisive techniques mentioned in the literature. They are monothetic divisive strategies and polythetic divisive strategies.

Monothetic divisive strategies form clusters based on the presence of a particular variable (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988; Everitt, 1974). As a result, a monothetic cluster refers to a group in which all of the individual cases possess roughly the same value on the variable of interest. Furthermore, in order to become a member of a monothetic cluster certain scores must be attained on the variables

of interest. In contrast to the monothetic divisive strategies, clusters formed using polythetic divisive strategies do not require the presence of a certain variable. In these cases certain subsets of the variable of interest are considered to be sufficient for its inclusion in the cluster (Blashfield & Aldenderfer, 1988).

(4) Density Search Methods

If individual cases were represented by dots in metric space then the very essence of clustering would suggest that there would be areas where the concentration of dots were very dense and other areas where the concentration of dots were not so dense. Density search methods are clustering techniques that seek to identify the regions of high density in the data (Blashfield & Aldenderfer, 1988; Everitt, 1974). Not surprisingly then, the term cluster is used to refer to these areas of high density.

Many of the density search methods were developed in an attempt to overcome the problem of chaining experienced by the single linkage clustering technique. In contrast to the single linkage technique, the density search methods of clustering follow certain rules that lead to the development of new clusters. For example, when making a decision regarding the development of a new cluster, many of the density search clustering methods compute a distance measure to identify how close a new case or cluster is to an existing cluster (Blashfield & Aldenderfer, 1988). Then the decision to create a new cluster or combine the case with an existing cluster is based on the distance measure that has been calculated (for a description of the different density search methods see Everitt, 1974).

(5) Iterative Partitioning Methods

Iterative partitioning methods are clustering methods that attempt to classify the data in such a way as to achieve an optimum measure of homogeneity within the new cluster (Blashfield & Aldenderfer, 1978). Unlike the hierarchical agglomerative methods, which work with a $N \times N$ similarity matrix, the iterative partitioning methods are clustering methods that work directly with the raw data. As a result, these methods have the ability to handle much larger data sets than the hierarchical clustering methods (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988).

The initial step for these clustering methods is to partition the data set into an already predetermined number of clusters. Then the centroids of each of these clusters are calculated. Once this is done, data points are assigned to the cluster that has the nearest centroid. Once a complete pass through the data has been made, the centroids of these new clusters are calculated and again data points are assigned to the cluster that has the nearest centroid. This process continues until none of the data points change clusters (Anderberg, 1973 as cited in Aldenderfer & Blashfield, 1984).

The iterative partitioning clustering methods are attractive to many researchers, particularly in the area of psychology because they do not produce classification systems that are hierarchical in nature (i.e., these methods produce single clusters that are not nested and do not overlap with other clusters) (Blashfield & Aldenderfer, 1988). Furthermore, the original clustering of the data can be altered if it is determined that cases have been poorly assigned to clusters. However, these clustering techniques have difficulty identifying the optimal partition of a given data set. In order to identify the optimal partition of a given data set, researchers would ideally like to investigate all of

the possible partitions of their data set. Unfortunately this task is computationally impossible even with the use of computers (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988).

In an attempt to overcome this inability to examine all possible partitions of a data set, heuristic procedures have been developed that enable researchers to examine a subset of every partition that is evident in a given data set. It is hoped that this will provide the researcher with an approximation of the optimal partition of a data set. Most of these procedures are comprised of three major elements: 1) the choice of the initial partition; 2) the type of pass; and, 3) the statistical criterion used (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988).

Iterative partitioning methods can begin with either an initial partition of the data set or with an initial estimate of cluster centroids (also referred to as seed points, Anderberg, 1973 as cited in Aldenderfer & Blashfield, 1984). For those methods that begin with an initial partition of the data set, this partition may be determined randomly or by the researcher. For those methods that use seed points, the data is partitioned after the first pass through the data, by assigning data points to the nearest cluster centroid (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988).

The type of pass used by iterative partitioning methods refers to the method by which data points are assigned to clusters. There are two different types of passes: the k-means pass and the hill climbing pass. The k-means pass assigns data points to clusters that have the nearest centroid in an attempt to minimize the variance within each of the clusters. Alternatively, the hill climbing pass moves cases between clusters when such a move serves to optimize the value of the statistical criterion of interest (Aldenderfer &

Blashfield, 1984). While there are a number of statistics that can be used, many of the iterative partitioning methods use the error-sum-of-squares as their statistical criterion (Blashfield & Aldenderfer, 1988).

The Concept of Similarity

The concept of similarity is fundamental to the classification process. Generally speaking, objects are classified based on their similarity or dissimilarity with other objects. Objects that are similar are placed in the same group, whereas objects that are different are placed in another group. That is, objects are generally more similar to other objects in the same group than they are to objects in other groups (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988; Hair & Black, 2000).

When the goal is to classify data into groups it is common to refer to the data in terms of profiles. Cronbach and Gleser (1953) identified three components used to determine the amount of similarity that exists between profiles. Initially, the *shape* of the profile is observed paying close attention to the pattern of dips and peaks that the variables demonstrate. The second component used in determining the amount of similarity between profiles is the amount of *scatter* displayed by the variables. In other words, how scattered the scores are around their average. The final component is the *elevation* of the profile. That is ‘...the mean score of the case over all of the variables’ (Aldenderfer & Blashfield, 1984, p.23).

While there have been four types of similarity measures outlined in the literature the two that have been widely used in the social sciences are correlation coefficients and distance measures (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988). Even though the other similarity measures have received attention in other disciplines

(e.g., biological sciences), only those relevant to the social sciences will be discussed (for a review of all types see Aldenderfer & Blashfield, 1984).

Correlation Coefficients

Within the social sciences the Pearson product moment correlation coefficient is the correlation coefficient that is generally used. While the Pearson product moment correlation coefficient is often used to determine the relationship between variables, it has also been used to identify a correlation between cases when the goal is to classify quantitative variables (Aldenderfer & Blashfield, 1984; Everitt, 1974). This correlation coefficient ranges from +1 to -1 with a value of 0 signifying that no relationship exists between cases.

Similarity measures based on correlation coefficients tend to produce clusters of similar shape (Skinner, 1978) without considering the scatter or elevation of the variables within the cluster (Aldenderfer & Blashfield, 1984). As a result, two profiles could be perfectly correlated yet not identical. In other words, two profiles with a correlation of +1 might not pass through the same points and thus may not overlap. However, their shapes may present as identical because the two profiles have a linear relationship. As a result, these correlation similarity measures are ideal for projects where the similarity of the profile shapes is of primary interest (Everitt, 1974). Nevertheless, this sensitivity to shape at the expense of all else is considered to be a major drawback since some of the information regarding the clusters is lost which may lead to misleading results (Aldenderfer & Blashfield, 1984).

Distance Measures

When distance measures are used to measure the similarity between variables, two cases are considered identical when the distance measure is zero. Conversely, as the distance measure increases the similarity between the variables decreases. As a result, distance measures have often been described as dissimilarity measures rather than similarity measures (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988; Hair & Black, 2000). Unlike the correlation coefficient similarity measures where the values are restricted between 0 and 1, distance measures can generate any positive value (Everitt, 1974). Furthermore, the actual value produced by a distance measure has no absolute meaning and is scale-dependent (Aldenderfer & Blashfield, 1984).

The most commonly used distance measure is the Euclidean metric (Blashfield & Aldenderfer, 1988; Everitt, 1974). Basically, the Euclidean distance between two points is the same as the hypotenuse on a right angle triangle and can be defined as the square root of the sum of the squared differences between two points (Hair & Black, 2000). While distance measures produce clusters based on shape, scatter, and elevation (Skinner, 1978), for many distance metrics including the Euclidean metric, the similarity between the resulting clusters is greatly influenced by differences in elevation. Those variables that are small in size and have small standard deviations can be overpowered by variables that are much larger and have larger standard deviations (Blashfield & Aldenderfer, 1988).

Problems with Clustering Techniques

As previously mentioned, cluster analysis is the most commonly used statistical technique for classifying data into homogeneous groups. Despite its frequent use, cluster

analysis is a statistical technique that has developed more from heuristics than from a well developed body of statistical reasoning (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988). As a result, researchers may have difficulty not only choosing the best clustering method, but also determining the number of clusters that emerge from their data.

Determining the Most Appropriate Clustering Method to Use

The ability to classify objects into homogeneous groups is useful not only for researchers in the social sciences but for those in almost all disciplines. When considering the applicability of classification schemes to numerous scientific disciplines combined with their heuristic nature it is not surprising that a number of different clustering methods have emerged, thus making the task of choosing the most appropriate clustering technique somewhat more difficult, though no less important. When determining which clustering method to use, researchers must be mindful of the fact that different methods will often produce different clusters for the same data (Aldenderfer & Blashfield, 1984; Blashfield & Aldenderfer, 1988). Therefore, determining which clustering method is the most appropriate to use is of the utmost importance.

Blashfield and Aldenderfer (1988) identify two approaches that are commonly used when deciding which clustering method to use: an analytical approach and an empirical approach. Using the analytical approach, the best clustering technique is determined based on how well it meets certain analytical criteria that have been previously outlined by the researcher. In other words, prior to making a decision the researcher identifies certain criteria that he/she feels the clustering method should meet. Then the clustering technique that best meets these criteria is used.

Using the empirical approach, the best clustering technique is chosen based on how well it retrieves previously identified clusters. This approach makes use of Monte Carlo procedures to create a data set, which can be classified into homogeneous groups. Different clustering techniques are then tested on this data set and compared against the predetermined classificatory pattern already identified for the data. The method that classifies the data to most closely approximate the groups that were identified using the Monte Carlo procedures would be used (Blashfield & Aldenderfer, 1988).

Determining the Number of Clusters

Regardless of which clustering technique is chosen, researchers face the inevitable challenge of determining how many clusters appear in their data (Blashfield & Aldenderfer, 1988; Everitt, 1974, 1979; Hair & Black, 2000). Clustering techniques serve to classify all of the data into homogeneous groups. As a result, a decision must be made as to how many of the identified clusters should be included in a meaningful classification scheme. Even though numerous attempts have been made to overcome this problem none of the solutions have been deemed completely acceptable (Everitt, 1979).

Blashfield and Aldenderfer (1988) outline two procedures that may be useful in determining the number of clusters present in a data set. The first one involves a visual examination of the identified clusters. This is commonly done when agglomerative methods are used which produce a tree dendrogram. The researcher would examine the diagram paying particular attention to the branches that have formed. Each of the major branches would be considered representative of a cluster within the data. However this procedure is fairly subjective since the researcher decides how many of the branches are considered 'major'. Therefore, the number of clusters that are present in the data is

ultimately determined by the researcher and thus may differ from researcher to researcher even if the data remains the same.

The second procedure that may be useful in determining the number of clusters present in a data set is commonly used when coefficients produced by the clustering technique can be used to represent the combination of cases to form clusters. The researcher would perform a visual search of these coefficients in an attempt to identify a sudden increase in values. Such an increase would suggest that two clusters have merged which are not very similar. Therefore, the best estimate of the number of clusters present in the data would be the number of clusters that were identified prior to the sudden increase in values (Hair & Black, 2000). This procedure is also rather subjective as the size of the increase in values used to suggest the amalgamation of dissimilar clusters is left solely to the researcher's discretion (Blashfield & Aldenderfer, 1988). As a result, the number of clusters identified in a data set may differ from researcher to researcher.

Evaluating Cluster Solutions

As previously mentioned data sets can produce different clusters depending on which clustering method is used. Subsequently, it is of the utmost importance to evaluate any clusters that emerge in an attempt to determine whether they are merely a product of the clustering technique or whether they are a true reflection of the data from which they were derived. As a result, whenever possible researchers should seek to replicate the identified cluster solution. This report will highlight some of the techniques that are frequently used to determine the replicability of the clusters.

One of the techniques that can be used to determine the replicability of clusters involves applying different clustering approaches to the same data set. In this situation

only the clusters that emerge from the data for all (or the majority) of the clustering techniques would be considered natural clusters (Everitt, 1974), whereas those clusters that only emerged from some of the techniques may have been nothing more than a product of that particular clustering technique.

The second technique works particularly well with large samples. It recommends that once a cluster analysis has been performed the sample should be randomly divided in half and each half should be individually cluster analyzed. The results from each of the cluster analyses would then be compared to determine the stability of the clusters (Everitt, 1974; Stevenson, 1989). In order for a cluster to be considered stable, it must be similar to the clusters that emerged when the data was partitioned (Everitt, 1974).

Another way to estimate the replicability of a cluster solution is to see if the identified cluster solution can generalize to other data sets from the same population (Blashfield & Aldenderfer, 1988; Lorr, 1983; Speece, 1995). Basically, two samples (A and B) from the same population are cluster analyzed. Then members of clusters identified in sample B are assigned to clusters identified in sample A based on their similarity to members of the sample A clusters. Then the amount of agreement between the initial clusters and the assigned clusters is statistically compared (Lorr, 1983; Speece, 1995). In cases where similar cluster solutions are identified within different samples taken from the same population, these solutions are probably stable enough to generalize to other data sets (Lorr, 1983).

Rationale for Study

The PCL-R consists of twenty items that contribute to an individual's level of psychopathy, and uses a cut-off score of 30 and above to distinguish psychopathic

offenders from non-psychopathic offenders. However, these twenty items can be combined in a number of different ways to obtain a score of 30 and above. As a result, it may be rather presumptuous to assume that all individuals, who are diagnosed as psychopathic, based on a score of ≥ 30 on the PCL-R, pose the same level of risk to society and have the same intervention needs. Subsequently, it would be beneficial to determine whether different subtypes of psychopaths emerge based on different combinations of the PCL-R items.

Currently there are only two empirical studies (Hervé et al., 2000 and Hervé & Hare, 2001) presented in the psychopathy literature (as defined by the PCL-R) that explore the possibility that different types of psychopaths may exist. As a result, this study will attempt to enhance the understanding of the psychopathy construct by further investigating the existence of different types of psychopaths as defined by the PCL-R.

At the present time, forensic clinicians who are using the PCL-R to identify psychopaths within their institutions are required to follow the instructions outlined in the PCL-R coding manual in order to ensure an accurate assessment. The PCL-R coding manual instructs clinicians to define a psychopath as someone who has scored 30 or above when all of the 20 PCL-R items have been summed (Hare, 1991). Subsequently a typology of psychopaths, which includes only those individuals with scores of ≥ 30 , would be ideal. However, the limited number of 'true' psychopaths within an institution at any given time makes creating this typology difficult. As a result, the current study will identify psychopaths as those individuals with a PCL-R score of ≥ 27 . This score has been chosen for two reasons. First, a PCL-R score of 27 is approximately one standard error of measurement below the recommended cutoff thus accounting for any

measurement error that may be associated with the standard cutoff score of 30 (Hare, 1991). Secondly, it more than doubles the sample size for the present study thus increasing the validity and reliability of the resulting cluster solution.

It is also believed that limiting the number of items that a typology is created on would increase the clinical utility of the resulting typology. As a result, rather than creating the current typology using all 20 of the PCL-R items, a subset of these items will be used instead. To this end, the current typology will be created using the six-factor solution identified by Simourd and Hoge (2000; see Table 1 for a list of factors). Since the current study is primarily using the same data set, it was felt that the six-factor solution identified by Simourd and Hoge (2000) would be the factor structure that best represents the current data. The current study will also attempt to enhance the existing literature by exploring the predictive utility of the all of the emerging sub-types of psychopathy in an attempt to determine how the different types of psychopaths compare on their level of risk.

Table 1

The Six Factor Solution to the PCL-R (Simourd & Hoge, 2000) and the PCL-R ItemsThese Factors are Comprised of

Factors	PCL Items
Factor 1: Lifestyle Instability Indicator	Parasitic Lifestyle (PCL-R item # 9) Lack of Long Term Goals (PCL-R item #13) Impulsivity (PCL-R item # 14) Irresponsibility (PCL-R item # 15)
Factor 2: Egocentric Personality Style	Glibness/superficial charm (PCL-R item # 1) Grandiose sense of self-worth (PCL-R item # 2) Pathological lying (PCL-R item # 4) Conning/Manipulative (PCL-R item # 5)
Factor 3: Emotional Deficit	Lack of remorse or guilt (PCL-R item # 6) Shallow affect (PCL-R item # 7) Callous/lack of empathy (PCL-R item # 8)
Factor 4: Early Antisocial Conduct	Early behaviour problems (PCL-R item # 12) Juvenile delinquency (PCL-R item # 18)
Factor 5: Criminal Element	Revocation of conditional release (PCL-R item # 19) Criminal versatility (PCL-R item # 20)
Factor 6: Marital Relationship Component	Promiscuous sexual behaviour (PCL-R item # 11) Short term marital relationships (PCL-R item # 17)

Note: The following PCL-R items are not included in this six-factor solution: Need for Stimulation (PCL-R item # 3); Poor Behavioural Controls (PCL-R item # 10); Failure to Accept Responsibility (PCL-R item # 16).

Since the same data set can produce different clusters depending on which clustering technique is used, it is important to replicate the resulting cluster solution whenever possible. To this end, the current study will use three different clustering algorithms: Complete Linkage, Ward's Method and K-Means. If the same clusters are identified using these three different algorithms it will indicate that the resulting clusters

are a true reflection of the data and not merely a product of the clustering technique that was used.

These clustering algorithms were chosen for a couple of reasons. Firstly, the researcher felt that it was important for the resulting clusters to be comprised of highly similar entities with a small amount of variance among cluster members. Secondly, the researcher felt that it would be beneficial to use a combination of hierarchical and non-hierarchical clustering algorithms. As Hair and Black (2000) point out, the hierarchical clustering techniques would determine the number of clusters in a data set. This information can then be used when running the non-hierarchical clustering algorithms and any cases that have been poorly assigned to clusters can be re-assigned to a more appropriate cluster. Therefore two hierarchical methods (Complete Linkage and Ward's Method) and one nonhierarchical method (K-Means) will be used in the present study.

All of the analyses will be run using the raw data and the Squared Euclidean Distance measure for interval data. This distance measure was chosen rather than the correlation coefficient primarily because it is the distance between the profiles that is of interest to the researcher, not whether or not the profiles are parallel.

The number of clusters will be determined by a visual examination of the resulting dendrogram (where major branches would represent a cluster) and a visual examination of the distance coefficients (where a sudden increase in values would suggest the merging of two dissimilar clusters). Once the number of clusters has been determined, they will be validated on two groups of external criteria: criminal behaviour and assessment information. The criminal behaviour information will include both previous and current criminal behaviours and will also explore the differences between

clusters on recidivism data. The assessment information will seek to validate the clusters using both attitudinal measures and a risk/need measure.

Method

Participants

The sample consisted of 100 federally sentenced adult male offenders all with PCL-R scores of ≥ 27 . All of the participants were offenders sentenced to at least two years in a medium-security federal institution in Ontario and were drawn from a larger database of 450 offenders collected between 1994 and 2000. The average age of the offenders was 32 years ($SD = 8.9$). Sixty-seven percent of the offenders were Caucasian, 18% were Black, 13% were Native and the remaining offenders were of Middle Eastern or Spanish decent. While over ninety percent of the sample was serving time for a violent offence, none of the offenders were serving time for a sexual offence (see Table 2). On average, offenders who participated in this study had 20.6 ($SD = 14.6$) prior convictions, a score of 35.8 ($SD = 5.8$) on the Level of Service Inventory – Revised (LSI-R; Andrews & Bonta, 1995) and a score of 29.5 ($SD = 2.1$) on the PCL-R.

Table 2

Most Serious Conviction for Index Offence

Index Offense	Percentage of Offenders (N = 100)
Murder	11
Manslaughter	12
Attempted Murder	4
Assault	6
Aggravated Assault	10
Assault with a Weapon	6
Assault causing Bodily Harm	4
Robbery	29
Robbery with Violence	7
Possession of Weapon	2
Use Firearm	2
Dangerous Use of Firearm	1
Utter Threats	1
Trafficking in Narcotics	2
Break and Enter	3

MeasuresAssessment Measures*The Hare Psychopathy Checklist-Revised*

The Hare Psychopathy Checklist-Revised (PCL-R; Hare, 1991, see Table 3 for a list of items) is a 20-item clinical rating scale designed to measure the extent to which individuals within forensic populations fit the image of the prototypical psychopath exemplified by Cleckley (1976). The PCL-R is completed using information gathered from a semi-structured interview and collateral sources (e.g. detailed file information). Individual items are scored on a 3-point scale according to specific criteria outlined in the PCL-R manual (Hare, 1991). Individual items are summed to obtain a total score, ranging from 0-40, and two distinct factor scores. Factor 1 represents the personality

characteristics of psychopaths, while Factor 2 identifies the behavioural/lifestyle characteristics of psychopaths. The reliability and validity of the PCL-R have been well established (e.g. Hare et al., 1990; Harpur et al., 1988).

Table 3

The Hare Psychopathy Checklist-Revised (1991) Items

1. Glibness/superficial charm	11. Promiscuous sexual behaviour
2. Grandiose sense of self-worth	12. Early behaviour problems
3. Need for stimulation	13. Lack of long-term goals
4. Pathological lying	14. Impulsivity
5. Conning/manipulative	15. Irresponsibility
6. Lack of remorse or guilt	16. Failure to accept responsibility
7. Shallow affect	17. Short-term marital relationships
8. Callous/lack of empathy	18. Juvenile delinquency
9. Parasitic lifestyle	19. Revocation of conditional release
10. Poor behavioural controls	20. Criminal versatility

The Level of Service Inventory-Revised

The Level of Service Inventory-Revised (LSI-R; Andrews & Bonta, 1995, see Appendix A) is a 54-item risk/need assessment instrument designed to identify an offender's need for treatment and his/her risk for deviant behaviour. The LSI-R is completed using information gathered from a semi-structured interview and collateral sources (e.g. detailed file information). The instrument provides an overall measure of an offender's risk/need level while also providing information regarding his/her risk/need in the following areas: Criminal History, Education/Employment, Finances, Family/Marital, Accommodations, Leisure/Recreation, Companions, Alcohol/Drug, Emotional/Personal, and Attitude/Orientation. All of the LSI-R items that apply to the offender are identified and summed to obtain an overall measure of the offender's level of risk for deviant behaviour and need for treatment. Higher scores correspond to a greater risk of

recidivism and a greater need for intervention. The reliability and validity of the LSI-R among federally sentenced offenders has been previously established (Loza & Simourd, 1994). In addition, Loza and Simourd (1994) found the average LSI-R score for a sample of federal offenders to be 26.2 ($SD = 9.9$).

The Pride in Delinquency Scale

The Pride in Delinquency Scale (PID; Shields & Whitehall, 1991) is a 10-item self-report instrument that outlines specific antisocial behaviours (e.g. "striking someone who insults you") and identifies how comfortable an individual is being involved in such behaviours. The PID items are scored on a 21-point Likert scale with scores ranging from -10 to +10. A score of 0 indicates that the subject would neither be proud nor ashamed to commit the behaviour, whereas a positive value indicates that the subject would be proud to do it and a negative value indicates that the subject would be ashamed to perform the behaviour. The individual items are summed to obtain a total score ranging from -100 to +100. This total score is then added to a constant of 100 to ensure that all of the scores are positive, with higher scores signifying greater criminal attitudes.

The PID has demonstrated acceptable psychometric characteristics among offenders (Simourd, 1997; Simourd & van de Ven, 1999). For example, Simourd (1997) found the internal consistency (as measured by Cronbach's alpha) of the PID to be .75. Similarly, Simourd and van de Ven (1999) found the internal consistency to be .76 for male federal offenders, .76 for violent federal offenders and .75 for nonviolent federal offenders. Furthermore, the convergent validity of this scale was supported by its significant correlations with other criminal risk measures such as the LSI-R ($r = .42$) and

the PCL-R ($r = .24$) (Simourd, 1997). Simourd (1997) also found the PID to be significantly correlated with a number of offense-based criteria for male federal offenders: total number of convictions ($r = .24$); number of different offences ($r = .22$); total number of institutional misconducts ($r = .20$); previous violent offences ($r = .31$) and previous property offences ($r = .20$).

The Criminal Sentiments Scale-Modified

The Criminal Sentiments Scale-Modified (CSS-M; Shields & Simourd, 1991) is a 41-item self-report measure that taps an offender's antisocial attitudes, beliefs, and values. The overall scale is divided into five different subscales: Attitudes Toward the Law (Law; e.g. "It's our duty to obey all laws"), Court (Court; e.g. "You cannot get justice in court"), Police (Police; "Life would be better with fewer cops "), Tolerance for Law Violations (TLV; "It's OK to break the law as long as you don't get caught"), and Identification with Criminal Others (ICO; "I prefer to be with people who obey the law rather than people who break the law"). An offender's respect for the law and the criminal justice system in general is measured by combining the first three subscales, which form the Law-Court-Police (LCP) subscale. The TLV subscale measures the extent to which an offender justifies his/her criminal behaviour and the ICO subscale assesses an offender's general beliefs about other individuals who break the law. The individual items are scored on a 3-point scale (0, 1, 2) with higher scores reflecting greater criminal attitudes. A score of two is given to those items for which the offender has accepted an antisocial statement; a score of one is given to items where the offender

is undecided as to his/her response; and, a score of zero is given to those items for which the offender rejected an antisocial statement.

The psychometric properties of the CSS-M with male federal offenders have been demonstrated in previous research studies (Simourd, 1997; Simourd & van de Ven, 1999). For example, Simourd (1997) found the internal consistency (as measured by Cronbach's alpha) of the CSS-M to be .73 for male federal offenders. Similarly, Simourd and van de Ven (1999) found the internal consistency to be .75 for male federal offenders and .76 for violent and .75 for nonviolent federal offenders. Furthermore, the convergent validity of this scale was supported by its significant correlations with other criminal risk measures such as the LSI-R ($r = .37$) and the General Statistical Information on Recidivism Scale ($r = .25$) (Simourd, 1997). Simourd (1997) also found the CSS-M to be significantly correlated with total number of institutional misconducts ($r = .20$) for male federal offenders.

The Paulhus Deception Scale

The Paulhus Deception Scale (PDS; Paulhus, 1999) is a 40-item self-report scale designed to measure the extent to which individuals respond to questions on self-report measures in a socially desirable way. Individual items are scored on a 7-point Likert scale ranging from 1 to 7 with higher scores indicating the statement to be very true and lower scores indicating the statement to be not true. The individual item scores are summed to obtain a total score, an Impression Management (IM) score (includes items such as "I never swear") and a Self-Deception Enhancement (SDE) score (includes items such as "My first impressions of people usually turn out to be right"). The IM subscale

taps the degree to which an individual is attempting to present him/herself in a positive light. The SDE subscale provides a measure of the extent to which an individual is deceiving him/herself by minimizing his/her problems, or the seriousness of these problems. Higher scores on each of these subscales represent a greater likelihood to respond in a biased fashion, whereas higher total scores indicate that an individual is responding to questions on self-report measures in a more socially desirable way. There is support for the use of the PDS with criminal offenders (Kroner & Weekes, 1996; Robertson, 1998).

Criminological Measures

Criminal History

The criminal history variables that were of interest in the present study were: total number of convictions, the number of previous non-violent offences, and the number of previous violent offences. The total number of convictions variable identified the total number of convictions the offender had up to the time of the current assessment. Therefore, it included both prior convictions and convictions for the offences he was currently serving time for. The other two criminal history variables measured the number of violent and non-violent offences the subject had been convicted of in the past. These variables did not include the offences that the offender was currently serving time for and only included offences for which the offender had been convicted.

Recidivism

Recidivism data was available for forty-two of the offenders in the present sample. The recidivism variables that were of interest in the present study were: time at risk, general recidivism, violent recidivism, and supervision violations. The average time

at risk for these offenders was 359 days ($SD = 266$). This variable measured the number of days these offenders were in the community before having any contact with the criminal justice system, either for charges, convictions, or supervision violations. General recidivism was defined as any contact with the criminal justice system after being released from the institution. This included both violent and non-violent charges, convictions, and/or supervision violations (see Appendix B for offences coded as nonviolent). Violent recidivism was defined as any charges or convictions for violent offences once released from the institution (see Appendix C for offences coded as violent). Finally, supervision violations were defined as any violation of an offender's release conditions once he was released from the institution. This included both parole violations and mandatory supervision violations. All of the recidivism variables, except the time at risk variable, were dichotomous in nature and subsequently tapped the presence or absence of these measures.

Procedure

One of the policy requirements set forth by the National Parole Board and the Correctional Service of Canada states that any federally sentenced offender who has committed a crime against a person must undergo a psychological assessment prior to his/her consideration for conditional release. This assessment is comprised of a number of self-report measures and an individual interview with a psychologist. All of the information used in this study was obtained during this assessment.

At the onset of the assessment, individuals were asked to complete several self-report measures. These measures were completed either on an individual basis or in a small group (i.e. 5 or less) and included the self-report measures used in the present

study. After completing the necessary questionnaires, participants were individually interviewed by one of four psychologists. The information obtained in this interview was combined with available file information and used to complete the PCL-R and LSI-R for the present study. In all cases, the psychologist who conducted the interview completed both the PCL-R and LSI-R. Unfortunately the interrater reliability was not calculated for any of the measures.

Cluster Analysis

As previously mentioned, both hierarchical and nonhierarchical clustering techniques were used in the present study. One of the downfalls of the hierarchical clustering techniques, compared to the nonhierarchical techniques, is that once a cluster is formed it cannot be changed. As a result, clusters may contain cases that perhaps should be part of another cluster (Everitt, 1974; Lorr, 1983). One technique that may minimize the effect of this problem is to order the data in a theoretically meaningful way (Hair, Anderson, Tatham, & Black, 1998). As a result, prior to conducting any of the cluster analyses, the subjects in the present study were rank ordered in an ascending fashion based on their total PCL-R scores. This is in line with the belief that individuals with similar scores on the PCL-R will be more alike than those with very different scores on the PCL-R. Subsequently, all of the cluster analyses were conducted using the newly ordered data set, the raw data and the Squared Euclidean Distance measure for interval data.

As previously mentioned, the cluster analyses were performed on the individual's scores for each of the six factors identified by Simourd and Hoge (2000). Therefore, before conducting the cluster analyses the individual's factor scores had to be calculated.

The mean factor scores ranged from 2.01 ($SD = 1.18$) to 6.32 ($SD = 1.22$) and are presented in Table 4.

Table 4

Mean PCL-R Factor Scores

PCL-R Factor	N	Minimum	Maximum	Mean	Standard Deviation
Factor 1	100	2.00	8.00	6.32	1.22
Factor 2	100	1.00	8.00	4.78	1.76
Factor 3	100	1.00	6.00	4.39	1.21
Factor 4	100	.00	4.00	2.73	1.36
Factor 5	100	.00	4.00	3.70	0.67
Factor 6	100	.00	4.00	2.01	1.18

Once these factor scores were calculated they were subjected to both hierarchical and nonhierarchical clustering techniques. The hierarchical methods that were chosen were the Complete Linkage method and Ward's Method and the nonhierarchical method that was used was the K-Means method. Both of the hierarchical clustering methods (Complete Linkage; Ward's Method) were conducted first followed by the non-hierarchical clustering method (K-Means). Since the non-hierarchical clustering techniques require that the number of clusters be specified at the outset, conducting the hierarchical methods first provided a guideline to determine how many clusters were present in the current data set (Hair & Black, 2000).

The number of clusters was determined by a visual examination of the resulting dendrogram (where major branches would represent a cluster) and a visual examination of the distance coefficients (where a sudden increase in values would suggest the merging of two dissimilar clusters). Once the number of clusters within each clustering technique was identified, the reliability and stability of the resulting cluster solutions were assessed.

Cluster solutions were deemed reliable if the same number of clusters emerged across the three different clustering techniques.

Once a stable and reliable cluster solution was identified, it was then validated on two groups of external criteria: criminal behaviour and assessment information. To this end, a series of Multivariate Analyses of Variance (MANOVA's), a Univariate Analysis of Variance (ANOVA) and Chi-Square statistical techniques were conducted on the resulting cluster solution.

Results

Cluster Analysis

In order to determine how many clusters were present in the current sample a number of steps were taken. First, the number of clusters identified by the hierarchical methods was investigated. This investigation started with a visual examination of the resulting dendrograms. When inspecting these dendrograms the major branches represented different clusters, with the longer branches representing greater distance between the clusters. Therefore, the longer the branches, the more valid the resulting clusters are likely to be. The next step was to visually examine the distance coefficients. When examining the distance coefficients, a sudden increase in values would suggest the merging of two dissimilar clusters. For the Complete Linkage clustering technique, a review of both the dendrogram (see Appendix D) and the distance coefficients (see Appendix E) identified the presence of four distinct clusters. However, Ward's Method identified either a three, four, or five cluster solution (see Appendix E and Appendix F).

Since the nonhierarchical clustering techniques require that the number of clusters be specified at the outset, based on the above findings, the K-Means clustering technique

was conducted specifying a three, four, and five cluster solution. When determining the number of clusters that resulted from this clustering technique, the cluster centers were plotted and the resulting profiles were examined. The cluster solution that provided the most parsimonious yet distinct profile was deemed to be the most valid. As a result, the K-Means clustering technique also identified a four-cluster solution thus suggesting that the four-cluster solution was likely the most appropriate.

Since the K-Means clustering technique was one of the algorithms that pointed to a four-cluster solution, the cluster interpretation and validation will be completed using the data presented by this technique. Furthermore, to enable comparisons to be made across clusters, the mean factor scores were prorated. As a result, factor 3 (which contained three items) and factors 4, 5, and 6 (which each contained 2 items) were prorated to the same scale as factors 1 and 2 (which contained 4 items each). The average factor scores are presented in Table 5 and the average prorated factor scores for each of the four clusters are presented in Table 6. Also, when describing the cluster profiles using the prorated scores, mean factor scores of ≥ 6 will be considered high, mean factor scores of ≥ 3 and < 6 will be considered moderate and mean factor scores of < 3 will be considered low.

Table 5

Mean Factor Scores (Standard Deviations) Across Clusters

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
PCL-R Factor 1	6.57 (.96)	6.53 (.94)	5.25 (1.45)	6.59 (1.18)
PCL-R Factor 2	6.04 (.88)	2.70 (1.02)	6.30 (.73)	4.59 (1.01)
PCL-R Factor 3	4.07 (.98)	5.13 (.86)	4.70 (1.30)	3.32 (.99)
PCL-R Factor 4	3.36 (.78)	3.23 (1.28)	.95 (.10)	3.05 (.90)
PCL-R Factor 5	3.57 (.92)	3.90 (.31)	3.55 (.83)	3.77 (.43)
PCL-R Factor 6	1.11 (.63)	1.83 (1.26)	2.30 (1.03)	3.00 (.82)

Table 6

Mean Prorated Factor Scores Across Clusters

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
PCL-R Factor 1	6.57	6.53	5.25	6.59
PCL-R Factor 2	6.04	2.70	6.30	4.59
PCL-R Factor 3	5.43	6.84	6.27	4.43
PCL-R Factor 4	6.72	6.46	1.90	6.10
PCL-R Factor 5	7.14	7.80	7.10	7.54
PCL-R Factor 6	2.22	3.66	4.60	6.00

Cluster 1 was comprised of twenty-eight participants who had high scores on the lifestyle instability, egocentric personality, early antisocial conduct and criminal element factors (Factors 1, 2, 4 and 5), moderate scores on the emotional deficit factor (Factor 3) and low scores on the marital relationship factor (Factor 6). The average age of the participants within this cluster was 30.21 (SD = 1.5) and the mean PCL-R score for this cluster was 30.43 (SD = 2.03). Cluster 2 was comprised of thirty participants with high scores on the lifestyle instability, emotional deficit, early antisocial conduct and criminal element factors (Factors 1, 3, 4 and 5), moderate scores on the marital relationship factor (Factor 6) and low scores on the egocentric personality factor (Factor 2). The average age of the offenders in this cluster was 32.05 (SD = 1.78) and the mean PCL-R score for this cluster was 29.18 (SD = 2.04). Cluster 3 was comprised of twenty participants with high scores on the egocentric personality, emotional deficit and criminal element factors (Factors 2, 3, and 5), moderate scores on the lifestyle instability and marital relationship factors (Factors 1 and 6) and low scores on the early antisocial conduct factor (Factor 4). The average age of the offenders in this cluster was 34.01 (SD = 1.95) and the mean PCL-R score for this cluster was 29.31 (SD = 1.77). Finally, cluster 4 contained twenty-two individuals who had high scores on the lifestyle instability, early antisocial conduct,

criminal element and marital relationship factors (Factors 1, 4, 5, and 6), and moderate scores on all of the other factors, an average age of 32.57 (SD = 1.92) and a mean PCL-R score of 29.31 (SD = 1.77). These cluster profiles are illustrated in Figure 1.

Figure Caption

Figure 1. Profile of prorated mean factor scores across all 4 clusters.

Cluster Validation

In order for the emerging clusters to be useful they should produce distinct patterns of information. As a result, it is important to validate the resulting cluster solution on external criteria. While this type of validation is important it does not guarantee the utility of the resulting clusters. However it does provides an initial step in the assessment of the validity of the clusters that emerge. In order to determine the actual validity of the resulting clusters it is important to replicate and validate the emerging cluster solution on other samples. In the current study, both criminal behaviour information and assessment information were used to assess the utility of the resulting clusters. Before preceding with the findings of these examinations a brief overview of the statistical methods used and any relevant issues surrounding these methods will be provided.

As previously mentioned, a series of Multivariate Analyses of Variance (MANOVA's), one Univariate Analysis of Variance (ANOVA) and Chi-Square statistical techniques were conducted in the present study. Since most of the recidivism variables were dichotomous in nature, Chi-Square analyses were deemed to be the most appropriate statistical technique for these dichotomous variables. However when exploring the amount of time the offender spent in the community prior to reoffending, an ANOVA was conducted. In addition, a MANOVA was identified as the most appropriate statistical technique for validating the cluster solution using the assessment information and the criminal history variables. MANOVA is a statistical technique that is commonly used for analyzing the variance within research designs containing multiple independent and dependent variables when the dependent variables are correlated.

Furthermore, MANOVA was deemed superior to multiple univariate analyses of variance because it protects against inflated alpha levels, which often lead to spurious results (Tabachnick & Fidell, 2001).

Prior to conducting the ANOVA and the MANOVAs, the data was examined to ensure that all of the statistical assumptions associated with an ANOVA and MANOVA were met. All of the observations in the present study were independent, thus allowing the assumption of independent observations to be met. The homogeneity of variance assumption was also considered robust since all of the group sizes were approximately equal. The assumption of normality was then assessed. To this end outliers were identified and altered, and the skewness and kurtosis of the distributions were explored to identify any non-normal distributions. Then transformations were completed for all dependent variables that violated the assumption of normality.

The presence of univariate outliers were identified by identifying variables that contained scores that were greater than 3 standard deviations above the mean. Following this formula the following variables had values changed:

Total number of convictions – 1 case changed to within 3 SD

Time at risk – 1 case changed to within 3 SD

Criminal Sentiments Scale total score - 1 case changed to within 3 SD

Once the influence of the univariate outliers was minimized, the normality of the distributions was explored using the skewness and kurtosis values. An examination of these values identified 12 variables with non-normal distributions. According to Tabachnick and Fidel (2001) it is often beneficial to attempt more than one transformation in an effort to produce a distribution as close to normal as possible.

Once the non-normal distributions were identified an examination of the resulting histograms pinpointed which transformation may be most effective. Both logarithmic and square root transformations were completed for the positively skewed distributions and reflect logarithmic and reflect square root transformations were conducted for the negatively skewed distributions.

Logarithmic transformations improved the normality of the distribution for the Criminal Sentiments Scale. Square root transformations improved the normality of the distributions for the Time at Risk, Total Number of Convictions and Previous Violent and Non-Violent Offences variables. Finally, a reflect logarithmic transformation improved the normality of the distribution for The Level of Service Inventory - Revised and many of its subscales (criminal history, education/employment, leisure/recreation, attitudes/orientation). All of the other variables included in this study were sufficiently normally distributed.

In addition to the assumptions surrounding MANOVA researchers must also be mindful of the fact that examining multiple dependent variables at the same time may lead to spurious results. In an effort to minimize this effect, four separate MANOVAs were conducted with each MANOVA including only variables that were not strongly correlated with each other. Furthermore, Bonferroni inequality corrections were applied when determining which variables made a unique contribution to the overall multivariate significance.

Group Differences on the Criminal Behaviour Variables

The current study explored the presence of differences between the four clusters on two sets of criminal behaviour variables: 1) criminal history and 2) recidivism. The

criminal history variables included the total number of convictions, and the total number of violent and non-violent offences the offender had been convicted of in the past. The recidivism variables explored the differences between the four clusters on the offender's time at risk, the number of participants who recidivated, recidivated violently or had supervision violations. All of the recidivism variables included both charges and convictions.

The differences between the four clusters on the criminal history variables were explored by conducting a MANOVA that contained all three of the criminal history variables. Whereas, the difference between the four clusters for all of the recidivism variables except Time at Risk, were investigated using Chi-Square analyses. Differences between the four groups on the amount of time at risk were explored using an ANOVA.

Criminal History

Total Number of Convictions, Previous Non-Violent Offences and Previous Violent Offences

A 4-group (cluster 1, cluster 2, cluster 3, cluster 4) between subjects MANOVA was conducted on the following three predictor variables: total number of convictions, previous violent offences and previous non-violent offences. Using the Wilks' criterion for determining multivariate significance, the combination of these three variables differentiated the four clusters $F(9, 228.92) = 2.01, p < .05$, and demonstrated a modest association between the four clusters and the combined predictor variables (partial $\eta^2 = .17$). Within this MANOVA, only the previous non-violent offences variable made a significant unique contribution when differentiating the four clusters $F(3, 100) = 3.76, p < .02, \eta^2 = .11$. For this predictor variable follow-up post hoc Tukey HSD analyses

revealed that cluster 3 had significantly fewer previous non-violent offences compared to clusters 1 and 4 (see Table 7). These findings suggest that while they did not significantly differ on the total number of convictions or the total number of previous violent convictions, the psychopaths identified in cluster 3 had fewer previous non-violent convictions than those psychopaths in clusters 1 and 4.

Table 7

Means, Standard Deviations and Post Hoc Results for the MANOVA Containing the Following Predictor Variables: Total Number of Convictions, Previous Violent Offences and Previous Non-Violent Offences

Variable	Cluster 1 n=28		Cluster 2 n=30		Cluster 3 n=20		Cluster 4 n=22		Post hoc
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Total Convictions	29.93	15.92	28.64	12.22	21.63	15.45	36.00	15.96	ns
Previous Violent	1.21	1.48	2.64	1.36	1.75	1.28	2.13	.83	ns
Previous Non-Violent	9.64	3.37	8.64	2.34	7.13	5.91	9.88	3.36	3<4,1

Recidivism

Recidivism data was available for forty-two of the offenders in the present sample. The remainder of the sample had not been released from the institution at the time the recidivism data was collected. The recidivism variables that were of interest in the present study were: time at risk, general recidivism, violent recidivism, and supervision violations. As previously mentioned, all of the recidivism data included both charges and convictions. The time at risk variable was defined as the length of time the

offender spent in the community before receiving new charges or convictions. This variable was measured in days and ranged from 22 to 1158 days, with a median score of 369. General recidivism was defined as any contact with the criminal justice system after being released from the institution. This included both violent and non-violent charges, convictions, and/or supervision violations. Violent recidivism was defined as any charges or convictions for violent offences once released from the institution. Finally, supervision violations were defined as any violation of an offender's release conditions once he was released from the institution. This included both parole violations and mandatory supervision violations.

Time at Risk

The presence of significant differences between the four clusters on the offender's time at risk was explored using an ANOVA. This analysis revealed that there were no significant differences across the four clusters on time at risk $F(3, 42) = 1.45$, ns. The means and standard deviations are presented in Table 8.

General Recidivism

The existence of significant differences between the four clusters on general recidivism was explored using a Chi-Square analysis. This analysis revealed that there were no significant differences across the four clusters on general recidivism $\chi^2(3, N = 42) = 5.83$, ns. However, as Table 8 illustrates, a high percentage of psychopaths in each of the clusters reoffended after being released from the correctional facility.

Violent Recidivism

The presence of significant differences between the four clusters on violent recidivism was to be explored using a Chi-Square analysis. However, since more than

25% of the cells had a sample size of less than five, no statistical analyses were performed on this data.

Supervision Violation

Chi-Square analyses were used to determine whether or not the four clusters differed significantly on supervision violations. This analysis revealed that regardless of which cluster they were in, the participants in the current study did not differ on the presence of supervision violations $\chi^2 (3, N = 42) = 4.01, ns$. As Table 8 indicates the majority of participants, regardless of which cluster they fell into, had violated their supervision conditions once they were released from the correctional facility.

Table 8

Number (Percent) of Offenders who Recidivated, Violently Recidivated and Violated the Terms of Their Supervision and Means and Standard Deviations for Time at Risk.

Variable	Clusters							
	Cluster 1		Cluster 2		Cluster 3		Cluster 4	
	<u>n</u> = 14		<u>n</u> = 11		<u>n</u> = 9		<u>n</u> = 8	
Recidivism	13 (92.9%)		11 (100%)		6 (66.7%)		6 (75%)	
Violent Recidivism	1 (7.1%)		7 (63.6%)		1 (11.1%)		3 (37.5%)	
Supervision Violation	12 (92.9%)		11 (100%)		7 (77.8%)		6 (75%)	
Time at Risk	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
	475.93	330.49	255.45	206.58	319.50	152.74	311.13	168.81

Group Differences on the Assessment Variables

In addition to exploring the presence of differences between the four clusters on the criminal behaviour variables discussed above, the present study also investigated the presence of differences between the four clusters on two types of assessment variables: 1) a risk/need measure (the LSI-R) and 2) attitudinal measures (the CSS-M, PID and PDS). To this end three separate MANOVAs were conducted. The first MANOVA was conducted on the total scores for the risk/need measure (the LSI-R) and all of the attitudinal measures (the CSS-M, PID and PDS). The other two MANOVAs were conducted on five of the ten subscales outlined in the LSI-R.

The ten subscales outlined in the LSI-R were divided into two groups for a couple of reasons. In order to maximize power, Stevens (1996) recommends that when conducting a MANOVA the number of subjects per group : number of predictor variables ratio should be about 5:1. Since the number of subjects per group ranged from 20 to 30 it was felt that conducting two separate MANOVAs would be more beneficial than conducting one MANOVA with all ten predictor variables. In addition an attempt was made to include only those variables that were not strongly correlated with each other in each MANOVA (see Appendix G for intercorrelation matrix). It was felt that this would improve power by reducing the effects of multicollinearity.

LSI-R, CSS-M, PID, and PDS

A 4-group (cluster 1, cluster 2, cluster 3, cluster 4) between subjects MANOVA was performed on the following four predictor variables: LSI-R total score, CSS-M total score, PID total score, and PDS total score. However the results indicated that the PID total score was not contributing to the overall findings ($\eta^2=.01$) and subsequently it was removed from the analysis. As a result, the findings were reexamined by running another 4-group between subjects MANOVA which included the following three predictor variables: LSI-R total score, CSS-M total score, and PDS total score. Using the Wilks' criterion for determining multivariate significance, the combination of these three variables differentiated the four clusters $F(9, 207.02) = 2.58, p < .01$, and demonstrated a modest association between the four clusters and the combined predictor variables (partial $\eta^2=.23$).

Two of the predictor variables (LSI-R total score and CSS-M total score) made unique contributions when differentiating the four clusters. The LSI-R total score made

the largest contribution when differentiating the four clusters $F(3, 91) = 4.61, p < .01, \eta^2 = .14$. Follow-up post hoc Tukey HSD analyses revealed that cluster 3 had significantly lower scores on the LSI-R than the other clusters (see Table 9). Thus suggesting that the participants identified in cluster 3 may present a lower risk and have fewer treatment needs than the psychopaths in the other three clusters. The CSS-M total score also made a significant unique contribution when differentiating the four clusters $F(3, 91) = 4.01, p < .01, \eta^2 = .12$. For this predictor variable follow-up post hoc Tukey HSD analyses revealed that cluster 3 had significantly lower scores on the CSS-M than clusters 1 and 2 (see Table 9). Thus suggesting that the participants identified in cluster 3 may possess fewer antisocial attitudes, beliefs, and values than those psychopaths in clusters 1 and 2.

Table 9

Means, Standard Deviations and Post Hoc Results for the MANOVA Containing the Following Predictor Variables: LSI-R, CSS-M, and PDS

Variable	Cluster 1 $n=26$		Cluster 2 $n=27$		Cluster 3 $n=17$		Cluster 4 $n=21$		Post hoc
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
LSI-R	38.36	4.16	41.09	3.27	34.50	5.58	38.63	3.34	3<4,2,1
CSS-M	21.29	8.25	24.64	16.50	21.13	11.39	23.25	11.68	3<1,2
PDS	12.23	5.60	12.04	5.93	15.29	3.79	12.95	5.57	ns

LSI-R Subscales (financial, drug/alcohol, attitudes/orientation, education/employment, criminal history)

A 4-group (cluster 1, cluster 2, cluster 3, cluster 4) between subjects MANOVA was performed on the following five predictor variables: LSI-R financial subscale, LSI-R drug/alcohol subscale, LSI-R attitudes/orientation subscale LSI-R education/employment subscale, and LSI-R criminal history subscale. Using the Wilks' criterion for determining multivariate significance, the combination of these five variables differentiated the four clusters $F(15, 254.37) = 2.39, p < .01$, and demonstrated a strong association between the four clusters and the combined predictor variables (partial $\eta^2 = .31$). Within this MANOVA, only the LSI-R education/employment subscale made a significant unique contribution when differentiating the four clusters $F(3, 100) = 4.55, p < .01, \eta^2 = .12$. For this predictor variable follow-up post hoc Tukey HSD analyses revealed that cluster 3 had significantly lower scores on the LSI-R education/employment subscale than the other three clusters (see Table 10). This suggests that the participants identified in cluster 3 may possess fewer educational and employment difficulties than those participants in clusters 1, 2 and 3.

Table 10

Means, Standard Deviations and Post Hoc Results for the MANOVA Containing the Following LSI-R Subscales: Financial, Drug/Alcohol, Attitudes/Orientation, Education/Employment, and Criminal History

Variable	Cluster 1 n=28		Cluster 2 n=30		Cluster 3 n=20		Cluster 4 n=22		Post hoc
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Financial	1.39	.63	1.23	.63	1.20	.70	1.50	.60	ns
Drug / Alcohol	4.79	3.04	5.40	2.49	3.40	2.52	3.86	2.64	ns
Attitudes / Orientation	2.43	1.16	3.45	.82	3.13	.99	2.88	.99	ns
Education / Employment	8.79	1.58	8.55	1.75	8.00	1.51	8.25	1.49	3<2,1,4
Criminal History	8.79	1.05	9.09	.83	7.88	1.64	9.00	.76	ns

LSI-R Subscales (emotional/personal, companions, accommodation, family/marital and leisure/recreation)

A 4-group (cluster 1, cluster 2, cluster 3, cluster 4) between subjects MANOVA was performed on the following five predictor variables: LSI-R emotional/personal subscale, LSI-R companions subscale, LSI-R accommodation subscale, LSI-R family/marital subscale and LSI-R leisure/recreation subscale. Using the Wilks' criterion for determining multivariate significance, the combination of these five variables differentiated the four clusters $F(15, 248.85) = 3.61, p < .01$, and demonstrated a fairly

strong association between the four clusters and the combined predictor variables (partial $\eta^2=.42$).

Two of the predictor variables (LSI-R accommodation subscale and LSI-R emotional/personal subscale) made unique contributions when differentiating the four clusters. The LSI-R emotional/personal subscale made the largest contribution when differentiating the four clusters $F(3, 98) = 7.87, p < .01, \eta^2=.20$. Follow-up post hoc Tukey HSD analyses revealed that cluster 1 had significantly higher scores on this subscale than the other clusters (see Table 11). Thus suggesting that the participants identified in cluster 1 may have more mental health issues than the participants in the other three clusters. The LSI-R accommodation subscale also made a significant unique contribution when differentiating the four clusters $F(3, 98) = 5.02, p < .01, \eta^2=.14$. For this predictor variable follow-up post hoc Tukey HSD analyses revealed that cluster 3 had significantly lower scores on this subscale than clusters 2 and 4 (see Table 11). Thus suggesting that the participants identified in cluster 3 may be more satisfied with their accommodations compared to those participants in clusters 2 and 4.

Table 11

Means, Standard Deviations and Post Hoc Results for the MANOVA Containing the Following LSI-R Subscales: Emotional/Personal, Companions, Accommodation, Family/Marital and Leisure/Recreation

Variable	Cluster 1 n=26		Cluster 2 n=30		Cluster 3 n=20		Cluster 4 n=22		Post hoc
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	
Emotional / Personal	3.12	1.11	1.73	1.31	2.05	.89	2.36	.90	1>4,3,2
Companions	3.23	1.03	3.33	.92	2.55	1.00	3.05	.79	ns
Accommodation	1.46	.99	2.13	1.04	1.20	.83	1.95	.84	3<4,2
Family / Marital	2.23	1.03	2.77	1.01	2.35	.99	2.32	.99	ns
Leisure / Recreation	1.71	.53	1.83	.46	1.60	.75	1.59	.67	ns

Discussion

The aim of the present study was to determine whether or not psychopathic offenders could be classified into homogeneous sub-groups. Such a typology would not only heighten the conceptual clarity of the construct of psychopathy but it could also increase the validity of clinical assessments and aid clinicians in making decisions regarding security classification, treatment and release for these offenders.

Using the six-factor solution of the PCL-R identified by Simourd and Hoge (2000) the current study uncovered four different types of psychopaths. The first cluster was comprised of psychopaths with high scores on the lifestyle instability, egocentric

personality, early antisocial conduct and criminal element factors, moderate scores on the emotional deficit factor and low scores on the marital relationship factor. This cluster could be referred to as the 'prototypical' psychopaths. The second cluster contained psychopaths with high scores on the lifestyle instability, emotional deficit, early antisocial conduct and criminal element factors, moderate scores on the marital relationship factor and low scores on the egocentric personality factor. This cluster could be referred to as the 'callous' psychopaths. The third cluster included psychopaths with high scores on the egocentric personality, emotional deficit and criminal element factors, moderate scores on the lifestyle instability and marital relationship factors, and low scores on the early antisocial conduct factor. This cluster could be referred to as the 'adult criminality' psychopaths. Finally, the fourth cluster consisted of psychopaths with high scores on the lifestyle instability, early antisocial conduct, criminal element and marital relationship factors and moderate scores on the egocentric personality and emotional deficit factors. This cluster could be referred to as the 'unstable lifestyle' psychopaths.

The labeling of the resulting types of psychopaths was a very difficult yet important task. When labeling different groups the labels that are chosen can enhance communication surrounding these individuals. Therefore, an attempt was made to use a name that would help describe the characteristics of the psychopaths within that cluster. To this end, the labels that were chosen to identify the four different types of psychopaths arose from the factor items which best discriminated the particular cluster.

High scores on the criminal element factor characterized all of the four clusters. In fact, it was this factor that received the highest score for all of the cluster profiles and thus did not effectively discriminate the four clusters. This is not all that surprising

considering the population of offenders used in the present study. Psychopathic offenders not only violate the conditions of their release more than nonpsychopathic offenders (e.g., Seto and Barbaree, 1999) but their criminal careers are also characterized by a great deal of versatility (e.g., Simourd & Hoge, 2000).

As the cluster profiles indicate, different factors served to discriminate the four clusters. Whereas both clusters 2 and 3 received moderate scores on the marital relationship factor, Cluster 1 received a low score and cluster 4 received a high score on this factor. In addition to being the only cluster to receive a high score on the marital relationship factor, cluster 4 was also the only cluster to receive a moderate score on the egocentric personality factor. The profile demonstrated by cluster 2 was particularly interesting. Compared to the other clusters, cluster 2 was the only group to receive a low score on the egocentric personality factor. In addition, the psychopaths in cluster 2 had the highest scores on the emotional deficit factor. This was somewhat surprising since none of the other clusters demonstrated such a discrepancy on these interpersonal characteristics of psychopathy. The profile demonstrated by cluster 3 was also unexpected. Considering that psychopaths who engage in aggressive and antisocial activities often do so from a young age (see Hare et al., 1992), it was somewhat surprising to have such a discrepancy in factor scores on the early antisocial conduct factor. The psychopaths in cluster 3 had much lower scores on this factor than the other three clusters. In fact, all of the clusters except cluster 3 had high scores on the early antisocial conduct factor, whereas cluster 3 had a low score on this factor.

While the study by Hervé and Hare (2001) also identified four different types of psychopaths, only two of the cluster profiles appear to be similar. Even though the Hervé

and Hare (2001) study used the three facet scores outlined by Cooke and Michie (2001) there was a fair amount of overlap between these facet items and the items that comprised the first three factors used in the present study (see Table 12). Also, Hervé and Hare (2001) prorated their three facet scores to a scale of four items. Similarly, the current study also prorated the factor scores to a four-item scale thus allowing direct comparisons between the studies to be made. However these comparisons were only made for the first three factors used in the current study. Furthermore, the study by Hervé and Hare (2001) did not specify the cut-off scores for determining whether a score was high, moderate or low. As a result the following comparisons are being made based on how the cluster profiles were presented in their study.

Table 12

Comparison between the First Three PCL-R Factors Outlined by Simourd and Hoge (2000) and the Three PCL-R Facet Scores outlined by Cooke and Michie (2001)

First Three PCL-R Factors Simourd and Hoge (2000)	Three PCL-R Facet Scores Cooke and Michie (2001)
Lifestyle Instability Indicator (Factor 1)	Lifestyle Facet (Facet 3)
Parasitic lifestyle	Parasitic lifestyle
Lack of long term goals	Lack of long term goals
Impulsivity	Impulsivity
Irresponsibility	Irresponsibility
	Need for Stimulation
Egocentric Personality Style (Factor 2)	Interpersonal Facet (Facet 1)
Glibness / superficial charm	Glibness / superficial charm
Grandiose sense of self worth	Grandiose sense of self worth
Pathological lying	Pathological lying
Conning / manipulative	Conning / manipulative
Emotional Deficit (Factor 3)	Affective Facet (Facet 2)
Lack of remorse or guilt	Lack of remorse or guilt
Shallow affect	Shallow affect
Callous / lack of empathy	Callous lack of empathy
	Failure to accept responsibility

The findings presented by Hervé and Hare (2001) also identified four different clusters of psychopaths. While two of the cluster profiles were replicated in the current study, the remaining two were not. The psychopaths identified in cluster 2 of the study by Hervé and Hare (2001) received high scores on the affective and lifestyle facets and low scores on the interpersonal facet. Similarly, the psychopaths identified in cluster 2 in the present study also received high scores on the lifestyle instability and emotional deficit factors (which are comparable to the lifestyle and affective facets) and low scores

on the egocentric personality factor (which is comparable to the interpersonal facet). In addition, the psychopaths identified in cluster 4 also appeared to be quite similar. The psychopaths identified in cluster 4 of the study by Hervé and Hare (2001) received high scores on the lifestyle facet and moderate scores on the interpersonal and affective facets. Similarly, the psychopaths identified in cluster 4 in the present study received high scores on the lifestyle instability factor (comparable to the lifestyle facet) and moderate scores on the egocentric personality and emotional deficit factors (comparable to the interpersonal and affective facets). Therefore, it appears that two of the psychopathic profiles outlined by Hervé and Hare (2001) have been replicated in the current study. However, since this replication was done using only three of the six factor scores used to identify the cluster profiles in the current study, the reliability of the clusters identified in the present study is still unknown.

The other two clusters of psychopaths identified by Hervé and Hare (2001) were not replicated in the present study. Hervé and Hare (2001) identified a cluster of psychopaths, which was characterized by high scores across each of the interpersonal, affective, and lifestyle facets. In comparison, none of the clusters identified in the present study contained high scores across all of the lifestyle instability, egocentric personality and emotional deficit factors. Another group of psychopaths identified by Hervé and Hare (2001) obtained high scores on the interpersonal and affective facets and low scores on the lifestyle facet. None of the clusters in the current study matched this profile however cluster 3 was the closest. This cluster was characterized by high scores on the egocentric personality and emotional deficit factors (which are comparable to the interpersonal and affective facets) but only moderate scores on the lifestyle instability

factor (compared to low scores found by Hervé and Hare (2001)). While these differences could be due to differences among the populations used to create the typologies, they definitely indicate the need to replicate the findings of the current study before an accurate assessment of the reliability of the resulting cluster solution can be made.

The average PCL-R scores across clusters are also of interest when describing the four clusters. The PCL-R coding manual instructs clinicians to define a psychopath as someone who has scored 30 or above when all of the 20 PCL-R items have been summed (Hare, 1991). In all of the clusters except for cluster 1, the average PCL-R score was below the standard cutoff score of 30 and the average score for cluster 1 just exceeded this requirement ($M = 30.43$). This finding may in fact be more a consequence of the sample than anything else. Due to the limited number of 'true' psychopaths within many institutions at any given time the current study identified psychopaths as those individuals with a PCL-R score of ≥ 27 . In addition, the current sample was created using offenders serving time in a medium security institution. Due to the nature of the disorder, psychopathic offenders are often considered to be among the most dangerous offenders (see Hemphill et al., 1998). As a result, using a sample of psychopathic offenders obtained from a maximum security correctional facility may provide more 'true' psychopaths. Therefore, before generalizing this four-cluster solution to other psychopathic inmates further investigations need to confirm the presence of this four-cluster solution using samples containing more individuals who meet the recommended criteria for psychopathy (i.e. a PCL-R score of ≥ 30).

Once these four clusters were identified the differences across the clusters on both criminal behaviour and assessment variables were explored. The criminal behaviour variables that were of interest included both criminal history and recidivism variables. For the criminal history variables (total number of convictions, previous non-violent offences, previous violent offences) there were no significant differences across the four types of psychopaths for the total number of prior convictions or the number of previous violent offences. Thus indicating that while psychopathic criminals have a greater number of convictions and are more likely to have convictions for violent offences than their nonpsychopathic counterparts (e.g., Simourd & Hoge, 2000), as a group, psychopaths do not seem to differ in these areas. However, when it comes to previous non-violent offences, the 'adult criminality' psychopaths had significantly fewer previous non-violent offences when compared to the 'prototypical' and 'unstable lifestyle' psychopaths.

For the recidivism variables (time at risk, general recidivism, violent recidivism, supervision violations) the four types of psychopaths did not significantly differ on the amount of time spent in the community before recidivating, or whether or not they recidivated or violated the conditions of their supervision. Once again indicating that while psychopathic criminals tend to violate the conditions of their release more than nonpsychopathic offenders (e.g., Seto & Barbaree, 1999), as a group, psychopaths do not seem to differ in these areas. With regards to violent recidivism, the 'callous' psychopaths appeared to be more likely to commit a violent offence compared to the other psychopaths once they were released. However, due to the small sample size the differences between the four groups of psychopaths could not be analyzed to see if this

difference was statistically significant. Subsequently, the only conclusion that can be drawn is that the majority of the 'callous' psychopaths recidivated violently whereas the majority of the other offenders did not.

This finding was particularly interesting since the 'callous' psychopaths obtained low scores on the egocentric personality factor. As a result, these individuals are not as likely to be conning, manipulative and charming when compared to the other psychopaths. With this in mind it would be interesting to identify what type of violent offences these 'callous' psychopaths are committing once they are released. Since the egocentric personality factor identifies characteristics that would be beneficial in interpersonal relationships, one might hypothesize that the offences committed by these 'callous' psychopaths may be more instrumental (i.e. goal directed rather than emotional) and predatory in nature (e.g., Cornell et al., 1996) than those committed by the other types of psychopaths. These instrumental violent offences might consist of dispassionate violence that occurs without emotion, perhaps motivated by revenge and committed against a stranger.

The discovery that the 'callous' psychopaths may be more likely to commit a violent offence compared to the other psychopaths once they were released was somewhat surprising since no differences were found across the four types of psychopaths for previous violent offences. Nonetheless, being able to identify which psychopaths are likely to commit more violent crimes once they are released could be very helpful for clinicians and other members of the criminal justice system who need to make decisions regarding security classification, treatment and release for these offenders. However, due to the very small number of psychopaths for which recidivism

data was available these findings must be considered with caution until such findings can be replicated.

In addition to exploring the presence of differences between the four clusters on the criminal behaviour variables discussed above, the present study also investigated the presence of differences between the four clusters on two types of assessment variables: 1) a risk/need measure (the LSI-R) and 2) attitudinal measures (the CSS-M, PID and PDS). For the risk/need measure the presence of differences was investigated for the total score and all of the subscale scores. The findings indicated that compared to all of the other groups, the 'adult criminality' psychopaths presented a lower risk for recidivism and fewer treatment needs. Furthermore, this same group of psychopaths had fewer education/employment difficulties than the rest, and fewer accommodation problems than the 'callous' and 'unstable lifestyle' psychopaths. Also of interest was the finding that the 'prototypical' psychopaths had more mental health problems than the other psychopaths.

When differences between the four types of psychopaths were explored for the attitudinal measures the four groups only differed on the CSS-M. The findings indicated that compared to all of the other groups, the 'adult criminality' psychopaths possess fewer antisocial attitudes, beliefs and values. Thus it would seem that those psychopaths who have few behaviour problems early in life and little contact with the criminal justice system as an adolescent not only possess fewer antisocial attitudes, beliefs and values but also have fewer intervention needs and present as the lowest risk for recidivism.

Utility of the Current Typology

According to Gibbons (1975), a typology of offenders must meet certain criteria in order for it to be useful. The first requirement of a good typology is that it is clear and objective. In other words, the criteria that are used to categorize the offenders need to be clearly stated so that different people can use the typology and reliably assign offenders to the appropriate category. The current study classified offenders based on their scores on the six factors of the PCL-R outlined by Simourd and Hoge (2000). Once a clinician has obtained these factor scores he/she would match the offender's profile of scores to one of the four profiles outlined in the current study. Therefore the current study not only provides clinicians with clearly defined categories to use when classifying offenders but it also enables different clinicians to objectively and reliably assign offenders to the appropriate cluster based on their scores on each of the six factors.

The second requirement outlined by Gibbons (1975) states that a good typology should identify mutually exclusive categories. Using the typology, it should not be possible to classify an offender into more than one group. While it may be possible for an offender to be classified in different groups over time, at any given time an offender should not meet the criteria for more than one group. The current study identified four different types of psychopaths each with different profiles. In other words, each of the psychopathic groups had a different combination of factor scores thus indicating the presence of mutually exclusive categories.

The third requirement outlined by Gibbons (1975) states that a useful typology should be comprehensive enough to be able to classify all, or at least the majority, of the population of interest. In the present study the population of interest was psychopathic

offenders. Since the current typology was developed using an instrument that is used to identify all psychopaths it seems reasonable to assume that the four cluster solution that emerged would be comprehensive enough to classify all, or at least the majority, of psychopathic offenders. However, the ability of this typology to meet this requirement cannot be known for sure until further research is conducted.

The final requirement of a good typology outlined by Gibbons (1975) is parsimony. In order to be useful, the typology should have relatively few categories. As previously mentioned the current typology was developed using the six-factor solution identified by Simourd and Hoge (2000) rather than all of the 20 PCL-R items. This was done in an attempt to increase the clinical utility of the resulting typology by reducing the number of items that clinicians would need to examine when categorizing psychopathic offenders. In other words, using the six-factor solution rather than the 20 items provided a more parsimonious typology. As a result, the current typology appears to meet all of Gibbons' (1975) requirements and therefore could be considered quite useful.

Limitations of Study

While the current study suggests that there may be four distinct types of psychopaths, the limitations of the present study must be considered when interpreting these results. One of the possible limitations of the present study is the factor structure that was used to create the typology. The six-factor solution outlined by Simourd and Hoge (2000) contains three factors that are comprised of only two PCL-R items. Furthermore, it omits three PCL-R items that are often thought to be central to the concept of psychopathy (i.e., need for stimulation, poor behavioural controls, failure to accept responsibility). Therefore, while the six-factor solution identified by Simourd and

Hoge (2000) was deemed to be the factor structure which best represented the current data set, the reliability of this factor structure still needs to be explored.

Another limitation of the current study is the small sample size, especially for the recidivism data. With a larger sample, it is possible that more differences between the four clusters would be identified. For example, recidivism data was only available for forty-two of the subjects in the current study. As a result, the number of psychopaths within each cluster with recidivism data ranged from eight to fourteen. Had these cluster sample sizes been larger it is possible that a greater number of cluster differences may have been identified. Furthermore, due to the small number of psychopaths who had been released from the institution at the time the data was collected, the current study included all of the psychopaths who recidivated regardless of their time at risk. As a result the time at risk ranged from 22 to 1158 days, with an average of 355 days. In other words, the amount of time spent in the community by psychopaths in the current study ranged from 3 weeks to just over 3 years. Therefore, the inability to identify differences across the four clusters on most of the recidivism variables may be more a consequence of the small sample size rather than a true reflection of these differences across the four types of psychopaths.

Future Directions

While the present study served as an initial step in the search to identify whether or not different types of psychopaths actually exist, more research is needed in this area. Before concluding that four different types of psychopaths do actually exist, future research must seek to replicate the current four cluster solution. However prior to this, it would be beneficial to examine the reliability of the six-factor solution used in the present

study. Once the reliability of the six-factor structure of the PCL-R outlined by Simourd and Hoge (2000) has been investigated, future research should attempt to replicate the four-cluster solution identified in the current study.

Once this four-cluster solution has been replicated, it would be useful to determine the generalizability of the current cluster solution to other samples of psychopathic offenders. In addition, the predictive utility of these clusters should be explored using a much larger sample than was available in the present study. This would serve to demonstrate the stability of the recidivism data while determining whether or not the inability to identify differences across the four clusters on most of the recidivism variables in the current study was a true reflection of the differences across these four types of psychopaths. Furthermore, since most of the recidivism variables used in the current study were dichotomous in nature, future research could explore differences across clusters on the number of different types of offences committed after being released to the community. Future research could also explore differences across clusters on the age of onset of criminal activity, the type of aggression demonstrated by offenders, and the presence of other diagnoses such as personality disorders and/or substance abuse.

At the present time, forensic clinicians who are using the PCL-R to identify psychopaths within their institutions are required to follow the instructions outlined in the PCL-R coding manual in order to ensure an accurate assessment. The PCL-R coding manual instructs clinicians to define a psychopath as someone who has scored 30 or above when all of the 20 PCL-R items have been summed (Hare, 1991). Subsequently a typology of psychopaths, which includes only those individuals with scores of ≥ 30 , would be ideal. Therefore, in an attempt to increase the clinical utility of the emerging

cluster solution it would be helpful for future research to attempt to replicate the resulting four-cluster solution using a sample of offenders with PCL-R scores ≥ 30 .

In summary, the findings of the current study suggest that there may be four distinct types of psychopaths: 'prototypical' psychopaths, 'callous' psychopaths', 'adult criminality' psychopaths and 'unstable lifestyle' psychopaths. Within these four types the 'callous' psychopaths may be more likely to commit violent crimes once they are released from prison and subsequently could be identified as the high-risk group. In contrast, the 'adult criminality' psychopaths not only possess fewer antisocial attitudes, beliefs and values but also have fewer intervention needs and present as the lowest risk for recidivism. Subsequently this group could be identified as the low-risk group. However, due to the exploratory nature of the present study, more research is needed to confirm the existence of the emerging cluster solution. Also, in an attempt to increase the clinical utility of the emerging clusters, future research in this area should attempt to focus on 'true' psychopaths (i.e. PCL-R scores ≥ 30) and confirm the predictive utility of the emerging clusters. In addition, the generalizability of these findings to other samples needs to be explored. Therefore, while the present study has served as an initial step in the search to identify whether or not different types of psychopaths actually exist, more research is needed in this area.

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Appendix A

The Level of Service Inventory-Revised (Andrews & Bonta, 1995)

Criminal History

1. Any prior adult convictions?
2. Two or more prior convictions?
3. Three or more prior convictions?
4. Three or more present offenses?
5. Arrested under age 16?
6. Ever incarcerated upon conviction?
7. Escape history from a correctional facility?
8. Ever punished for institutional misconduct?
9. Charge laid or probation/parole suspended during prior community supervision?
10. Official record of assault/violence

Education/Employment

When in labor market:

11. Currently unemployed?
12. Frequently unemployed?
13. Never employed for a full year?
14. Ever fired?

School or when in school:

15. Less than regular grade 10?
16. Less than regular grade 12?
17. Suspended or expelled at least once?
18. Participation/performance
19. Peer interactions
20. Authority interactions

Financial

21. Problems
22. Reliance upon social assistance

Family/Marital

23. Dissatisfaction with marital or equivalent situation
24. Non-rewarding, parental
25. Non-rewarding, other relatives
26. Criminal - Family/Spouse

The Level of Service Inventory-Revised (con't)

Accommodation

- 27. Unsatisfactory
- 28. 3 or more address changes last year
- 29. High crime neighborhood

Leisure/Recreation

- 30. Absence of recent participation in an organized activity
- 31. Could make better use of time

Companions

- 32. A social isolate
- 33. Some criminal acquaintances
- 34. Some criminal friends
- 35. Absence of anti-criminal acquaintances
- 36. Absence of anti-criminal friends

Alcohol/Drug Problem

- 37. Alcohol problem, ever
- 38. Drug problem, ever
- 39. Alcohol problem, currently
- 40. Drug problem, currently Specify type of drug: _____
- 41. Law violations
- 42. Marital/Family
- 43. School/Work
- 44. Medical
- 45. Other indicators Specify: _____

Emotional/Personal

- 46. Moderate interference
- 47. Severe interference, active psychosis
- 48. Mental health treatment, past
- 49. Mental health treatment, present
- 50. Psychological assessment indicated Area: _____

Attitudes/Orientation

- 51. Supportive of crime
- 52. Unfavorable toward convention
- 53. Poor, toward sentence
- 54. Poor, toward supervision

Appendix B

Offences coded as non-violent

Disguise with Intent	Break and Enter
Possession of Weapon	Attempted Break and Enter
Possession of Restricted Weapon	Theft
Possession of Prohibited Weapon	Attempted Theft
Carrying Concealed Weapon	Possession of Stolen Property
Possession of Firearm	Fraud
Living off Avails of Prostitution	Forgery
Prostitution	Mischief
Accessory after the fact	Willful Damage
Arson	Extortion
Fail to Comply	Possession of Tools to Commit Crime
Fail to Appear	Unlawfully in Dwelling
Escape Lawful Custody	Attempted Fraud
Unlawfully at Large	Take Car Without Consent
Obstruct Justice	Possession of Stolen Credit Card
Attempt to Obstruct Justice	Parole Revocation
Breach of Recognizance	Attempted Escape
Causing a Disturbance	Impersonating a Peace Officer
Breach of Conditions	Disobey Order of Justice
Dangerous Driving	False Pretenses
Impaired Driving	False Message
Fail to Remain at Scene of Accident	Possession of Narcotics
Driving While Disqualified	Trafficking in Narcotics
Impaired Driving Causing Bodily Harm	Unsafe Storage of Gun
Refuse to Provide Sample	Conspiracy

Appendix C

Offences coded as violent

Murder
Manslaughter
Attempted Murder
Assault
Aggravated Assault
Assault with Weapon
Assault Causing Bodily Harm
Assault Peace Officer
Robbery
Robbery with violence
Attempted Robbery
Use of Firearm to Commit
Kidnapping
Forcible confinement
Resist Arrest
Point Firearm
Uttering Threats
Explosion with Intent
Sexual Assault
Dangerous use of firearm
Wounding
Causing Bodily Harm
Grievous bodily harm

Appendix D

Dendrogram for Complete Linkage Clustering Method

Appendix E

Distance Coefficients Used to Determine the Number of Clusters for Hierarchical
Clustering Techniques

Complete Linkage	Ward's Method
30	357.980
30	379.108
32	406.247
34	438.467
37	470.959
39	509.886
42	569.235
56	637.641
67	742.310
87	963.720

Appendix F

Dendrogram for Ward's Clustering Method

Appendix G
Correlation Matrix for LSI-R Subscales (Pearson r)

	Financial	Accommodation	Companions	Drug/Alcohol	Emotional/ Personal
Financial	1.00	.12	-.01	.12	.00
Accommodation	.12	1.00	.05	.01	-.19
Companions	-.01	.045	1.00	-.01	-.23*
Drug/Alcohol	.12	.012	-.01	1.00	.16
Emotional/ Personal	.00	-.19	-.23*	.16	1.00
Family/Marital	.12	.07	.14	-.08	-.05
Education/ Employment (reflect log)	-.274**	-.25	-.10	-.11	-.07
Leisure/ recreation (reflect log)	-.285**	-.13	-.28**	-.21*	.15
Criminal history (reflect log)	-.08	-.02	.04	-.06	-.29**
Attitudes (reflect log)	.02	-.28**	-.25*	.05	.38**

Note: * $p < .05$; ** $p < .01$

	Family / Marital	Education / Employment (reflect log)	Leisure / Recreation (reflect log)	Criminal History (reflect log)	Attitudes (reflect log)
Financial	.10	-.27**	-.29**	-.08	.02
Accommodation	.07	-.25*	-.11	-.02	-.28**
Companions	.14	-.10	-.28**	.04	-.25*
Drug/Alcohol	-.08	-.11	-.21*	-.06	.05
Emotional/ Personal	-.05	-.07	.15	-.29**	.38**
Family/Marital	1.00	-.09	-.10	-.05	-.20*
Education/ Employment (reflect log)	-.09	1.00	.30**	.17	.16
Leisure/ recreation (reflect log)	-.10	.30**	1.00	-.02	.30**
Criminal history (reflect log)	-.05	.17	-.02	1.00	-.16
Attitudes (reflect log)	-.20*	.16	.30**	-.16	1.00

Note: * $p < .05$; ** $p < .01$