Emotional Processing and Psychopathic Traits in Male Adolescent Offenders

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Abstract

The persistent patterns of antisocial behaviour seen in adult psychopathy (Cleckley, 1976; Hare, 2003) have lead researchers to examine the developmental precursors for this disorder in children and adolescents (Forth, Kosson, & Hare, 2003; Lynam, 1996). Psychopathy is a personality disorder that is characterized by several interpersonal, affective, and behavioural manifestations. The current study examined the emotional processing abilities of 31 incarcerated male young offenders through the administration of three tasks: a lexical decision task, an affective matching task, and a picture-word stroop task. The tasks were designed to clarify the extent to which psychopathic individuals are sensitive to affective cues using different emotional valence (positive/negative) and domains (linguistic/nonlinguistic). The findings of this study provide preliminary evidence to suggest that an emotional processing abnormality is found among young offenders who score high on psychopathic traits when presented with emotional material. For the lexical decision task, youth who scored high on the PCL:YV (Forth et al., 2003) responded more quickly overall to negative words and positive words than to neutral, reflecting a behavioural attention to more emotional components in words. This was more evident when youth responded with their left hand, thus stimulating right hemispheric structures. Further differences among high and low scoring young offenders were not observed on the remainder of the tasks, however differences on processing abilities with juveniles on certain aspects of these tasks were observed.

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Emotional Processing and Psychopathic Traits in Male Adolescents Offenders

The quest for the understanding of aberrant behaviour has fuelled researchers for many years. More specifically, the examination into criminal behaviour has led to many discoveries regarding personality characteristics, emotional processing, and the development of many socially deviant behaviours. Over the course of the last century, many clinicians have examined what is typically referred to as psychopathy (Cleckley 1976; Hare, 1993) in the attempt to understand why some individuals develop this disorder. The purpose of this thesis is to explore the association between psychopathic traits and emotional processing abilities amongst a young offender sample in the attempt to identify if this target sample will show similar patterns of emotional deficits as seen in adult psychopaths.

Within the last 50 years, one of the most influential writers in the field of psychopathy has been Hervey Cleckley (1976). Cleckley (1976) described 16 characteristics of psychopathy that together manifest itself into this distinct condition. Through Cleckley's (1976) observations of several psychopaths in his clinical practice, the manifestation of a "typical" psychopath was developed. This manifestation has shaped the research community that has delved into the examination of psychopathy by providing a clear conceptualization of this disorder and has influenced the development of several assessments in this field (Forth, Kosson, & Hare, 2003; Frick & Hare, 2001; Hare, 2003; Lilienfeld & Andrews, 1996).

The constellation of symptoms that characteristically define a psychopathic individual include numerous interpersonal, affective and behavioural features, including: superficial charm, tendency to manipulate others, above average intelligence, insincerity,

shallow affect, including a deficit in expressing remorse or shame. Moreover, other characteristics include pervasive antisocial behaviour, profound sense of egocentricity, and a general lack of future goal planning (Cleckley, 1976).

Psychopathic personality traits are often found in individuals who use intimidation, manipulation and often violence to control others and frequently bring about personal gain from these actions (Blackburn, 1998; Hare, 2003). The traits that are characteristic of adult psychopathy are not only serious in its impact on society, but its persistent qualities are found to be relatively immune to treatment (Rice, Harris, & Cormier, 1992; Seto & Barbaree, 1999). Furthermore, Hare (1996) noted that “the ease with which psychopaths engage in instrumental and dispassionate violence has very real significance for society in general and for law enforcement personnel in particular” (p. 38). The violence perpetrated by psychopaths has been found to persist throughout their life span (Harris, Rice, & Cormier, 1991). Moreover, those who score high on psychopathy assessments are also more likely to recidivate following release from prison (Serin & Amos, 1995; Serin, Peters, & Barbaree, 1990).

The implications of a diagnosis of psychopathy are numerous. Hare (1996) has indicated that there is “no known treatment for psychopathy” (p. 41) and although the characteristics of psychopathy are not immutable, currently there are no sound and viable treatment options that have been shown to work with this population. Within the judicial system, psychopaths will routinely engage in treatment programs and will often demonstrate an “improvement” as a result of these programs. However, following release, some of these individuals have been found to engage in violent acts. Rice et al. (1992) found that treated psychopaths were more likely to violently recidivate than untreated

nonpsychopaths. As a result, within the past few years, several researchers have begun examining psychopathic tendencies in children and adolescents in the attempt to develop more adequate intervention strategies and to understand the developmental precursors of this disorder (Forth et al., 2003; Forth & Mailloux, 2000; Lynam, 1996; Salekin, Rogers, & Machin, 2001; Seagrave & Grisso, 2002).

One of the more intriguing factors underlying the syndrome of psychopathy is what Hare (1993) and Cleckley (1976) describe as an emotional poverty exhibited by psychopaths. These individuals, at times, appear cold and unemotional, while at other times appear to experience feelings. However, these “feelings” are often dramatic and short-lived and upon careful observation, psychopaths appear to be play-acting and are not truly experiencing the full range of emotional states. In describing this abnormal process, Cleckley (1982) wrote that:

Although it is true that he sometimes becomes excited and shouts as if in rage or seems to exult in enthusiasm and again weeps in what appear to be bitter tears or speaks eloquent and mournful words about his misfortunes or his follies, the conviction dawns on those who observe him carefully that here we deal with a readiness of expression rather than a strength of feeling (p. 348).

Several researchers have demonstrated that psychopaths show affective processing abnormalities in response to both non-language (Lykken, 1957; Newman & Wallace, 1993; Ogloff & Wong, 1990) and language tasks (Lorenz & Newman, 2002a, 2002b; Williamson, Harpur, & Hare, 1991) when compared with nonpsychopaths. The present literature review will first explore the contribution the Psychopathy Checklist-Revised (Hare, 2003) has made in relation to expanding the knowledge pertaining to adult psychopathy. The

investigation into adolescent psychopathic tendencies will be discussed in regards to the characteristics of this age group (12 to 18 years of age). Furthermore, research studies that examined affective processes of psychopaths in both adult and youth populations will be examined in relation to two theories. Gray's (1982) Behavioral Inhibition System account of psychopathy and Gorenstein and Newman's (1980) response modulation hypothesis will be explored in the attempt to link research findings with the theories of why psychopaths show an abnormality to emotional stimuli.

Historical Accounts of Psychopathy

One of the first clinicians to describe psychopathy was psychiatrist Philippe Pinel. Pinel wrote about individuals who behaved in a socially deviant manner but did not display any signs of mental illness. He stated these individuals had *manie sans delire* (mania without delirium) who routinely engaged in acts of cruelty, irresponsibility, and immorality (Rotenberg & Diamond, 1971). Following Pinel, British psychiatrist, Pritchard used the term "moral insanity" to portray people who deviated from society's norms regarding religion, ethical, and cultural conduct. Koch, in 1888 believed that the term moral insanity was inappropriate as it appeared to place less emphasis on mental deficits and therefore used the term of psychopathic inferiority instead to describe those who engaged in socially abnormal behaviours (Herpertz & Sass, 2000).

Over the years, many researchers and clinicians have used other nomenclature to refer to the typical behaviours and traits associated with psychopathy. The term sociopath, as proposed by Partridge in 1930 was for a time believed to be appropriate, as the term was used to describe a set of behaviours that were socially, not mentally, aberrant (Pennington, 1966). The American Psychiatric Association's (APA) Diagnostic and Statistical Manual

(DSM) has repeatedly changed its terminology in reference to this disorder. In its most recent edition, the label antisocial personality disorder is used to describe the set of symptoms most notably used to classify a person as psychopathic (APA, 1994).

Assessment of Psychopathy in Adults

Hare (1996) called psychopaths “intraspecies predators” who use various means, such as charm, manipulation, intimidation and often violence, to get what they desire. Psychopaths often violate social norms without any regard to others’ feelings. Although psychopaths are believed to represent a small minority within the general population (about 1%), it has been found that psychopaths are more commonly found in the prison population (approximately 15-25%) (Hare, 1996). Hare (1996) postulates that at one time or another, we will all encounter a psychopath and his or her destructive activities, therefore identifying and discovering treatment and/or prevention strategies should be at the forefront of research studies.

Building from Cleckley’s (1976) work, Hare (1991) and his colleagues developed an assessment tool, the Psychopathy Checklist-Revised (PCL-R; Hare, 2003) designed to measure the interpersonal, affective, and behavioural characteristics of psychopathy. Through the use of a semi-structured interview and case file review method, a trained examiner will score the individual on a 3-point scale: 0 (definitely does not apply), 1 (somewhat applies) and 2 (definitely applies). Scores can range from 0 to 40, with a score of 30 or above used to diagnose psychopathy (Hare, 2003), although some researchers use the score of 25 as the cut-off for the diagnosis of this disorder (Simourd & Hoge, 2000). Individuals who score less than 21 on this scale are referred to as nonpsychopaths. The reliability and validity of this assessment tool has been strongly demonstrated among

numerous populations, including criminal offenders (Hare, 1996; Hare, Forth, & Stachan, 1992), sex offenders (Barbaree, Seto, Langton, & Peacock, 2001), civil psychiatric patients (Douglass, Ogloff, Nicholls, & Grant, 1999; McDermott et al., 2000), forensic psychiatric patients (Hart & Hare, 1989), female offenders (Salekin, Rogers, Ustad, & Sewall, 1998), and African American offenders (Cooke, Kosson, & Michie, 2001).

The PCL-R (Hare, 2003) consists of two correlated factors. Factor 1 includes the affective and interpersonal dimension describing the constellation of personality traits that many believe form the core of this disorder. Such traits include: glibness and superficial charm, grandiose sense of self worth, pathological lying, manipulateness, lack of remorse, shallow affect, callousness and lack of empathy, and failure to accept responsibility. The second factor identifies traits more closely associated with a chronically, unstable antisocial lifestyle. The traits included in this factor are: need for stimulation and proneness to boredom, parasitic lifestyle, poor behavioural controls, early behavioural problems, lack of realistic long-term goals, impulsivity, irresponsibility, and juvenile delinquency. However recently, Cooke and Michie (2001) hypothesized that a three factor hierarchical solution better describes the features of psychopathy.

Through the use of confirmatory factor analysis, Cooke and Michie (2001) concluded that the two-factor model did not adequately explain the factors of this disorder. Based upon theoretical considerations, Cooke and Michie (2001) examined the PCL-R on the basis of three important factors described by Cleckley (1976) and Hare (1991) as the core features of this disorder: affective, interpersonal, and behavioural qualities. By eliminating six items that the PCL-R (Hare, 2003), this new factor structure places less emphasis on specific antisocial behaviours and rather shifts more focus on personality

traits. Therefore, the Cooke and Michie (2001) factor structure deemphasizes criminal behaviour more so than does the two-factor structure described by Hare et al. (1990). Further exploration into the factor structure of the PCL-R has recently discovered that a 4-factor model of psychopathy may provide the most comprehensive explanation into the manifestation of this disorder (Hare, 2003). This model incorporates the same factors as the 3-factor model identified by Cooke and Michie (2001), however it adds a fourth dimension that consists of the five of the seven items that Cooke and Michie (2001) excluded from their model. This fourth dimension captures antisocial behaviour.

Within the research community, many authors have used the term psychopathy to be synonymous with antisocial personality disorder (APD). This conceptualization is incorrect and has led to much confusion regarding the two disorders (Bartol, 2002). Antisocial Personality Disorder (APD), as defined by the Diagnostic and Statistical Manual (DSM-IV; American Psychiatric Association, APA, 1994) is a personality disorder which is marked by a “pervasive pattern of disregard for, and violation of, the rights of others” (p. 645). The DSM-IV (APA, 1994) also notes that this disorder is also referred to as psychopathy, sociopathy, or dyssocial personality disorder. However, most of the symptoms required for a diagnosis of APD are based upon behavioural characteristics, whereas the diagnosis of psychopathy, as per Cleckley (1976) also describes interpersonal and affective characteristics. This has led to the contention that these two concepts are not equivalent and thus, should be treated as such (Hare, Hart, & Harpur, 1991; Millon, 1981). Adult psychopathy and APD appear to have an asymmetrical relation. Approximately 90% of individuals who are deemed psychopathic also meet the criteria of APD, while only 25% of individuals with APD are psychopathic (Hare, 1985). Although there is a significant

relationship between the two constructs, APD has been more strongly associated with factor 2 of the PCL-R (Hare, 1991).

The debate whether psychopathy is a function of a diagnostic category or continuum has lead to several empirically based studies to be conducted regarding this disorder (Blackburn & Coid, 1998; Harris, Rice, & Quinsey, 1994). Blackburn and Coid (1998) argued that many features of psychopathy are not specific to any one personality disorder. Several studies have found that PCL-R scores among prison and forensic psychiatric populations are correlated with characteristics of several personality disorders, including narcissistic, histrionic, borderline, paranoid, as well as APD (Hart & Hare, 1989; Hart, Forth, & Hare, 1991; Hart, Hare, & Forth, 1994). This suggests that the concept of psychopathy should not be viewed as a distinct entity, but rather as a continuum of symptoms that pervade over other personality disorders (Blackburn & Coid, 1998).

Harris and colleagues (1994) have taken a different approach when attempting to classify psychopathy. Harris et al. (1994) hypothesized that this construct is better understood as a taxon. Utilizing curve-fitting procedures, the distribution plot of the PCL-R scores from 653 offenders revealed two distinct normal distributions suggesting that this disorder should be considered as a distinct category instead of a continuous dimension.

Through the clinical descriptions by Cleckley (1976) of the core features that underlie psychopathy, several researchers have been able to demonstrate that the unique characteristics of interpersonal, affective and behavioural qualities that define psychopathy are indeed a clinical construct. Further studies are required before a full understanding of whether psychopathy is a distinct disorder or a continuum.

Assessment of Psychopathy in Youth

In the attempt to discover tomorrow's psychopathic adult (Seagrave & Grisso, 2002), several researchers have recently developed assessment instruments to identify psychopathic traits in children and adolescents (Forth et al., 2003; Frick, O'Brien, Wootton, & McBurnett, 1994; Lynam, 1997). The DSM-IV (APA, 1994) states that in order for a diagnosis of antisocial personality to be made in an adult, symptoms of conduct disorder have to be documented before the age of 15. Therefore, the emergence of psychopathy does not appear when the individual reaches adulthood, instead, there is strong evidence to support that antisocial behavioural problems in childhood is a good predictor of later antisocial personality diagnosis in adulthood (Hill, 2003; Huesmann, Eron, Lefkowitz, & Walder, 1984; Moffitt, 2001; Robins, 1966; Sampson & Laud, 1990).

In exploring whether antisocial behaviour emerges in adulthood or is best explained as a developmental process that begins in childhood, several longitudinal studies have explored criminal offending spanning between childhood and adulthood (Farrington, Barnes, & Lambert, 1996; Moffitt & Caspi, 2001). In the Cambridge Study of Delinquent Development (Farrington, 1992), it was found that of the 441 who were followed in the study, almost 40% were convicted of at least one offence by the age of 32. However, of those who were convicted offenders, 6% were responsible for committing over half of all offences. Farrington (1992) also noted that those who were found to be chronic offenders were more likely to have begun committing offences at a young age.

Several researchers have examined the issue of antisocial behaviour that manifests itself in adolescence and subsides in early adulthood (adolescent limited) and antisocial behaviour that begins in childhood (life-course persistent) and persists throughout

adulthood as two distinct syndromes (Moffitt, 2001). Adolescent limited symptomatology is marked by more covert aggression than life-course persistent antisocial behaviour and is typically heavily influenced by peer interactions. Often these adolescents engage in “crime free” periods in the midst of their brief crime careers (Moffitt, 2001). On the other hand, chronic antisocial behaviour that persists across a person’s lifespan is marked by symptoms of impulsivity, attention deficit/hyperactivity symptoms (Loeber & Stouthamer-Loeber, 1998), neurological deficits, difficult temperaments (Moffitt & Caspi, 2001), and abnormalities evident in the corpus callosum (Raine, 2003). Several of these symptoms are evident in children who exhibit conduct disorder (Lynam, 1996).

The DSM-IV (APA, 1994) outlines the diagnostic criteria for conduct disorder (CD) in children. The two subtypes: childhood onset (symptoms present before age 10) and adolescent onset (no symptoms present before age 10) both share the symptoms required for diagnosis, such as a persistent pattern of violating rules and the rights of others, including being aggressive and destructive. In order for a child to be diagnosed with conduct disorder, he or she has to knowingly violate the rules with the intention of breaking them (Keenan & Wakschlag, 2002).

Since many researchers believe that psychopathy does not emerge in adulthood, but rather psychopathic tendencies can be identified in childhood and adolescence (Forth et al., 2003; Lynam, 1996, 1998; Seagrave & Grisso, 2002), The Hare Psychopathy Checklist: Youth Version (PCL:YV; Forth et al., 2003) was developed to assess features of this disorder in an adolescent population. This assessment tool was modified from its parent tool the PCL-R (Hare, 2003) to reflect the age appropriateness of the target population (Forth et al., 2003). The item descriptions of the PCL:YV take into account the behavioural

qualities of adolescent life and the restrictions this age group experience. As a result, the items place more emphasis on relations with peers, family, and school adjustment (Forth & Burke, 1998).

The relationship between youth who exhibit conduct disorder symptoms and psychopathy has been examined in several studies. Smith, Gacono, and Kaufman (1997) found that of 48 male adolescents with conduct disorder, 58% of those also classified as having high Psychopathy Checklist: Youth Version (PCL:YV) scores (29 or more), had a diagnosis of childhood onset CD. Those in the nonpsychopathic group (scores of 20 or less) were only found to have childhood onset CD in 10% of the cases. The authors found a prevalence rating for CD of 66%, 51%, and 21% for those assessed as high, medium, and low on the psychopathy ratings, respectively.

Lynam (1996) hypothesized that children who exhibit CD symptoms, as well as symptoms of attention deficit hyperactivity disorder (ADHD), engage in more antisocial behaviour as children and thus, are at the greatest risk of developing antisocial personality disorder or psychopathy as adults (Lynam, 1996, 1998). Children who exhibit symptoms of either CD or ADHD, but not both are not at as high a risk as those children who display symptoms of both disorders.

Loeber, Brinthaup, and Green (1990) examined 210 boys between the grades of 4 and 10 and classified the sample into four categories: ADHD and CD, ADHD only, CD only, and children without ADHD or CD. Loeber et al. (1990) found that those boys who had dual diagnosis of ADHD and CD were more likely to have (after 5 year follow-up) subsequent police contacts (54%), multiple offences (31% vs. 21% for CD only group), higher rate of offending (54% vs. 48% of CD group), higher self-reported delinquency

(62% vs. 21% for CD group), higher self-reported aggression (54% vs. 29% of CD group), and higher self-reported thefts (54% vs. 29% of CD group).

Lynam (1996) postulated that symptoms of CD and ADHD, specially impulsivity in children, could be identified as “fledgling psychopathy”, however his assertion into the manifestation of psychopathic tendencies in children only takes into account behavioural aspects of this disorder. In a recent article, Vincent, Vitacco, Grisso, and Corrado (2003) argued that the emphasis of past research on behavioural explanations of childhood chronic antisocial behaviour has ignored other factors that play a pivotal role in identifying those who exhibit symptoms of severe antisocial behaviour. Through a cluster analysis of 259 incarcerated youth, Vincent and colleagues (2003) identified four distinct juvenile subtypes on the basis of their affective, behavioural, and interpersonal features. Those youth who had the most severe and chronic antisocial behaviours were those who exhibited deficits in all three components. These findings suggest that the identification of youth who are high at risk for being identified as psychopathic adults needs to take into account all three dimensions of behaviour, interpersonal and affective features. By focusing on behavioural features only, Vincent et al. (2003) argue that a high rate of false positives would occur.

The relation between childhood behavioural disorders such as ODD, CD and ADHD with childhood psychopathy appears to mimic similar adult level disorders (Salekin et al., 2001). Forth (1995) found that youth offenders scoring high on the PCL:YV met the diagnostic criteria of CD, while only 30% of youth with CD were scored as having many psychopathic traits. This suggests that the two disorders, as with adult psychopathy and antisocial personality disorder, are two distinct but overlapping disorders and should not be used interchangeably (Forth & Burke, 1998).

The construct of psychopathy as measured by the PCL:YV (Forth et al., 2003) in adolescents has been structured around the premise that it measures four distinct components that best explain this disorder among juvenile populations. Utilizing an exploratory and confirmatory factor analysis, Forth et al. (2003) examined 505 incarcerated juvenile male offenders and a pooled sample of 1631 that comprised of both male and female offenders to examine the factor structure of the PCL:YV. These analyses revealed both a 3-Factor and a 4-Factor model that encompasses similar dimensions as outlined by the PCL-R in adult populations. The 3-Factor model incorporates affective, behavioural and interpersonal dimensions, whereas the 4-Factor model adds a fourth component, antisocial behaviour, and is believed to be a better fitting model in explaining the factors that distinguish juvenile psychopathic traits (Forth et al., 2003).

Factor 1 of the PCL:YV describes a set of symptoms that emphasize interpersonal relations with others, such as impression management, grandiose sense of self-worth, pathological lying, and manipulation. On the other hand, Factor 2 of this assessment tool stresses affective processes such as lack of remorse, shallow affect, callousness and lack of empathy, and the juvenile often exhibits a lack of accepting responsibility. Factor 3 describes more behavioural aspects of this construct, such as stimulation seeking, impulsivity, irresponsibility, parasitic orientation, and often the youth will lack goals regarding his or her future. The last factor (Factor 4) reflects more antisocial qualities exhibited by adolescents assessed as having psychopathic traits. These often include: serious criminal offending, violations of conditional release, poor anger control, early behavioural problems and versatility among criminal offences.

Several dimensions of behavioural problems have been examined in adolescents using the PCL:YV (Forth et al., 2003) or an 18-item modified PCL-R (Forth, Hart, & Hare, 1990; Hare, 1991) both in institutional and community samples. Forth et al. (1990) demonstrated that psychopathy scores highly correlated with symptoms of conduct disorder ($r = .64$), with age of first arrest ($r = -.25$), number of institutional charges for violent or aggressive behaviour ($r = .46$), and for violent recidivism ($r = .26$) among juvenile offenders.

In a study of adolescent sexual offenders, Gretton, McBride, Hare, O'Shaughnessy and Kumka (2001) measured the predictive validity of the PCL:YV. A sample of 220 male adolescent sex offenders (ages 12 to 18 years) were followed for an average of 55 months. Adolescents high on psychopathic traits were more likely to escape from the institution (44.8%) and to have more breaches of probation (69%) than were low-scoring adolescent offenders (0% and 16.3%, respectively). PCL:YV scores were correlated .25 with general recidivism and .19 with violent recidivism. Moreover, through survival analysis, Gretton and colleagues (2001) found that those who scored high on psychopathy recidivated significantly sooner following release for general and violent offences than did those who scored low on psychopathy.

Most research utilizing the PCL:YV (Forth et al., 2003) have examined its validity amongst incarcerated young offenders, with few studies on community or probation samples. In 2002, Kosson, Cyterski, Steuerwald, Neumann, and Walker-Matthews investigated the relationship between juvenile psychopathy and several correlates associated with adult psychopathy. Kosson and colleagues (2002) examined 115 male adolescents in the community who were either on probation or in a short-term detention

facility. Several measures on childhood psychopathology, interpersonal behaviour, parental attachment, and ethnicity were obtained to explore the possible associations with PCL:YV scores.

Kosson and colleagues (2002) reported a significant relation was found between psychopathy ratings and indices of criminal behaviour, including violent ($r = .27$) and non-violent offences ($r = .35$), participation in different types of illegal activity ($r = .45$), and a willingness to use weapons ($r = .34$). Furthermore, psychopathy scores were found to be significantly related with interpersonal abnormalities, such as a pervasive lack of attachment to family ($r = -.35$), which is similarly found in adult psychopathy. This study also failed to detect any differences between psychopathy and several construct validity measures between African American and Caucasian offenders. Although some adult studies suggest that differences between African American and Caucasian offenders exist in regards to certain aspects of psychopathy (Lorenz & Newman, 2002b), Kosson et al.'s (2002) study raises doubt that this difference exists among adolescents.

The application of the PCL:YV (Forth et al., 2003) is both time consuming and requires considerable training to ensure accurate scoring of the measure (Forth et al., 2003). As such, several new instruments have been developed that use self report measures and a brief collateral report as an index of childhood psychopathy. One such measure, the Antisocial Process Screening Device (APSD, Frick & Hare, 2001, previously known as the Psychopathy Screening Device [PSD]), provides a screening measure of who might further warrant more intensive assessment (Murrie & Cornell, 2002).

The APSD was developed by Frick and Hare (2001) from Hare's PCL-R (1991) to be used as a measure of psychopathic traits in children. This assessment tool was designed

to be completed by parents or teachers and is structured similar to the PCL:YV (Forth et al., 2003) in that items are scored on a 3-point scale with 0 (not true), 1 (sometimes true) and 2 (definitely true) yielding a score range of 0 to 40. The APSD examines the dimensions of the PCL-R with the exception of those not relevant to children and adolescents (i.e., irresponsible behaviour as a parent and multiple marriages). Similar to the PCL-R, the APSD has been noted to have two distinct factors that measure callous/unemotional (CU) traits (factor 1), such as lack of guilt, absence of empathy and emotional poverty. The second factor, impulsivity/conduct problems (I/CP) reflects more antisocial behaviour such as poor impulse control and susceptibility to boredom. This scale although typically administered via parent or teacher ratings, has been administered to adolescents as a self-report measure (Caputo, Frick, & Brodsky, 1999).

In a comparison study, Murrie and Cornell (2002) examined the construct validity of several measures of juvenile psychopathy, including the PCL:YV (Forth et al., 2003), the APSD self report scale (Frick & Hare, 2001), the APSD staff rating scale (Frick & Hare, 2001), and the Psychopathy Content Scale (Murrie & Cornell, 2000). Utilizing a discriminant function analysis, ratings of psychopathy established by the measures were used to predict scores of 25 or more on the PCL:YV. The analysis revealed that the measures accurately classified 67% to 77% of the sample, however Kappa coefficients did not reveal accurate prediction much beyond chance (.02-.36). When APSD staff ratings and Psychopathy Content Scale scores were combined, 82% of cases were accurately identified, with a Kappa coefficient of .55. Correlational analyses revealed that several items on the two APSD scales correlated significantly with PCL:YV counterparts, but this was not the case for every item. This suggests that the different measures examined by Murrie and

Cornell (2002) do not adequately assess the same factors underlying psychopathy as does the PCL:YV. Furthermore, the APSD self report and APSD staff ratings yielded a correlation of .04, indicating that self-report measures may not be appropriate given the target population (Murrie & Cornell, 2002).

The belief that psychopathy does not emerge in adulthood (Lynam, 1996) but rather, symptoms can be identified in early childhood had led to the examination of several correlates of psychopathic tendencies in children and adolescents. The work of several researchers (Forth et al., 2003; Frick & Hare, 2001) is greatly influencing the landscape of juvenile psychopathy and advancing the notion that this disorder shows behavioural and affective dimensions that can be identified earlier than adulthood. The implications of these assessment tools are numerous and will no doubt greatly impact the treatment services available for this age sample.

Emotional Processing and Psychopathy

Most clinical accounts of psychopathy describe difficulties in the processing and experiencing emotional material (Cleckley, 1976; Hare, 1998). In his clinical description of this disorder, Cleckley (1976) outlined 16 core features that define the construct of psychopathy, with four of these features pertaining to the emotional function of the psychopath, such as: absence of remorse or shame, pathologic egocentricity and inability to love, general poverty to major affective reactions, and an absence to feel nervousness. As a manifestation of these features, the psychopath is unable to appreciate many of life's experiences in the true sense (Steuerwald & Kosson, 2000).

Early research within this field examined classical and instrumental conditioning in its relation to psychopathy and the role passive avoidance learning has on fear and anxiety

among those with psychopathic traits. Lykken (1957) was very influential in this context as he found that psychopaths showed a deficit in acquiring conditioned fear responses and avoidant punishments in a passive avoidance-learning paradigm. This finding has led to numerous investigations in regards to electrodermal conditioning (Hare, 1998).

Researchers have found that psychopaths show abnormal electrodermal responses when examined for a conditioned fear response (Hare, 1978, 1998, Lykken, 1995; Newman & Wallace, 1993), which led Hare (1998) to postulate that these findings imply that psychopaths show little fear in anticipation of an unpleasant or painful event.

Schmauk (1970) examined passive avoidance learning among psychopathic and nonpsychopathic offenders in which three methods of punishment were utilized. Schmauk (1970) administered either an electric shock, saying the word “wrong”, or subtracting 25 cents from a eight dollar purse in accordance with an incorrect response. Schmauk (1970) found that psychopaths did not show any avoidance learning while in the electric shock or verbal warning conditions, whereas the nonpsychopathic group differed significantly from psychopaths in these conditions. For the monetary loss punishment, no group differences were noted, suggesting that loss of monetary reward was salient enough to inhibit a behavioural response among psychopaths.

Blair, Jones, Clark and Smith (1997) conducted a study in which psychopaths ($n = 18$) and nonpsychopaths ($n = 18$) were examined to see if group differences would be observed on skin conductance response after viewing threatening, distressful or neutral slides. Blair and colleagues (1997) found no significant group differences for neutral pictures, but that skin conductance responses differed between the two groups for the emotional slides. Nonpsychopaths showed equal and large responses to both threatening

and distressing pictures, whereas the psychopaths only displayed a large response when viewing threatening pictures. The response to the distressing pictures was small for the psychopathic group suggesting less emotional arousal occurs when psychopaths encounter distressing stimuli (Blair et al., 1997).

Studies examining emotional processing through the paradigm of classical or instrumental conditioning have revealed that psychopaths appear to have a deficiency associated with passive avoidance learning (Lykken, 1995). This reflects an inability on the part of the psychopath to process relevant material and understand it in an appropriate emotional context. These studies suggest that psychopaths have less arousal to situations that typically evoke an emotional response in nonpsychopathic individuals (Blair et al., 1999; Schmauk, 1970).

Language, Affect and Psychopathy

Cleckley (1976) noted that psychopaths often display a form of semantic aphasia referring to the notion that although they may understand a word or short phrase, the underlying significance of the word or phrase often escapes them. Cleckley (1976) also likened this description to emotional poverty of the psychopath. The assertion that psychopaths are deficient in understanding the linguistic features of emotionality was first examined by Williamson et al. (1991). Through the use of a lexical decision task ("Is this a word or not?"), Williamson et al. (1991) investigated whether psychopaths would identify words that were positive, negative or neutral differently than nonpsychopaths. Based upon Cleckley's (1976) theory that psychopaths are deficient in emotional processing, the authors hypothesized that psychopaths would show less differentiation between neutral and emotional words by measuring accuracy, reaction times, and event-related brain potentials.

Williamson et al. (1991) found that psychopaths do show less behavioural and electrocortical differentiation between affective and neutral words. Nonpsychopathic offenders responded significantly faster to emotional words than to neutral words. This finding was not evident in the psychopathic group. This suggests that psychopaths do not attend to the affective qualities in language in the same manner as do nonpsychopaths.

Lorenz and Newman (2002a) examined 74 Caucasian male offenders (37 high anxious: 17 psychopaths and 20 controls; 37 low anxious: 11 psychopaths and 26 controls) on a lexical decision task. The task had four experimental blocks of positive, negative, neutral and non-words presented on a computer screen for 100 ms. The offenders were instructed to indicate as quickly as possible whether the stimulus presented was a word or a non-word.

Using emotional facilitation as the dependent variable for this task (mean reaction time for neutral words minus mean reaction time for emotional words for correct responses), low anxious psychopaths had significantly less facilitation than did the low anxious nonpsychopathic controls. Furthermore, regardless of anxiety level, nonpsychopaths displayed greater facilitation than psychopaths when they responded with their right hand. When responses were provided with their left hand, no significant differences were noted between psychopaths and nonpsychopaths. The findings of this study suggest that psychopaths have an emotional deficit pertaining to activities that stimulate the left hemisphere.

Lorenz and Newman (2002b) further examined affective processing via a lexical decision task with a sample of 94 African American male offenders. Utilizing the same procedure as described above, the findings of this examination revealed that African

American offenders do not show the same pattern of responding as do Caucasian offenders. There were no group differences on emotional facilitation for this task, suggesting that the emotional performance deficits observed in Lorenz and Newman (2002a) do not generalize to this ethnic population.

The proposition that psychopaths are deficient in certain areas of semantic processing lead researchers to examine whether psychopaths would also be different processing abstract and concrete words as seen in previous studies (Lorenz & Newman, 2002a, 2002b; Williamson et al., 1991). Based on the premise that psychopaths have difficulty comprehending conceptually abstract information (Williamson, 1991), Kiehl, Hare, MacDonald, and Brink (1999) examined 29 male inmates to determine if such a relationship would be noted between psychopathy and abnormal emotional processing or on level of abstractness.

Kiehl and colleagues (1999) divided the sample into two groups based on their PCL-R (Hare, 1991) scores: psychopaths (PCL-R score of 30 or above, $n = 8$) and nonpsychopaths (PCL-R score of 20 or below, $n = 9$) and administered a lexical decision task that consisted of 50 abstract and 50 concrete words and corresponding non-words. Dependent measures were reaction times and event-related brain potentials (ERPs). All participants responded faster and more accurately to concrete words. However, psychopaths showed greater ERP negativity over frontal and central sites than did nonpsychopaths at 300-400 ms. In the 400-800 ms window, nonpsychopaths, but not psychopaths demonstrated ERP differences between concrete and abstract words, with larger negative components over frontal, central, and parietal sites, which corresponds to the findings reported in Williamson et al. (1991). Psychopaths on the other hand, showed

large centrofrontal negative potential and failed to demonstrate any differentiation between concrete and abstract words. The findings of this study indicate that psychopaths have difficulty processing abstract information. Furthermore, the differences noted on ERPs for both groups suggest that psychopaths differ from controls in the manner in which they process such information (Kiehl et al., 1999).

Recently, Loney, Frick, Clements, Ellis, and Kerlin (2003) administered the lexical decision task described by Williamson et al. (1991) to 60 adolescent offenders. The youth completed the self-report version of the APSD (Frick & Hare, 2001). The association between callous-unemotional (CU) traits and impulsivity (measured by the APSD Impulsivity-Conduct Problems and ADHD impulsivity symptoms as measured by the Youth Inventory-4) with the measure of response time facilitation was investigated. Utilizing a multiple regression approach, the results revealed that the abnormal processing effects found among adult psychopaths are generalizable to adolescents. Young offenders who scored high on having callous-unemotional traits differed significantly from other young offenders with antisocial behaviour problems on how they processed affective stimuli. Similar to adult psychopaths, adolescents high on CU traits demonstrated a deficit in emotional facilitation to emotional words, however this finding was only noted for negative words. This may suggest that this deficit is specific only to aversive stimuli (Loney et al., 2003).

Cleckley (1976) speculated that psychopaths' ability to process language differed from normals in that psychopaths display inconsistencies in semantic and affective components of language. In line with Cleckley's (1976) descriptions of psychopathic characteristics, many researchers have investigated the neurological component in people's

ability to process linguistic material, as well as emotional stimuli (Hare & Jutai, 1988; Kosson, 1998; Mayer & Kosson, 2000) by examining hemispheric lateralization. It has been shown that emotional processing is mediated primarily in the right cerebral hemisphere in humans (Blonder, Burns, & Bowers, 1993). More specifically, researchers have found that the right hemisphere primarily processes negative/unpleasant emotions whereas positive/pleasant emotional stimuli are mediated by the left hemispheric response (Sacheim et al., 1982).

By presenting a divided visual field procedure to participants, Hare and Jutai (1988) examined the processing abilities of a sample of participants who were either criminals or noncriminal controls on a task of semantic processing. In the criminal sample, the offenders were divided into three groups based on their PCL (Hare, 1985) scores: high ($n = 13$), medium ($n = 13$), and low ($n = 13$), whereas the noncriminal community subsample also consisted of 13 participants.

The participants were instructed to identify if the stimuli presented via a tachistoscope was presented in either the right or left visual field that matched either a pre-trial target, was an example of a specific target, or belonging to an abstract category (performed as three separate trials). The results indicated that for the abstract condition, low psychopathic offenders and noncriminal controls made significantly less errors when the stimuli were presented to their right visual field than when they were presented to the left visual field. This finding, however, was opposite amongst high psychopathic offenders, suggesting that psychopaths may have a deficit in language processing due to hemispheric asymmetry abnormalities (Hare & Jutai, 1988).

The examination into the semantic processing abilities of psychopaths has virtually all been conducted on incarcerated male offenders. Although researchers are beginning to explore the affective processes associated with linguistic stimuli, much work has yet to be done. Through Cleckley's (1976) assertion of a semantic aphasia on the part of the psychopath and as Johns and Quay (1962) noted that psychopaths "know the words but not the music" (p. 217), the contention that psychopaths have this deficit has profound implications on our understanding of this disorder, as well as, for treatment options that can address this anomaly. Through the use of new protocols, such as functional magnetic imaging (fMRI), more information regarding how key cortical structures play a key role in affective processing may soon be better understood (Hare, 1998).

Non-Linguistic Emotional Processing and Psychopathy

Recently, in the attempt to explain neurocognitive processes associated with fear and empathy, Blair and colleagues (Blair & Frith, 2000) hypothesized that animals will terminate aggressive actions when their opponent offers submission. They used the term Violence Inhibition Mechanism (VIM) for this model and have argued that humans have evolved to use sadness expressions as a sign of submission. It is believed, through this model, that this mechanism plays a key role whenever distress cues, namely sad and fearful expression of others, are displayed. This produces an autonomic response, such as within the threat response system, which typically causes the person to freeze (Blair, Colledge, Murray, & Mitchell, 2001).

Further, Blair et al. (2001) argued that through VIM, a person becomes morally socialized as a consequence of the pairing of the activation of this mechanism with acts that represent distress or moral transgressions (Blair, 1995). Blair (1995) hypothesized that

children normally develop to find the pain of others aversive, and later the thought of pain in others aversive. It is this deficit in classical conditioning learning that Blair postulates is deficient in psychopaths (Blair et al., 2001).

A consequence of an activation in the VIM system, according to Blair (1995), is arousal. Moreover, feelings of guilt, empathy, sympathy, and remorse are thought of as cognitive interpretations to this state of arousal. Therefore, according to this model, since psychopaths show abnormalities in their development of moral emotions, this model predicts that psychopaths would not feel these types of emotions. Blair and colleagues (1995) compared psychopaths to nonpsychopaths, as assessed with the PCL-R, on ratings of emotional stories to determine if the two groups would similarly attribute emotional states depicting happiness, sadness, embarrassment, and guilt. The participants were read several stories each describing an emotional state and asked the participants what the protagonist would feel given the situation. The only story in which a significant difference found between psychopaths and nonpsychopaths was in the story representing guilt. The controls in this study most frequently attributed the correct emotional context to this story. However, psychopaths most frequently attributed a state of indifference or a positive emotive state to this story. The authors of this study suggested that psychopaths do not have a global deficiency for emotion. Rather it was implied that psychopaths, in certain emotional situations such as ones that elicit guilt, show a deficiency in their ability to process such a situation. Since this study used only a very narrow range of situations, further studies are required to determine if such a deficit would be found in other situations (Blair et al., 1995).

In order to explore if emotional processing abnormalities are found outside the linguistic domain, Blair and colleagues (2002) investigated responsiveness to vocal expressions of five different intonations: happy, disgust, anger, fear and sadness. Blair et al.'s (2002) study comprised of adult male psychopathic offenders ($n = 19$) and nonpsychopathic offenders ($n = 20$). Offenders listened to words in each affective tone that were spoken either by a female or male voice and they were instructed to determine the emotional state the speaker was feeling when the word was spoken.

Psychopaths performed significantly poorer than nonpsychopaths on identifying the correct emotional tone depicted by the speaker in that they made significantly more errors overall in recognizing emotional expressions. Moreover, psychopaths were significantly more deficient in identifying fearful intonations. This provides support for the hypothesis that emotional processing deficits are not confined to the linguistic domain (Blair et al., 2002).

In a facial recognition task (Kosson, Suchy, Mayer, & Libby, 2002), psychopathic ($n = 34$) and nonpsychopathic male offenders ($n = 33$) were compared to determine if differences depicting emotional expression recognition would be found between the two groups. Pictures of either a male or female portraying one of six emotional expressions (happy, sad, angry, afraid, surprised, or disgust) were shown to the offenders who were asked to correctly identify the emotion being displayed. Half of the participants were asked to select the correct response with their left hand, while the other half was instructed to use their right hand to respond.

Kosson et al. (2002) found that psychopaths differed significantly from nonpsychopaths on correct responses to emotional expression. It was found that

psychopaths performed more poorly when classifying faces depicting disgust than did nonpsychopaths. The other emotional expressions did not reveal significant differences between psychopaths and nonpsychopaths. Further, Kosson and colleagues (2002) found that for left handed responses psychopaths performed more poorly than nonpsychopaths, whereas no significant group differences were found when offenders responded with their right hand. Contrary to their hypothesis, psychopaths classified expressions of anger more accurately when responding with their right hand than did nonpsychopaths.

Psychopaths in Kosson et al.'s (2002) study showed a deficiency in recognizing facial expressions when the task was designed to rely more on right hemisphere activation. This suggests that psychopath's poor performance in processing nonverbal emotional expressions may be a result of dysfunctional right hemisphere structures, or a deficiency in hemisphere asymmetry that allows for normal affective processing.

In an examination of the relation between psychopathy and emotional deficits, Blair and colleagues (2001) explored this among children. Two groups were compared, the psychopathic tendencies group ($n = 20$) and a comparison group ($n = 31$) that were selected based upon their scores on the APSD (Frick & Hare, 2001). The children were given an emotional expression multimorph task that consisted of six emotional expressions (happiness, surprise, fear, sadness, disgust, and anger). Each emotional expression consisted of 21 pictures that were morphed together to produce a continuum of expression, from 0% expression (neutral face) to 100% expression (emotional face) in 20 5% increment stages. The children were instructed to identify the emotional expression being depicted as soon as they recognized what it was. The children were scored based upon the number of stages presented before the correct expression was identified. In line with past research,

psychopathic children showed recognition impairment and made significantly more errors when classifying fearful expressions than the comparison group. Moreover, children with psychopathic tendencies took significantly longer (viewed more stages) to identify pictures depicting sad expressions than did the comparison group.

Day and Wong (1996) assessed 20 adult male psychopaths and compared this group with 20 male nonpsychopaths to determine if differences would be observed when participants were presented with negative emotional material. The authors examined if psychopaths would rely less on connotative emotional processes (localized on right hemisphere) and more on denotative-linguistic processes (localized on left hemisphere) than nonpsychopaths. Day and Wong (1996) presented words and pictures via a tachistoscope and measured accuracy and reaction time of responses to which visual field the stimuli were presented.

The findings of Day and Wong's (1996) study revealed that nonpsychopaths were more accurate and responded faster in processing negative words when presented in the left visual field than in the right visual field. This finding was not evident in the psychopathy group as they focused equally to both visual fields. However, these results were only found when emotional words were presented, not emotional faces. This suggests, as Cleckley (1976) postulated, that the emotional deficit may be restricted to the linguistic domain.

Levenston, Patrick, Bradley and Lang (2002) examined affect-startle modulation in adult male psychopathic ($n = 18$) and nonpsychopathic incarcerated individuals ($n = 18$) and found that psychopathic participants exhibited abnormal startle response when compared with nonpsychopathic participants when viewing pleasant and unpleasant pictures. Psychopaths showed a blink inhibition when presented with both pleasant and

unpleasant stimuli in comparison with neutral stimuli. This finding was particularly evident when psychopaths were shown pictures depicting victimization. The authors suggested that psychopaths exhibit abnormal responses to emotional material, such that they do not display empathy and the authors even suggested that psychopaths may show pleasure in response to the distress of others (Levenston et al., 2002).

Similar to the findings of Levenston and colleagues (2002), Sutton, Vitale and Newman (2002) extended this line of research of emotional processing deficits to female offenders. Using the PCL-R (Hare, 1991), the researchers compared women who scored high on psychopathy to those who scored low on psychopathic traits (thus deemed nonpsychopathic) on the startle-blink method. Women who were assessed as psychopaths displayed an abnormal startle response to unpleasant pictures significantly more so than did nonpsychopathic women. These findings were more prominent in psychopaths who were also assessed to have low anxiety levels. These results suggest that both men and women with psychopathy will typically exhibit an abnormal startle response to emotional stimuli. This deficit was only found in the initial 2.0 second probe, but diminished at the 4.5 second probe. The authors postulated that psychopaths show a deficiency in initially recognizing emotional stimuli, but given time, they may show an appropriate response (Sutton et al., 2002).

Intrator, Hare and Stritzke (1997) found through a study conducted using single photon emission computerized tomography (SPECT) that psychopaths show increased blood flow in subcortical regions than do nonpsychopaths during the processing of emotional words. This may mean that because psychopaths are deficient in emotional processing, they may need to put more effort into processing this task than nonpsychopaths.

Schneider, Habel, Kessler, Posse, Grodd, and Mueller-Gaertner (2000) found increased activity in the dorsolateral prefrontal cortex and the amygdala during a conditioning task where psychopaths were responding to conditional emotional neutral facial stimuli that were previously paired with an aversive odour.

Studies to date have revealed that the abnormalities pertaining to affective processes seen in psychopaths are not only limited to the linguistic domain, as Cleckley (1976) postulated, but that psychopaths also demonstrate a more global affective processing anomaly in their ability to depict facial expressions of emotion, such as disgust (Kosson et al., 2002) and to respond to negatively valenced pictures (Levenston et al., 2002). This provides support that psychopaths have a global deficit in emotional processing that affects several affective dimensions. These findings provide further evidence that our understanding of the affective qualities that govern a psychopath's existence is not limited to one domain and as such, researchers and clinicians should not focus on one type of affective processing when applying treatment options for psychopaths.

Psychopathy and Affective Deficit Theories

In the attempt to understand why certain individuals develop traits associated with psychopathic personality, several researchers have developed cognitive based theories to explain its development (Eysenck, 1977; Gray 1982, Hare, 1993; Lykken, 1995; Newman & Lorenz, 2003). Some researchers postulate that psychopathy develops due to the breakdown in the socialization process during childhood (Lykken, 1995), while others believe that psychopathy results from a malfunction in the brain's ability to control impulsivity (Heilburn, 1979). However the foundation of this study concerns itself on the basis of two theories regarding why psychopathy is believed to develop: Gray's (1982)

theory of behavioural inhibition and Gorenstein and Newman's (1980) theory of response modulation. Each theory will be discussed in detail and links will be made to the present study regarding the relation between psychopathy and emotional processing and how these relations correspond with contemporary assessments of emotional processing in adolescents with psychopathic traits.

Gray's (1982) theory regarding emotional behaviour is based on three biological systems: the fight-or-flight system that controls responses to unconditioned punishment or nonreward; the behavioural inhibition system (BIS) that responds to stimuli that signal unconditioned aversive events; and the behavioural activation system (BAS) that organizes behaviour in response to stimuli that signals unconditioned reward or nonpunishment.

Within the behavioural inhibition system, a high expectation of danger typically results in an avoidance behavioural response. Moreover, when an individual is faced with a stimulus that elicits a high expectation of danger, anxiety is produced. This activates the BIS system and through risk assessment, the person typically engages in behaviour so that anxiety is reduced. Typical aversive stimuli include signals of punishment, frustration, novelty items, and threatening events (Gray & McNaughton, 2000).

Lykken (1995) discussed Gray's theory and postulated that psychopathy may be understood as a consequence of a weakened behavioural inhibition system. When an individual experiences a deficient BIS system, he or she does not experience anxiety or fear in a normal manner. A weak BIS corresponds to a weak inhibition of behaviour to stimuli that is seen as a punishment or nonreward. Lykken (1995) also suggested that individuals who have a weakened BIS typically engage in active avoidance, either through lying or assaulting the source of the threat, which are behaviours characteristically associated with

psychopathic individuals. Moreover, as a result of this weakened system, more impulsive behaviours are likely to occur. In unstressful situations, a psychopath will likely be underaroused, easily bored, and as a result will seek out a more stimulating environment (Lykken, 1995).

In a study to measure behavioural inhibition, as per Gray's (1982) conceptualization, Newman, Wallace, Schmitt and Arnett (1997) compared psychopathic and nonpsychopathic offenders on responsiveness to cues for punishment. Participants were further divided into low and high anxious based upon their scores on the Welsh Anxiety Scale (WAS; Welsh, 1956). The offenders consisted 11 low anxious controls, 13 high anxious controls, 15 low anxious psychopaths and 9 high anxious psychopaths.

Newman and colleagues (1997) administered a task where participants completed a pre-treatment phase that enabled them to inhibit a behavioural pattern (button press) when a particular stimulus was present (letter "Q") so to avoid punishment. Then the offender performed a visual task in which the "Q" is irrelevant, such that a string of four letters or 3 letters and one number were presented on the computer screen. In half of the trials, the letter "Q" would be present in the letter string. The offenders were instructed to press the right hand button if all letters were present, but if one character in the string was a number, to not press any button. Participants were told that depending on how fast their responses were, they would receive a monetary reward.

The findings of this study revealed that high anxious psychopaths demonstrate stronger inhibition than low anxious controls. Contrary to their hypothesis, low anxious psychopaths and controls did not differ in regards to behavioural inhibition, in fact, both responded with relatively low levels of behavioural inhibition (Newman et al., 1997). In an

earlier study, Patterson and Newman (1993) proposed that the findings as obtained by Newman and colleagues (1997) might be explained as an ineptness at response modulation on the part of low anxious psychopaths, suggesting that these individuals are less likely to suspend reward seeking behaviour in order to process peripheral but potentially relevant information, such as cues for punishment.

Roussy and Toupin (2000) examined juveniles who were assessed as having psychopathic traits ($n = 25$) on several tasks that are believed to be measuring behavioural inhibition, such as the “go/no go” task and the “stopping” task. In comparison to nonpsychopathic juveniles ($n = 29$), the youth with psychopathic traits in this study exhibited a significant impairment on the behavioural inhibition tasks (Roussy & Toupin, 2000). Similar to the findings of the response modulation in the affective startle tasks (Levenston et al., 2000; Sutton et al., 2002), the results of this study support Gray’s theory that psychopaths are deficient when it comes to avoidance behaviours. Similar findings to Roussy and Toupin’s (2000) behavioural inhibition deficit in psychopaths were obtained by Newman et al. (1997) who also found psychopaths displayed less behavioural inhibition than nonpsychopaths on a go/no go task.

In response to Cleckley’s (1976) views on emotional processing, the theory that psychopaths are deficient in response modulation was postulated (Gorenstein & Newman, 1980). Response modulation refers to the ability to delay a dominant response when faced with an unexpected or neutral stimulus. This system, believed to be regulated by the limbic system, helps individuals to control behavioural responses in the face of novel stimuli (Newman, 1997). Therefore, when there is a deficit in the response modulation process, an individual does not inhibit maladaptive responses, is likely to not use contextual cues and is

instead solely focused on his/her goal-focused behaviour (Wallace, Vitale, & Newman, 1999). Furthermore, researchers have been able to show that response modulation deficits occur when people are faced with emotionally significant cues (Wallace, Bachorowski, & Newman, 1991; Wallace & Newman, 1997).

Newman and Lorenz (2003) believe that individuals who have deficient response modulation abilities are unable to process contextual cues in a normal manner. For example, they are unable to process unexpected or peripheral information that goes against their dominant response set (Newman, Schmitt, & Voss, 1997), are unable to learn from past experiences, and have an inability to control their cognitive processes to refine their responses (Newman & Lorenz, 2003). As a result, this diminished response modulation would greatly impact the emotional processing of an individual so that he/she is unable to take emotional contextual cues and process them in a manner that achieves socially appropriate self-regulation. These individuals would consider fewer factors associated with a given situation and would thus respond in a more goal-oriented manner instead of a more appropriate behavioural response from someone exhibiting appropriate response modulation. When a person's response modulation system is abnormal, the resulting behaviours show a relatively automatic expression of unchecked behavioural patterns (Wallace & Newman, 1997).

Newman, Patterson, and Kosson (1987) examined the response modulation hypothesis by using a behavioural inhibition task to psychopaths. In this study, offenders were provided with 100 playing cards, which were displayed on a computer monitor so that reward and punishment response set could be established. Initially, the odds of receiving a reward was high so that a dominant response set to reward would be achieved. However,

the odds of receiving a reward steadily declined after each block of 10 cards until the likelihood of reward decreased to zero. Using three feedback conditions (immediate, a cumulative display of all cards, and a 5-second delay after each response), the researchers measured how many cards the offender would play before he would stop playing.

The findings revealed that psychopaths played significantly more cards and lost more money when compared with nonpsychopathic controls in the condition of immediate feedback. In the cumulative display feedback condition, psychopaths again played more cards than did controls. In the 5-second delay feedback condition, psychopaths did not significantly differ from controls (Newman et al., 1987).

Although there are several theoretical constructs that address emotional deficits in psychopathic individuals, it remains unclear how these truly explain the abnormality exhibited by psychopaths. Both theories outlined in this literature review: Gray's (1982) behavioural inhibition theory and Gorenstein and Newman's (1981) response modulation hypothesis reflect an abnormal responding to negative emotionality on the part of the psychopath. However, neither of these theories have been directly addressed in relation to emotional processing within an adolescent population. This current study will attempt to link the theoretical constructs, as outlined by Gray (1982) and Gorenstein and Newman (1980), within a juvenile sample to see if such an examination will help clarify the literature within these theoretical frameworks.

The Current Study

Abnormal emotional processing has been shown to be a hallmark of psychopathy (Hare, 2003), therefore this study examined adolescents on different emotional valences (positive, neutral, negative) and domains (verbal and nonverbal) to explore the emotional

processing abilities of psychopathic and nonpsychopathic juveniles. Juvenile offenders were assessed as either low or high on psychopathic traits, as assessed by the PCL: YV (Forth et al., 2003) which has been shown to be a reliable and valid measure of psychopathy in juvenile offender samples (Forth et al., 2003). The young offenders were each administered three tasks that were designed to assess emotional processing abilities: a lexical decision task, an affective matching task, and a picture-word stroop task. Group differences on these tasks were explored.

Based on the findings of past studies examining the responses of participants on a lexical decision task (Kiehl et al., 1999; Lorenz & Newman, 2002a, 2002b; Williamson et al., 1991), this study expected to replicate the findings that psychopathic youth would show less emotional facilitation than youth who scored low on psychopathic traits. Youth with psychopathic traits were expected to not show any differentiation between emotional and neutral words, whereas nonpsychopaths were expected to have faster reaction times to emotional words than to neutral words. Furthermore, given Hare's (1998) contention that psychopaths' emotional deficiency may be a result from "anomalies in the integration of activities within and between hemispheres" (p. 124), and that as language tasks increase in complexity, nonpsychopaths rely more on left-hemisphere processing and psychopaths rely more on right hemisphere processing, comparisons between left and right handed responses on this task was conducted. Therefore, it was expected that nonpsychopaths would show greater emotional facilitation when responding with their right hand. No differences between psychopaths and nonpsychopaths were expected on emotional facilitation when the left hand was used for this task.

Based on the findings of Kiehl and colleagues (1999) that adult psychopaths showed ERP waveform differences from adult nonpsychopaths when responding to concrete and abstract words, adolescents were examined to determine if behavioural differences would be observed on reaction time and accuracy. Although no group differences were found in the Kiehl et al. (1999) study between low and high scoring psychopaths, this study had a low sample size and therefore inadequate power may have lead to the non-significant findings on reaction time for this sample. It was expected in this study that young offenders who scored high on psychopathic traits would respond significantly faster to concrete words than to abstract words, whereas this response facilitation was not expected to be as large for those who scored low on having psychopathic traits.

The second task that was administered to participants was an affective matching task that required participants to either match pictures based on similar valence ratings (pleasant-pleasant or unpleasant-unpleasant) or to an incongruent rating (unpleasant-pleasant or pleasant-unpleasant) with accuracy and reaction times measured for each event. Based on Gray's theory of behavioural inhibition, it was expected that adolescents assessed as having high psychopathic traits would show slower reaction times and more incorrect responses than adolescents with low psychopathic traits. It was also expected that those high on psychopathy would be significantly less accurate and have longer reaction times on the incongruent trial as compared with the congruent trial.

The final task, a picture-word emotional stroop task (Rosinski, Golinkoff, & Kukish, 1975) had participants naming pictures while trying to ignore superimposed incongruent words or nonwords. Based on Newman and Lorenz's (2003) response

modulation hypothesis that psychopaths are deficient in processing peripheral information and self-regulation when they are engaged in goal-directed behaviour, it was expected that high psychopathic adolescents would not show an interference effect (slower reaction time and more incorrect responses) when confronted with irrelevant peripheral stimuli. This effect was not expected for low psychopathic offenders as Schmitt and Newman (1999) found that nonpsychopathic and a normative control sample had significant impairment when trying to ignore the incongruent words.

Method

Participants

Participants were 45 male young offenders who were serving a sentence for a criminal offence or on remand status awaiting trial or sentencing at one of three young offender institutions in Ontario. No compensation was provided to young offenders who volunteered for this study. Ten participants were assessed for psychopathy but prior to completing the affective tasks were released from custody and two young offenders were excluded based on their inability to read English. The mean age of the participants was 17.13 ($SD = .84$) years and the ethnic composition of the sample was as follows: Caucasian 62.2% ($n = 28$), African Canadian 20% ($n = 9$), Aboriginal 13.3% ($n = 6$), Hispanic 2.2% ($n = 1$), and other 2.2% ($n = 1$) (see Table 2 for descriptive statistics). There is no recommended categorical cut-off for psychopathy in youth (Forth et al., 2003), therefore this study used for the cut-off designation between high and low, those who scored one standard deviation above the mean on the PCL:YV total scores (≥ 28) for the high group, while those in the low group consisted of those who scored below 17 on their total PCL:YV scores. The groups were classified into high and low groups to reflect the extreme ends of

the PCL:YV scale. This is consistent with past research which has examined psychopathic traits in relation to emotional processing abilities (Lorenz & Newman, 2002a; Williamson et al., 1991). All analyses in this study were based on comparisons between these two groups.

Measures

Handedness. The Chapman Handedness Scale (Chapman & Chapman, 1987) is a 13-item assessment tool that asks participants to identify which hand they use for various tasks, such as: to write, throw a snowball, use a hammer, or use scissors. For each item, the participant checked off either left, right or use both equally. For items in which the participant responded as right handed, a score of 1 was assigned, items that are coded as use of either hand was assigned a score of 2, and for left handed responses, a score of 3 was given. The scores were then totalled to provide an overall handedness score (13 to 17 right handed, 18 to 32 was ambilateral, and 33 to 39 left handed). Chapman and Chapman (1987) report high internal consistency with this scale and high correlations between the scale and behavioural measures (see Appendix E).

Psychopathy. The PCL:YV (Forth et al., 2003) was developed from the Hare Psychopathy Checklist – Revised (Hare, 1991) and uses the same methodology to assess psychopathic traits in adolescents. Information was gathered using a semi-structured interview and collateral file review format. Raters assigned a participant a scores of 0 (definitely does not apply), 1 (somewhat applies) or 2 (definitely applies) for the 20 items that comprise the scale. The scores were then totalled to provide an overall psychopathy score.

Similar to the PCL-R (Hare, 2003) the PCL:YV assesses interpersonal, affective, behavioural and antisocial behaviour to provide a composite assessment of psychopathic traits. Studies in which the PCL:YV has been used has revealed high inter-rater reliability scores, as well as high internal consistency ($\alpha = .85$ to $.94$) for both institutional and community samples. This scale has also been demonstrated to have adequate concurrent validity (Forth et al., 2003; Skeem & Cauffman, 2003). In comparison with a 20-item parent and teacher rating scale of the Antisocial Process Screening Device (APSD; Frick & Hare, 2001) with the PCL:YV, scores on both measures have been reported to correlate at $.35$ when file ratings of the PCL:YV were obtained and $.53$ when interview and file information was gathered. Gretton et al. (2003) found that PCL:YV total scores correlated moderately with number of conduct disorder symptoms (see Table 1 for Factor items).

Lexical Decision. The stimuli material consisted of 48 word pairs for the positive/negative condition and 24 word pairs for the concrete/abstract condition. For the positive/negative condition, 24 positive words, 24 negative words, 48 neutral words, and 96 corresponding nonwords that were grouped into 8 experimental blocks. Each block consisted of 3 positive, 3 negative, 6 neutral, and 12 nonwords. For the concrete/abstract condition, 6 concrete, 6 abstract and 12 nonwords were used. Four experimental blocks were constructed and the two conditions were counterbalanced to control for order effects. Half of the words used in this task were selected from Rubin and Friendly's (1986) word list, in which positive and negative words differed from neutral words on emotionality and positive, negative, and neutral words differed significantly from each other on goodness. The words were matched on frequency, pronouncability and concreteness (Kucera & Francis, 1967; Pavio, Yuille, & Madigan, 1968). The other half were based on the same

criteria as noted above, however, they were selected from Toggia and Battig's (1978) list of word norms (see Appendix H for list of words). Typically changing two letters from each word resulted in the pronounceable nonwords.

Affective Matching. The Affective Matching task was created using pictures drawn from the International Affective Picture System (IAPS; Center for the Study of Emotion and Attention, National Institute of Mental Health [CSEA-NIMH], 1999). The pictures were selected on the basis of normative ratings on valence and arousal in which pleasant pictures were selected on the rating of positive valence and high arousal, neutral pictures on neutral valence and low arousal, and unpleasant pictures on negative valence and high arousal. Selection was made based on valence and arousal ratings that were either one standard deviation above or below the mean, as appropriate (see Appendix I for slide numbers). Moreover, the appropriateness of each picture, given the target prison population was considered in the selection process. There were no highly erotic pictures or highly graphic victimization situations. The original pictures were resized to 512 x 384 pixels and converted into a bitmap file using PaintShop Pro8.

Picture-Word Stroop. The picture-word Stroop Task (Rosinski et al., 1975) consisted of four picture cards that had 20 grid blocks per page. The first card consisted of 20 three or four letter words presented in each grid block. The second card had hand-drawn pictures of the words presented on card 1. The next two cards consisted of the same pictures presented on card 2, but with either a word (presented on card 1) or nonwords superimposed on the picture. Each card was mounted on card-stock paper and placed on an easel for ease of viewing (see Appendix J).

Stimulus Materials

Presentation Software. The slides were presented using the software program Superlab Pro, Version 2 (Cedrus, 2002). A response pad, Model RB-620 (Cedrus, 2002) was used to record the reaction time and accuracy for each participant.

Viewing Apparatus. For the lexical decision task and affective matching task, slides were presented using a Hewlett Packard ze4420 laptop computer. The monitor was 15" in diameter and was situated approximately 0.5 m directly in front of each participant. Participants were seated in front of a desk and a response box was placed on the desk in front of him. The study was run in a quiet room inside the young offender institutions.

Procedure

The researcher was one of two female graduate students who were responsible for administering and scoring the PCL:YV (Forth et al., 2003) to the young offender sample. After obtaining approval via a court order to access young offender's criminal files, ethics approval was sought and granted from the Carleton University's Research Ethics Committee and from the Ministry responsible for Young Offenders in Ontario, the Ministry of Public Community Safety and Correctional Services. The Ministry approved three youth institutions in Ontario and each were contacted to facilitate the data collection. The researchers approached the designated ranges at each institution and initiated the information required for participation in this study (see Appendix A). Once the information was distributed, a sign-up sheet was posted on each range stating that this study consisted of two parts that would be administered over two 1 ½ hour time periods.

After informed consent was obtained regarding the interview (see Appendix B), permission to collect file information and to audio record the interview, one of the two

researchers conducted the semi-structured interview required for the scoring of the PCL:YV. Upon completion of the interview, file records on each participant were read for the collateral documentation required for the PCL:YV (see Appendices F and G). Offenders were debriefed following the interview and were provided with a debriefing form (see Appendix D).

After the interview was completed, participants were asked to complete the second phase of the study, which typically took place one to two days after the interview. Each participant was brought into a quiet room and was seated in front of a desk. Another informed consent form (see Appendix C) was given to each participant and each young offender was asked to read and sign the form before the study commenced. The researcher was blind to the participants PCL:YV score in order to control for experimental bias as the PCL:YV was not rated until completion of the second phase of the study.

The same order of the stimulus materials was provided to all participants, in that they completed the questionnaires first, followed by the computer-based tasks, and finally they were administered the picture-word emotional stroop task. Given the distinctiveness of each task, practice effects were not expected to significantly influence the responses provided by participants.

The order of the questionnaires was randomly distributed across participants to reduce the effects of practice and boredom. Once these were completed, participants were seated in front of the computer monitor. The two computer based tasks were counterbalanced to control for order effects. Furthermore, the two conditions in each task (concrete/abstract and positive/negative for the lexical decision task and congruent versus incongruent for the affective matching) were also counterbalanced and randomly assigned

to participants. Following the computer tasks, the picture-word emotional stroop task was given to the participants. Once all tasks were completed, participants were debriefed in regards to the study and any questions were addressed.

Lexical Decision Task. Participants were seated directly in front of a computer monitor. On the screen, instructions were shown stating that the task before them was one in which they had to decide if the stimulus on the screen was a word or non-word. If they believed the stimulus was a word, they were instructed to press the blue button on the response pad, whereas if they believed it was a non-word, they were to press the red button on the response pad. They were also instructed to answer as quickly as possible while trying to be as accurate as possible. Half of the participants received the concrete/abstract condition first, while the other half received the positive/negative condition first. For the first trial, participants were instructed to use their left hand, then in the following trial, use their right hand. This sequence alternated until the end of the trial block so that in total, six trials were performed with their left hand and six trials with their right hand. Between each trial, a 10 second delay was presented. Furthermore, after every four trials, a 30-second delay was given.

There were two practice trials that preceded the 12 trials of this task. Each word was presented on the screen for 750 ms¹ or until a response was made. Emotional facilitation was measured by taking the response time on the correct responses for the emotional words and subtracting from the response time for the correct responses on neutral words.

¹ 750 ms was utilized as the stimulus presentation time for the youth in this study. Past research has used a stimulus time ranging from 100 ms in adults (Lorenz & Newman, 2002a) to indefinite with adolescents (Loney et al., 2003). The time of 750 ms was chosen as a mid-point between past research protocols for this task.

Affective Matching Task. Participants were seated directly in front of a computer monitor. On the screen, a set of instructions was provided. For the congruent condition, participants were instructed that they would be initially shown a picture that was either pleasant or unpleasant that would be displayed on the screen for 1 second. Their task was to match their rating of pleasantness to one of two pictures that followed. In the incongruent condition, participants were told that they would be shown a picture that was either pleasant or unpleasant, which would be displayed for 1 second on the computer screen. Their task was to decide which one of the pictures that followed was opposite in their rating of pleasantness. If they believed the picture that matched corresponded to picture A, they were to press the blue button, or if they believed the picture matched picture B, they were to press the red button. The participants were told that they had three seconds to make their decision. If they did not respond within this time limit, the screen would change and the next event would commence. Once a selection was made, the screen changed and the next event began. The incongruent and congruent conditions were counterbalanced and randomly assigned to participants so that half of participants received the congruent condition first, while the other half received the incongruent condition first.

Picture-Word Emotional Stroop Task. This task involved four different stimulus cards of either 20 words or 20 pictures that were printed on white paper and in which each picture or word was printed in grids on the page. Participants were instructed for the first card to read each word, starting at the top left corner and continuing to read the words presented as if they were reading a book. They were also told that their time to read all words would be recorded using a stop-watch. The next card shown to participants consisted of pictures instead of words and the participants were instructed to name the

pictures as quickly and as accurately as possible in the same manner as the previous card. The next two cards presented were counterbalanced to control for order effects, so that half received the interference card first, while the other half were shown the trigrams card first. The interference condition contained the same pictures as was given previously, but a word was now superimposed on the picture. The instructions were to identify the picture, while ignoring the word. Reaction time and accuracy was recorded. The trigrams condition was similar to the interference condition, however, instead of a word being superimposed on the picture, a three-letter non-word was displayed. Again, the participants were told to read the pictures as quickly and as accurately as possible while ignoring the non-word.

Results

All analyses for this study were conducted using SPSS 11.0 statistical software package. Inter-rater reliability coefficients were conducted for PCL:YV total score and for each factor score using a Pearson Correlation Coefficient. These analyses revealed a very high agreement was obtained for total scores ($r = .99$) and across each of the factor scores, $r = .93$ for Factor 1, $r = .94$ for Factor 2, $r = .92$ for Factor 3, and $r = .99$ for Factor 4. Alpha reliabilities were also calculated for each of the factor scales and for the overall PCL:YV scores for the reduced sample. The total factor score yielded an alpha reliability of $\alpha = .95$, with factor scores observing alphas of: Factor 1: $\alpha = .79$, Factor 2: $\alpha = .91$, Factor 3: $\alpha = .81$, and Factor 4: $\alpha = .75$. These scores are similar to reliability measures found in similar studies on juvenile samples (Forth et al., 2003).

An alternative method of analyses was conducted on the entire sample of 45 young offenders using a median split of 20 to distinguish the groups into low psychopathic youth (≤ 19) and high psychopathic youth (≥ 20). See Appendix K for results.

Lexical Decision Task – Emotional Valance Condition

Preliminary Analyses. Correlation coefficients suggest that a relation exists between which hand was used for this task and response facilitation as it relates to psychopathic traits. A significant correlation was found between Factor 2 (affective) scores and response time facilitation for negative words for right handed responses, $r(31) = .38, p < .04$, indicating that those who score high on psychopathy have faster reaction times for negative words when responding with their right hand. Further, response facilitation for positive words for right handed responses revealed that youth who had high total scores had faster response times for positive words, $r(31) = .38, p < .04$ and those who scored high on Factor 2 (affective) also showed faster response times to positive words, $r(31) = .50, p < .01$ (see Table 3 for correlation coefficients).

To examine if group differences would be found on overall reaction time and accuracy for words and nonwords, four mixed model analyses of variance (ANOVA) were conducted. The first analysis examined group differences on word reaction time, therefore, a 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Hand: left, right)² mixed model ANOVA with group as a between subjects factor and hand as a within subjects factor. This analysis did not reveal any interaction effects or main effects (see Table 4 for means and standard deviations). A 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Hand: left, right) mixed model ANOVA was conducted on accuracy ratings for real words on this task. A significant interaction was observed between hand x group, Wilks's $\Lambda = .86, F(1, 29) = 4.65, p < .04, \eta^2 = .14$, indicating that when those in the high psychopathic group responded with their right hand ($M = 32.00, SD$

² Out of the 31 participants, only 2 were assessed as being left-handed; all other participants were classified as being right handed.

= 5.10), they were more accurate than the low scoring group who responded with their right hand ($M = 28.06$, $SD = 6.59$). All main effects for this analysis were not significant (see Table 4 for means and standard deviations).

To explore group differences on reaction time for nonwords, a 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (and: left, right) mixed model ANOVA was conducted. This analysis did not reveal any main effects for group or hand, as well, interaction effects were not significant. Further, a 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Hand: left, right) mixed model ANOVA was conducted on overall accuracy for nonwords, again revealing no significant main effects or interaction effects (see Table 4 for means and standard deviations).

Main Analyses. The hypothesis of whether group differences would be found on response facilitation [neutral mean reaction time minus emotional word (positive or negative) mean reaction time for correct responses] between those who score high on psychopathic traits when responding with either their left or right hand than those who score low on psychopathic traits was explored through a 2 (Group: high psychopathic traits, low psychopathic traits) by 2 (Hand: left, right), by 2 (Valence: positive, negative) mixed-model ANOVA with group as the between-group factor and hand and valence as the within-group factors on measures of reaction time. The following summary, however, must be interpreted with caution. The analysis was conducted using the sample of young offenders, however the accuracy ratings for this group ranged from 63% to 71% across hand and valance, with mean accuracy ratings across groups ranging from 58% to 67%. Further one participant scored above 3 standard deviations on reaction time for both emotional facilitation scores, thus his score was adjusted to 3 standard deviations on

reaction time³. This analysis revealed a significant main effect for group, $F(1, 29) = 4.88$, $p < .04$, $\eta^2 = .14$, indicating that youth in the high psychopathic group had greater response facilitation to emotional words ($M = 14.74$, $SD = 35.61$) than did youth in the low psychopathic group ($M = -19.85$, $SD = 51.15$) (see Figure 1). Further, a main effect for hand was found, Wilks's $\Lambda = .79$, $F(1, 29) = 7.61$, $p < .01$, $\eta^2 = .21$. This indicates that when the youth responded with their left hand ($M = 16.41$, $SD = 80.22$), greater facilitation was observed than when responses were provided with their right hand ($M = -18.44$, $SD = 79.20$) (see Figure 2). No interaction effects were significant for this task (see Table 5 for means and standard deviations).

Exploratory Analyses. Based on the theoretical framework that those who score high on Factor 2 (affective) scores show an abnormality when processing emotional material, a hierarchical regression was conducted with emotional facilitation as the outcome variable. When emotional facilitation was examined, collapsing across handedness, with Factor 2 entered at step 1, it accounted for a significant percentage of variance, $R^2 = .36$, $F(1, 29) = 4.25$, $p < .05$. When Factor 1, Factor 3, and Factor 4 were entered at step 2, no significant increase in variance was found (R^2 change = .07).

To examine the association between Factor 2 and emotional facilitation for left hand responses, another hierarchical regression was conducted. When Factor 2 was entered at step 1 in the regression analysis, it accounted for only 1% of the variance ($R^2 = .01$), $F(1, 29) = .29$, $p = .594$. Factor 1, Factor 3, and Factor 4 entered at step 2 of the analysis did not account for a significant increase in variance accounted for on emotional facilitation. A similar analysis was examined on emotional facilitation for right handed responses. When

³ Removing this one case from analysis did not change the overall significance for the main effects found with this case included in the analysis.

Factor 2 was entered at step 1, it accounted for a significant percentage of the variance, $R^2 = .26$ on emotional facilitation, $F(1, 29) = 10.38, p < .002$. Similar to the previous analysis, when Factor 1, Factor 3 and Factor 4 were entered at step 2, the factors did not account for a significant increase in the variance accounted for in emotional facilitation for right handed responses.

Lexical Decision Task – Concrete/Abstract Condition

Preliminary Analyses. Correlational analyses for the variables on this task revealed no significant correlations were observed on the PCL:YV total scores or factor scores with the variables of interest in this task (see Table 6 for correlation coefficients).

Main Analyses. A 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (hand: left, right) x 2 (Condition: concrete, abstract) mixed model ANOVA with group as a between subjects factor and hand and condition as within subjects factors on reaction time was conducted. This analysis revealed no significant interaction effects or main effects for group, hand, or condition (see Table 7 for means and standard deviations).

A 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Hand: left, right) x 2 (Condition: concrete, abstract) mixed model ANOVA was conducted on accuracy ratings for this task. A significant interaction was found between Hand x Condition, Wilks's $\Lambda = .87, F(1, 29) = 4.31, p < .05, \eta^2 = .13$, revealing that when young offenders responded with their left hand ($M = 8.23, SD = 3.02$) for concrete words, they were more accurate than responses provided for abstract words ($M = 7.72, SD = 2.88$), as well, when responses were provided by their right hand, young offenders were more accurate to responses for abstract words, ($M = 8.77, SD = 3.80$) than to concrete words (M

= 8.11, $SD = 2.71$). No other interaction effect or main effects were significant for this analysis (see Table 8 for means and standard deviations).

Affective Matching Task

Preliminary Analysis. Correlational analyses for the variables on this task revealed no significant correlations were observed on the PCL:YV total scores or factor scores with the variables of interest in this task (see Table 9 for correlation coefficients).

A 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Condition: congruent, incongruent) mixed model ANOVA with group as a between subjects factor and condition as a within subjects factor on reaction time was conducted yielding a significant main effect for condition, Wilks's $\Lambda = .87$, $F(1, 29) = 4.41$, $p < .05$, $\eta^2 = .13$, indicating that young offenders had faster reaction times for congruent condition ($M = 799.35$, $SD = 360.85$) than for the incongruent condition ($M = 892.60$, $SD = 558.45$). A 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Condition: congruent, incongruent) mixed model ANOVA on accuracy ratings was conducted which revealed a significant main effect for condition, Wilks's $\Lambda = .52$, $F(1, 29) = 27.03$, $p < .001$. This suggests that young offenders were more accurate when they responded to the congruent condition ($M = 8.61$, $SD = 2.03$) than when they responded to the incongruent condition ($M = 6.03$, $SD = 2.39$).

Main Analysis. Examining responses on the congruent condition only, a 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Valance: positive, negative) mixed model ANOVA on reaction time with group as the between group factor and valance as a within group factor was conducted. A main effect for valance was found, Wilks's $\Lambda = .69$, $F(1, 29) = 13.07$, $p < .001$, $\eta^2 = .31$ indicating that young offenders scored significantly faster on negative picture matching ($M = 751.38$, $SD = 336.57$) than when they responded

to positive picture matching ($M = 919.51$, $SD = 384.21$) (see Figure 5). No other main effects or interaction effects were significant for this analysis.

Picture-Word Emotional Stroop Task

A 2 (Group: high psychopathic traits, low psychopathic traits) x 4 (Card: card 1, card 2, card 3, card 4) mixed model ANOVA with group as a between subjects factor and card as a within subjects factor was conducted on overall reaction time to the cards presented in this task. As expected, a significant main effect was observed on picture word cards, Wilks's $\Lambda = .41$, $F(3, 27) = 12.75$, $p < .001$, $\eta^2 = .59$, indicating that young offenders were significantly faster when presented with card 1 (words) ($M = 11.05$, $SD = 6.99$) than cards two ($M = 18.02$, $SD = 4.61$), three ($M = 19.53$, $SD = 4.07$) and four ($M = 18.84$, $SD = 5.00$). No significant main effects on group and no interaction effects were found for this task (see Table 10 for means and standard deviations).

To assess group differences on accuracy for the trigram and interference conditions, a 2 (Group: high psychopathic offenders, low psychopathic offenders) x 2 (Card: trigram, interference) mixed model ANOVA was conducted with group as a between groups factor and card as a within groups factor. A significant main effect for group was observed, $F(1, 29) = 5.52$, $p < .03$, $\eta^2 = .16$, indicating that young offenders who score high on psychopathic traits had less errors on this task ($M = .11$, $SD = .29$) than did those scoring low on psychopathic traits ($M = .47$, $SD = .51$). No significant interactions were found for this analysis (see Table 11 for means and standard deviations).

Discussion

The present study examined the relation between emotional processing and psychopathic traits in an incarcerated male adolescent sample. The aim was to explore if

differences among emotional processing abilities found in adult psychopaths (Lorenz & Newman, 2002a; Williamson et al., 1991) would also be found in a sample of youthful offenders. More specifically, this study was designed to determine if those who scored high on psychopathic traits would show less response facilitation to positive and negative words in a lexical decision task than would those scoring low on psychopathic traits. It was expected that those who scored high on the PCL:YV would respond similarly to positive and negative words, whereas those low on the PCL:YV would respond faster to emotional words than to neutral words. Further, responses were provided with both hands for this task to explore lateralization differences amongst this sample. It was expected that those who were deemed to be low on psychopathic traits would show greater response facilitation when they responded with their right hand than those who scored high on psychopathic traits. Group differences were not expected when youth gave responses with their left hand.

The results of this study provide preliminary support that emotional processing abilities in youth who are high on psychopathic traits differ from those who score low on these traits. In the emotional valance condition of the lexical decision task, response facilitation on positive and negative words (response time on neutral words minus response time on emotional words) differed between those who scored higher on the PCL:YV than those who scored lower.

The youth in this study who scored low on psychopathic traits showed greater response facilitation only to positive words when they responded with their right hand. Furthermore, youth who scored low on psychopathic traits responded faster to neutral words than to negative and positive words when responses were provided with their left

hand and also responded faster to neutral words than to negative words for right handed responses. The group that scored high on psychopathic traits showed greater facilitation to negative words regardless of what hand was used to respond and they also showed greater facilitation to positive words when they responded with their left hand. The only condition in which high psychopathic youth responded slower to emotional words was for positive facilitation when they responded with their right hand. These findings were contrary to what was predicted. Adolescents with psychopathic characteristics showed greater response facilitation to negative words as compared to the adolescents who display few psychopathic traits.

Research conducted on adult samples has found a different pattern of responding for psychopathic and nonpsychopathic males than from what was observed in this current study. Williamson et al. (1991) administered a similar lexical decision task to an adult male sample and observed that psychopaths did not show greater facilitation to emotional words, whereas nonpsychopaths did. Further, Lorenz and Newman (2002a) found that when nonpsychopaths responded with their right hand, they showed greater facilitation to emotional words than did psychopaths. No differences between psychopaths and nonpsychopaths were found on emotional facilitation when these groups responded with their left hand.

Hare (1998) postulated that adult psychopaths have a deficiency in emotional processing due to an inability to properly facilitate the semantic and affective qualities associated with the connotative meaning of words. Through studies conducted on adult samples (Lorenz & Newman, 2002a; Williamson et al., 1991), this deficit amongst psychopathic males is clearly observed via the lexical decision paradigm. However, some

studies have also found these results were not generalizable in a sample of African American adults (Lorenz & Newman, 2002b). Gorenstein and Newman (1980) proposed through their response modulation hypothesis that psychopaths show this deficit because they are less influenced by the emotional aspects of word's meanings. However, young offenders who were high on psychopathic traits in this study, exhibited greater response facilitation when presented with negative words, whereas those in the low psychopathic group showed the opposite effect.

The majority of studies that have examined emotional processing differences among psychopathic offenders and nonpsychopathic offenders have been conducted on adult samples (Lorenz & Newman, 2002a, 2002b; Williamson et al., 1991). To date, there are few studies demonstrating the affective abilities of youth in relation to psychopathic traits. The findings of the present study appear to indicate that the results found in adult psychopaths are not generalizable to adolescents in that this younger age sample can differentiate between emotional words and neutral words when responding to a lexical decision task. The findings that adolescents in this sample were more reactive to negative, and to a lesser extent positive words than they were to neutral words, may suggest that psychopathic youth may process emotional contexts in a different manner than do adults. Day and Wong (1996) suggested that adult psychopaths show less intense emotional reactions to everyday situations than do nonpsychopaths. However, in light of the current findings, it may be argued that adolescents who show psychopathic traits are more responsive to situations, particularly those which elicit a negative emotional response. This response may be further mediated by heightened anxiety levels, which although not assessed by this study, may be an interesting avenue to explore in future studies.

Researchers who have examined impulsivity in children have shown that these children have problems regulating their affective processes, behaviours, and arousal levels (Barkley, 1997). It has further been suggested that these children who are highly impulsive show a heightened response to emotional stimuli, particularly with negative feedback during several learning and communication tasks (Cole, Zahn-Waxler, & Smith, 1994; Rosenbaum & Baker, 1984). This opposite pattern of responding to emotional material as what would be predicted for psychopathic youth may explain the results obtained in this study. Psychopathic youth in this study may be a highly impulsive group and as such this behavioural component may have played a mediating role in how they responded to emotional words. Future researchers should examine more closely the behavioural factor (Factor 3) to determine if this dimension can isolate those youth who are more likely to show differences in responding to emotional material than youth who are low on psychopathic traits.

In the only other study that examined the lexical decision paradigm associated with emotional processing abilities in an adolescent offender sample, Loney et al. (2003) found that those youth who did not exhibit high callous/unemotional (CU) traits, as assessed by the APSD (Frick & Hare, 2001), showed greater response facilitation to negative words than those youth who scored high on the CU dimension. The opposite finding in this study, in that greater facilitation was observed for high scoring youth for emotional words, especially negative words, could reflect a greater sensitivity to negative emotionality amongst this sample. Differences in response facilitation between the current study and Loney and colleagues (2003) may be explained by differences in procedure for the lexical decision task.

The current study utilized the procedure described by Lornez and Newman (2002a) in that young offenders were given a timed limit (750 ms) in order to make a decision on the task [Lorenz and Newman (2002a) used 100 ms, however given the target age of the current study, a longer response time was provided]. In the Loney et al. (2003) study, adolescents were not given a pre-set time limit in which to make their decisions, rather the word stayed on the screen until a response was recorded. This modification to the lexical decision task likely changes the manner in which participants process the stimuli and thus, it can be argued that it does not reflect true unconscious processing as this task was originally designed to measure.

Gray's (1982) behavioural inhibition system (BIS) attempts to explain behavioural patterns in response to stimuli that signal unconditional aversive events. It is believed through this theoretical framework that when an individual encounters a high expectation of danger, he or she should show an avoidance response, so that the anxiety that is produced by this encounter is reduced. Lykken (1995) postulated that those who exhibit psychopathic characteristics have a weakened BIS system which results in the individual not feeling anxious or frightened when a novel stimulus is encountered, as would normally be expected. This results in more impulsive behaviours to be exhibited by the individual.

Roussy and Toupin (2000) found that adolescents who possessed psychopathic traits showed significant impairment on a behavioural inhibition task, which was similar to the findings of Newman et al. (1997). Therefore, according to Gray's (1982) theory, it could be argued that adolescents who show high levels of psychopathic traits, thus having a weakened behavioural inhibition system should not respond in the same manner as those who do not possess these traits when presented with aversive material. This is in fact what

was found for the lexical decision task. Youth who had high psychopathic traits showed greater facilitation to negative words than those low on these traits. Therefore, it could be argued that youth in the high group were not affected by these aversive stimuli and were able to react in a much faster manner than those in the low group, who had to overcome a sense of arousal due to their heightened BIS system.

In relation to the response modulation hypothesis (Gorenstein & Newman, 1980) which purports that psychopaths have an inability to delay a dominant response when faced with unexpected or neutral stimuli. Thus, this may explain why psychopaths do not inhibit maladaptive behaviour and as a result are more focused on their goal-directed behaviour. Newman and Lorenz (2003) argued that as a result of this deficiency in response modulation, psychopaths are unable to take emotional contextual cues and process them in such a manner that achieves socially appropriate self-regulation. In light of the current findings revealing that those in the high psychopathic group generally responding faster to emotional words than to neutral words on this task, which is inconsistent with adult studies (Lorenz & Newman, 2002a; Williamson et al., 1991), this sample of incarcerated youth responded in a manner that contradicts how they should respond according to the response modulation hypothesis. The youth in this sample, according to Gorenstein and Newman's (1980) theory should have been less responsive to emotional cues. It is unclear at this preliminary stage to determine if youth with psychopathic traits differ from adults in how they process emotional contextual cues, thus reflecting that the response modulation hypothesis does not fully explain emotional processing abilities in adolescents. More studies will need to examine this theory before any conclusions can be drawn for adolescents.

When lateralization differences were explored, differences between high and low psychopathic youth were not observed. Both groups responded similarly depending upon which hand was used for the task, however, differences emerged based upon which hand was used across the sample. Youth in this study showed greater facilitation to emotional words when they responded with their left hand (right hemisphere activation), whereas they showed less facilitation to emotional words when their right hand was used (left hemisphere activation). Hare (1998) postulated that psychopath's deficiency in emotional processing may be explained by differences in lateralization between the left and the right hemisphere, such that psychopaths do not show an integration between the two hemispheres as nonpsychopaths do. The results of this study do not provide any definitive conclusions in regards to lateralization differences among adolescent offenders who were assessed as high on psychopathic traits. Young offenders who were assessed as high on psychopathic traits showed greater facilitation to negative and positive words when they responded with their left hand more so than they did when they responded with their right hand, which is consistent with Hare's (1998) contention that psychopaths rely more on their right hemisphere to process emotional material.

When an exploratory hierarchical regression was conducted to discern if factor scores could account for a significant percentage of the variance in the emotional facilitation scores for this sample, Factor 2 (affective) emerged as a significant predictor of emotional facilitation when handedness was collapsed. This factor, which assesses the emotional components of psychopathy, such as lack of affect, callousness, lack of remorse, and failure to accept responsibility, was able to account for almost 36% of the variance on emotional facilitation. When left handed responses were explored, this factor, as well as

the other factors, failed to explain a significant percentage of the variance. However, when right handed responses were examined, Factor 2 again emerged as explaining a significant percentage of the variance on this measure (26%) with the other factors not contributing a significant increase in the model. This provides further evidence of lateralization differences in emotional processing abilities, as assessed by the affective Factor of the PCL:YV may distinguish between those with psychopathic traits from those who do not possess these traits on emotional processing of words. Further research may wish to examine the role each factor has on the emotional processing abilities within this age group.

In the concrete/abstract condition of the lexical decision task, differences among groups were not found, which was consistent with the findings of Kiehl and colleagues (1999) who did not find differences among adults who were psychopathic from those who were nonpsychopathic on reaction time and accuracy to concrete and abstract words. However, Kiehl et al. (1999) found that all participants in their study responded significantly faster to concrete words than they did to abstract words. This finding was not replicated amongst this sample. This may be in part due to the low sample size observed in this study so that inadequate power may have contributed to the nonsignificant results or that the age of the sample was not able to fully comprehend the distinctiveness between these two word types. Future studies will need to examine this issue before any conclusions can be drawn.

Youth in this sample responded more accurately to concrete words than to abstract words only when they responded with their left hand, whereas the opposite effect was found for right handed responses. Young offenders were more accurate to abstract words

than to concrete words when their right hand was used for the task. This may be due in part to lateralization differences in the word type presented in this study. Kiehl and colleagues (1999) found through the examination of ERP waveforms that individuals respond differently to abstract words than to concrete words. Their analyses revealed that when participants were processing abstract words, their right anterior temporal and frontal cortex were activated. Many sites within both hemispheres were activated for both concrete and abstract words, suggesting significant overlap amongst brain structures in the processing of these word types. In light of this, Kiehl et al. (1999) found that the right hemisphere is more involved in the processing of abstract words, therefore, it is surprising that youth in this study who responded with their right hand (left hemisphere activation) showed greater accuracy to abstract words than when their left hand was used for this task. The inconsistencies in the findings of this current study with those reported by Kiehl and colleagues (1999) warrants further examination before such differences can be fully understood.

As expected, when participants were given the affective matching task, they were able to respond faster and more accurately to matching in the congruent condition (pleasant-pleasant or unpleasant-unpleasant) than in the incongruent condition (pleasant-unpleasant or unpleasant-pleasant). When group differences were explored between high and low youth on psychopathic traits on response times for negative and positive picture matching, no significant differences were noted between these groups. Overall, youth attended to the negative pictures more so than to the positive pictures. The negative pictures elicited a greater response which appears to suggest that the qualities of negativity

in these pictures may be more salient to this sample than the qualities presented in the positive pictures.

The findings of the affective matching task revealing that youth in this study responded faster to negative pictures are consistent with the lexical decision task, in that the negative aspect of the pictures were more salient to this sample of young offenders than were the positive pictures. This again provides further evidence that this sample of offenders may process emotional material in a different manner than non-criminals. Further research among community samples will need to be conducted to explore if such findings are restricted to those who exhibit antisocial behaviour.

The results of the affective matching task may be explained by the type of pictures used in this study. Most of the pictures depicted scenes of violence, such as someone being held at knife or gun point; therefore it could be argued that these pictures elicited a threatened response by the youth. Mathews and Milroy (1994) used an affective matching task with words and found that anxious people differed from nonanxious people in how they responded to threatening words. They found that those with anxiety showed greater facilitation to threatening words. It is possible that youth in this study may have heightened anxiety levels given their current situation of being incarcerated, and as such, may have responded more to the negative pictures as these elicited a more threatening reaction than did the pictures depicting positive situations.

The final task of this study did not reveal any significant differences among young offenders who were either classified as having high psychopathic traits or those scoring low on these traits for reaction time. It was expected that those who had high psychopathic traits would be able to respond faster than those who scored low on the PCL:YV. The

predicted result that those in the high group would have significantly less errors on this task than those scoring low on psychopathic traits was observed for this sample. Schmitt and Newman (1999) hypothesized that those high on psychopathic traits would not show an interference effect (i.e., less errors) due to a deficient response modulation. They argued that psychopaths have difficulty processing peripheral information when they are engaged in goal-directed behaviour; therefore, they are able to overcome the interference effect more easily than those who do not exhibit psychopathic traits. Although this task was designed to show a response time interference effect among those who scored low on psychopathic traits from those who score high, the fact that no differences were observed may reflect more of a design flaw in the task itself than an inability for low scoring psychopathic youth to not be influenced by irrelevant and conflicting information. The picture-word interference may not be able to elicit an interference effect as large as another type of stroop interference (i.e., word-colour). Future researchers may wish to explore if other types of stroop interference will provide the same effects as the current study.

Limitations

It is important to place the findings of this study in the context of the limitations inherent in the current design. First, the low number of young offenders who participated in this study may be a factor in why many of the analyses did not reach significance. An a priori power analysis based on past literature, which typically found low to moderate effect sizes, indicated that a sample of approximately 65 participants per group would have been needed to obtain a power level of .80. However, given that the significant main effects in this study revealed very low effect sizes, approximately 200 participants would have been required for a power level of .50 (400 participants for a power level of .80). Due to the low

counts in the institutions across Ontario, we were unable to obtain a larger number of participants as originally hoped. Future studies may wish to increase the sample size so that future analyses can be performed to determine if further differences would be obtained for this sample. Moreover, it would be useful if future studies examined these tasks amongst a comparable non-offender adolescent sample to determine if similar results would be observed in this target population. Since few studies to date have been conducted on the emotional processing abilities in adolescents with psychopathic traits and due to the somewhat conflicting findings this study found, a community sample may help to shed some light on the processing abilities of this age group.

Another potential limitation of this study is that accuracy rates in the lexical decision task were relatively low. It is possible that the young offenders in this study did not adequately understand the task, or it may have been presented in a manner that did not allow them to process the stimuli as intended. Although the presentation time for the words was increased for this sample from that which is typically used in adult studies, it still may have been too fast for them to process. Future studies may want to vary the presentation time further to see if accuracy rates also vary. Alternatively, more practice trials could be given to ensure the youth fully comprehend the instructions for the task.

The tasks in this study were designed to indirectly measure emotionality, however, it is difficult to evaluate whether other factors, such as temperament, cognitive or motivation, played an influential role on the results obtained in this study. The youth in this sample were incarcerated offenders; therefore, their motives for participation were probably quite diverse and as such, may have had a biasing effect on the study. It is important, therefore, to replicate these tasks amongst other adolescent samples, i.e. non-

offenders, probationers, those with antisocial behavioural patterns or conduct problems to determine if such results are related to this specific offender sample or if they are consistent across other groups of adolescents.

Finally, the current study did not control for anxiety. According to the response modulation hypothesis, psychopaths who exhibit low levels of anxiety show more emotional deficits in response to stimuli that contains material that is peripheral to their dominant response set (Lorenz & Newman, 2002a). Although a direct measure of anxiety was not performed for this study due to limited time constraints with each offender, the fact that the PCL:YV was administered as the assessment for psychopathic traits in this sample, an indirect measure of anxiety traits was obtained. Future researchers may wish to have a separate measure of anxiety to determine if the results obtained in this study are found only among those who are low-anxious or if it is generalized across levels of anxiety.

Conclusion

This study was designed to examine the emotional processing abilities in a sample of young offenders assessed on psychopathic traits. The findings of this study provide preliminary evidence to suggest that youth who exhibit psychopathic traits do in fact process emotional material differently from those who do not possess these traits. The current study sought to extend the research findings that have been observed amongst adult samples in an adolescent incarcerated sample so that a better understanding of emotional processing abilities could be gleaned in association with psychopathic traits. However, it appears that we are left with more questions than answers. It is unclear at this stage whether adolescents who exhibit psychopathic traits show a behavioural inhibition deficit or activation when confronted with novel or aversive stimuli or if their response modulation

abilities do in fact differ from adults. These findings, although far from conclusive, do provide additional experimental evidence that anomalies in affective processing exist in those who possess certain behavioural, interpersonal, and affective characteristics often associated with psychopathy with more research needed to fully understand what these anomalies might be in relation to youth with these characteristics.

This study provides some interesting future directions for research on the emotional processing abilities of adolescents with psychopathic traits. The notion that youth with psychopathic traits differ from those who do not possess these traits on how they incorporate emotional material has several treatment implications. Professionals who encounter adolescents who exhibit psychopathic traits should not only focus on changing behavioural patterns, but should also try to ameliorate the emotional abnormalities by targeting these traits. By incorporating treatment options that encompass the whole spectrum of symptoms instead of focusing on just the overt behavioural aspects, this may help to prevent the antisocial youth becoming the psychopath of tomorrow.

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Table 1

PCL:YV Factor Structure and Items for 3-Factor and 4-Factor Models

Three Factor Model	Four Factor Model
<p><i>Factor 1: Interpersonal</i></p> <ol style="list-style-type: none"> 1. Impression Management 2. Grandiose Sense of Self-Worth 3. Pathological Lying 4. Manipulation for Personal Gain <p><i>Factor 2: Affective</i></p> <ol style="list-style-type: none"> 1. Lack of Remorse 2. Shallow Affect 3. Callous/Lack of Empathy 4. Fails to Accept Responsibility <p><i>Factor 3: Behavioural</i></p> <ol style="list-style-type: none"> 1. Stimulation Seeking 2. Impulsivity 3. Irresponsibility 4. Parasitic Orientation 5. Lacks Goals 	<p><i>Factor 1: Interpersonal</i></p> <ol style="list-style-type: none"> 1. Impression Management 2. Grandiose Sense of Self-Worth 3. Pathological Lying 4. Manipulation for Personal Gain <p><i>Factor 2: Affective</i></p> <ol style="list-style-type: none"> 1. Shallow Affect 2. Lack of Remorse 3. Callous/Lack of Empathy 4. Fails to Accept Responsibility <p><i>Factor 3: Behavioural</i></p> <ol style="list-style-type: none"> 1. Stimulation Seeking 2. Impulsivity 3. Irresponsibility 4. Parasitic Orientation 5. Lacks Goals <p><i>Factor 4: Antisocial</i></p> <ol style="list-style-type: none"> 1. Poor Anger Control 2. Early Behavioural Problems 3. Serious Criminal Behaviour 4. Violations of Conditional Release 5. Criminal Versatility

Table 2

Means and Standard Deviations for PCL:YV Total and Factor Scores for Total Sample and Low and High Psychopathy Groups

PCL:YV Score	Total (<i>N</i> = 45)	Low (<i>n</i> = 17)	High (<i>n</i> = 14)
Total	20.94 (8.86)	11.28 (3.42)	31.19 (1.54)
Factor 1	3.47 (2.21)	1.82 (1.67)	5.40 (1.70)
Factor 2	3.94 (2.65)	1.65 (1.11)	6.97 (1.11)
Factor 3	5.59 (2.32)	3.49 (1.85)	7.36 (1.22)
Factor 4	6.35 (2.71)	3.68 (1.89)	8.23 (1.44)

Note. Standard Deviations in parentheses.

Table 3

Correlation Coefficients for PCL:YV Total and Factor Scores with Response Facilitation Scores On Lexical Decision Task –

<i>Emotional Valance Condition</i>	1	2	3	4	5	6	7	8	9
1. PCL:YV total	1								
2. Factor 1	.80**	1							
3. Factor 2	.93**	.70**	1						
4. Factor 3	.83**	.55**	.72**	1					
5. Factor 4	.84**	.55**	.72**	.64**	1				
6. Neu-Neg (left) ^a	.26	.20	.23	.17	.27	1			
7. Neu-Pos (left) ^a	-.11	-.16	-.08	-.06	-.06	.25	1		
8. Neu-Neg (right) ^a	.33	.08	.38*	.26	.30	.15	.22	1	
9. Neu-Pos (right) ^a	.38*	.33	.50**	.19	.23	.33	.03	.46**	1

^a response facilitation score (neutral reaction time minus emotional valance reaction score)

** $p < .01$ level (2-tailed)

* $p < .05$ level (2-tailed)

Table 4

Means and Standard Deviations for Overall Raw Reaction Time (in milliseconds) and Accuracy Rates for the Lexical Decision Task – Emotional Valance Condition

Measure	Low Psychopathic		High Psychopathic	
	Left	Right	Left	Right
Words				
Reaction Time	1541.67 (166.43)	1492.33 (142.84)	1402.10 (237.82)	1406.49 (261.77)
Accuracy Rates	30.82 (6.85)	28.06 (6.59)	31.57 (5.02)	32.00 (5.10)
Non- Words				
Reaction Time	1467.85 (299.27)	1473.18 (197.56)	1490.12 (251.21)	1425.74 (243.16)
Accuracy Rates	21.59 (7.74)	20.47 (5.70)	20.86 (7.05)	20.36 (7.57)

Note. Standard deviations in parentheses. Higher accuracy rates reflect greater accuracy.

Table 5

Means and Standard Deviations of Response Facilitation Scores (in milliseconds) for Lexical Decision Task – Emotional Valance Condition

Group	Positive ^a		Negative ^b		Emotional ^c	
	Left	Right	Left	Right	Left	Right
Low Psychopathic	24.28 (86.46)	-56.21 (68.10)	-6.97 (62.21)	-35.57 (57.77)	7.08 (66.18)	-46.77 (53.36)
High Psychopathic	15.14 (56.75)	-2.51 (60.14)	33.19 (72.13)	20.52 (84.05)	21.93 (39.80)	7.56 (58.71)

Note. Standard deviations in parentheses. ^a response facilitation score (reaction time for neutral words minus reaction time for positive words on correct responses); ^b response facilitation score (reaction time for neutral words minus reaction time for negative words on correct responses); ^c emotional facilitation score (reaction time for neutral words minus reaction time for emotional words on correct responses).

Table 6

Correlation Coefficients for PCL:YV Total and Factor Scores with Reaction Times On Lexical Decision Task – Concrete/Abstract Condition

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. PCL:YV total	1												
2. Factor 1	.80**	1											
3. Factor 2	.93**	.70**	1										
4. Factor 3	.83**	.55**	.72**	1									
5. Factor 4	.84**	.55**	.72**	.64**	1								
6. RT left concrete	.11	-.03	.09	.30	.04	1							
7. RT left abstract	.20	.33	.09	.26	.10	.20	1						
8. RT right concrete	.22	.03	.21	.20	.32	-.02	.27	1					
9. RT right abstract	.06	-.02	.07	-.08	.24	.05	-.27	.51**	1				
10. Acc left concrete	.25	.27	.23	.24	.08	.30	.13	.31	.25	1			
11. Acc left abstract	.07	.17	.05	.15	.04	.15	.31	.32	.20	.51**	1		
12. Acc right concrete	-.01	.06	.04	.03	-.06	-.31	.06	.17	.18	.46**	.46**	1	
13. Acc right abstract	.19	.33	.11	.14	.09	-.11	.17	.35	.36*	.71**	.60**	.61**	1

Note. RT = reaction time, Acc = accuracy rates.

** $p < .01$ level (2-tailed)

* $p < .05$ level (2-tailed)

Table 7

Means and Standard Deviations for Reaction Times (in milliseconds) on Lexical Decision Task – Concrete/Abstract Condition

Group	Concrete		Abstract	
	Left	Right	Left	Right
Low Psychopathic	483.48 (71.98)	493.51 (70.95)	470.30 (68.92)	491.25 (103.81)
High Psychopathic	499.04 (57.39)	520.10 (45.46)	499.35 (78.70)	497.05 (50.86)

Note. Standard deviations in parentheses.

Table 8

Means and Standard Deviations for Accuracy on Lexical Decision Task – Concrete/Abstract

Condition

Group	Concrete		Abstract	
	Left	Right	Left	Right
Low Psychopathic	7.82 (2.10)	8.29 (1.90)	7.65 (2.06)	8.53 (3.04)
High Psychopathic	8.64 (2.17)	7.93 (1.94)	7.79 (2.01)	9.00 (2.14)

Note. Standard deviations in parentheses. Higher scores reflect more accuracy.

Table 9

Correlation Coefficients for PCL: YV Total and Factor Scores on Affective Matching Task Condition

	1	2	3	4	5	6	7	8	9	10	11
1. PCL: YV total	1										
2. Factor 1	.80**	1									
3. Factor 2	.93**	.70**	1								
4. Factor 3	.83**	.55**	.72**	1							
5. Factor 4	.84**	.55**	.72**	.64**	1						
6. RT congruent	.28	.16	.23	.30	.35	1					
7. RT incongruent	.21	.02	.20	.26	.27	.81**	1				
8. Acc congruent	-.12	-.04	-.19	-.02	-.08	.00	-.07	1			
9. Acc incongruent	-.20	-.16	-.16	-.08	-.27	.09	.19	.24	1		
10. RT negative	-.04	-.23	.02	.05	-.07	-.06	.00	-.24	-.07	1	
11. RT positive	-.12	.27	-.07	-.00	-.18	.16	.14	-.12	.05	.77**	1

Note. RT = reaction time; Acc = accuracy rates
 ** $p < .01$ level (2-tailed)

Table 10

Means and Standard Deviations of the Reaction Times (in seconds) for the Picture-Word Stroop Task

Group	Card 1	Card 2	Card 3	Card 4
Low Psychopathic	10.23 (2.64)	17.94 (5.50)	19.45 (4.51)	18.65 (4.58)
High Psychopathic	12.05 (10.11)	18.12 (3.44)	19.63 (3.63)	19.07 (5.64)

Note. Standard deviations in parentheses

Table 11

Means and Standard Deviations of Error Rates for the Picture-Word Stroop Task

Group	Trigram Condition	Interference Condition
Low Psychopathic	.29 (.47)	.65 (.93)
High Psychopathic	.07 (.27)	.14 (.53)

Note. Standard deviations in parentheses. Higher scores reflect more errors.

Figure 1 . Response Facilitation Scores for High and Low Scoring Psychopathic Young Offenders on Lexical Decision Task - Emotional Valance Condition.

Figure 2 . Response Facilitation Scores for Left and Right Handed Responses for Young Offenders on Lexical Decision Task - Emotional Valance Condition.

Figure 3. Reaction Time for High and Low Scoring Psychopathic Youth on Affective Matching Task - Congruent Condition.

Appendix A

Information Form

This sheet is to provide you information about the study on processing emotional materials being conducted by Dr. Adelle Forth from Carleton University. Dr. Forth's graduate students Jillian Flight and Krista Richard will be conducting this study.

This study will measure how you process different types of emotional material. There are several different tasks that will be given to you. One task will involve you looking at words presented on a computer screen. On the screen you will either see a real word like "dead", "love", "tree" or you might see a nonword like "eter". You will be asked to press specific button as fast as possible when you see an actual English word and another button when you see a nonword. The words will vary in terms of whether they are related to positive or negative emotions. Another task will involve you looking at pictures that vary on how pleasant (e.g., puppies, babies, fun sports) or unpleasant (e.g., dead animal, accident scene, crying baby) they are. You will be asked to match pictures on how pleasant or unpleasant they are. If you do not wish to see the unpleasant pictures you can decide not to participate in this part of the study. A third task involves you looking at a picture-word emotional stroop task where you will be required to look at pictures and read them back to the experimenter as quickly as possible. There will also be three questionnaires that will be provided, with one asking questions regarding which hand you use for most tasks, one that pertains to how you react to different situations, and the last is about your personality and relationships to other people.

If you are interested in volunteering you will be asked to come back another day. The testing session will take approximately one and a half hours. You will also be asked to complete a short self-report questionnaire that asks you about how impulsive you are, how much you worry, and how you make decisions.

Your responses on the tasks and the self-report scale will not be provided to the police nor will any information be provided to institutional staff. You may decide to withdraw from the study at any time or decide not to do any of the individual tasks. Should you choose not to participate or to withdraw from the study this will have no influence on the way you are treated by your caseworkers or by the institution.

If you would like more information you can contact the faculty supervisor Dr. Adelle Forth (Tel. 613-520-2600, ext. 1267). If you have any ethical concerns regarding how this study is conducted, you may contact the Chair of the Carleton Research Ethics Committee for Psychological Research (Dr. Mary Gick, Tel. 613-5200-2600, ext. 2664) or the Chair of the Department of Psychology (Dr. John Logan, Tel. 613-520-2600, ext. 2648).

Appendix B

Informed consent for PCL:YV Interview

Project: An examination of personality characteristics related to motives for crime and violence, and the victims involved.

Research Personnel: This research is being conducted for the purposes of a Master of Arts Thesis in Psychology at Carleton University in Ottawa, Ontario. Jillian is the principal investigator and Dr. Adelle Forth is the faculty supervisor.

The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide enough information such that you have the opportunity to determine whether you wish to participate in this study. Please ask the researcher to clarify any questions that you may have.

I have been told that an interview will cover the following areas: education, family background, substance use, relationships, and criminal activities. I also understand that there will also be 5 questionnaires to complete that will cover areas of my antisocial and prosocial behavior, attachment with parents and peers, and ability to "put myself in another's shoes". I understand that I am not required to answer any questions that I do not wish to and that I may withdraw from this study at any time without any impact on the way I am treated by the Provincial Correctional Services or this institution.

The information shared will be used for research purposes only and I will not be identified by name (i.e. a coded number will be used). I understand that there is a limit to my confidentiality. If I disclose information regarding plans to harm myself or others, information concerning any unknown physical or sexual abuse of children, or information regarding unknown sexual abuse by a health professional, the researcher is obligated to break my confidentiality. Also, I understand that should I reveal my involvement in criminal acts that have not previously been known to authorities, the researcher is required to report these activities to the appropriate authorities. I may talk about these issues in a general sense but should I begin to disclose specifics I will be reminded of the researchers obligations to report this information.

Should I require further information regarding this study I can contact:
Dr. Adelle Forth, Faculty Advisor, 613-520-2600, ext. 1267

Should I have any ethical concerns regarding this study I can contact:
Dr. Mary Gick, Chair of the Carleton University Research Ethics Committee for
Psychological Research, 613-520-2600, ext. 2664
Dr. John Logan, Chair of Dept. of Psychology, 613-520-2600, ext. 2648

My signature below indicates that I have read the above and agree to take part in this study.

Name: _____

I.D.# _____ Date: _____

Signature (subject): _____

Signature (researcher): _____

Appendix C

Informed consent for Emotional Processing Tasks

Project: A study to measure how you process emotional words and pictures.

Research Personnel: The study is being conducted for Dr. Adelle Forth from the Department of Psychology at Carleton University in Ottawa. Her graduate students Jillian Flight and Krista Richard will be conducting this study.

The purpose of an informed consent is to make sure you understand the purpose of the study and the nature of your involvement. The informed consent must provide enough information such that you have the opportunity to determine whether you wish to participate in this study. Please ask the researcher any questions you want about the study.

I have been told that I will be asked to do several tasks that involve the presentation of different types of emotional material. I understand that it will take about one hour to complete these tasks. I will be asked to read words, look at pleasant and unpleasant pictures and look at another set of pictures on a timed accuracy test.. I also understand I will be asked to complete two questionnaires asking about how impulsive, how much I worry, and how I make decisions and what hand I use for everyday situations. I have been told that I do not need to do any of the tasks and that I am not required to answer any of the questions I do not wish to. I have also been told that I may withdraw from this study at any time and that if I do withdraw it will have no impact on the way I am treated by the staff at this institution or by the Ministry of Public Safety and Security – Correctional Services.

I further understand that under no circumstances will any of the information I give or how I do on the tasks will be released to anyone without my signed consent. The information will be used only for research purposes and I will not be identified by name (i.e., a coded number will be used). I understand that there is a limit to my confidentiality. If I disclose information regarding plans to harm myself or others, information concerning any unknown physical or sexual abuse of children, or information regarding unknown sexual abuse by a health professional, the researcher must break my confidentiality. In addition, should I reveal involvement in criminal activity that has not previously been known to the authorities I understand that the researchers are required to report these to the appropriate authorities. This study will not ask me about any of the above issues but should I talk about these issues the researcher will warn me about her obligations to report this information.

Should I require further information regarding this study I can contact:

Dr. Adelle Forth at the Department of Psychology, Tel. 613-520-2600, ext. 1267

Should I have any ethical concerns regarding this study I can contact:

1) Dr. Mary Gick, Chair of Carleton University Research Ethics Committee for Psychological Research, Tel. 613-520-2600, ext. 2664

2) Dr. John Logan, Chair of Department of Psychology, Carleton University, Tel. 613-520-2600, ext. 2648.

My signature below indicates I have read the above and agree to take part in the study.

Name: _____ Date: _____

Signature (participant): _____

Signature (researcher): _____

Appendix D

Debriefing Form

As researchers we are obligated to do our best to ensure that participants are not harmed in any way by participating in our study. This issue was addressed by allowing you the right to limit what components of the study you participate in, by encouraging you to ask any questions about the study, and by providing you with this written debriefing.

The purpose of this study was to measure how you process emotional material. During this study you were asked to respond to emotional and nonemotional words presented on a computer screen, to match the pleasant and unpleasant photos, and to identify pictures in a timed accuracy test. You also completed a self-report questionnaire measuring how impulsive you are, how much you worry and how you make decisions and one regarding which hand you use for everyday situations. Research with adult offenders has found that they vary on how they process emotional materials depending on their personality characteristics. For example, in the word task, some offenders are faster when emotional words are presented as compared to neutral words as compared to other offenders who respond the same speed to all types of words. In the other tasks we were measuring how quickly and how often you were correct at matching the pleasant and unpleasant pictures and the emotional tone used in speech. There has been very little research measuring how adolescents perform on these tasks. This study is designed to examine how the association between personality characteristics and the processing of emotional material.

I would like to thank you very much for agreeing to participate in this study. Your time, attention and effort is greatly appreciated.

Please contact Dr. Marie Claude Robinson here at Bluewater/Sprucedale Youth Centre if you have any concerns about your participation or if you have been bothered by viewing any of the photos.

If you would like more information about this study please contact:

Dr. Adelle Forth
Department of Psychology
Carleton University
Ottawa, ON
K1S 5B6
Tel. 613-520-2600, ext. 1267

If you have any ethical concerns about this study please contact:

Dr. Mary Gick
Chair, Carleton University Research Ethics
Committee for Psychological Research
Department of Psychology
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Dr. John Logan
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Appendix E

Chapman Handedness Scale

Please indicate which hand you ordinarily use for each activity.

With which hand do you:

1. draw?	_____ left	_____ right	_____ either
2. write?	_____ left	_____ right	_____ either
3. use a bottle opener?	_____ left	_____ right	_____ either
4. throw a snowball to hit a tree?	_____ left	_____ right	_____ either
5. use a hammer?	_____ left	_____ right	_____ either
6. use a toothbrush?	_____ left	_____ right	_____ either
7. use a screwdriver?	_____ left	_____ right	_____ either
8. use an eraser on paper?	_____ left	_____ right	_____ either
9. use a tennis racket?	_____ left	_____ right	_____ either
10. use scissors?	_____ left	_____ right	_____ either
11. hold a match when striking it?	_____ left	_____ right	_____ either
12. stir a can of paint?	_____ left	_____ right	_____ either
13. on which shoulder do you
rest a bat before swinging?	_____ left	_____ right	_____ either

Appendix F

Psychopathy Checklist: Youth Version Interview Guide

Interview Guide
(Rev. 05/02/03)*Case Information*ID: _____ Date of Birth: ____/____/____
Day Month Year

Age: _____ Sex: M F Race: _____

Interviewer Information

Interviewer: _____ Location: _____

Interview dates: ____/____/____ Length: _____
Day Month YearInterview dates: ____/____/____ Length: _____
Day Month YearInterview dates: ____/____/____ Length: _____
Day Month Year

Interview Recording: No Audio Video

Current Status (if institutionalized)

1. How long have you been in here?
2. What has it been like for you?
3. Have you been having any problems in here?

School History and Adjustment

I am going to start with your school. The questions refer to when you were a child which means when you were 10 years old or younger.

4. How would your teachers have described you as a child?
5. How often did you skip school as a child? [Where did you go when you skipped?]
6. Were you a troublemaker in school as a child? [What kind of things did you do? Did you disturb the class? Did you come to school drunk or stoned? Did you steal things at school? What type of punishment did you receive for getting into trouble?]
7. Did you get into any physical fights at school as a child? [Was anyone hurt in these fights? Why were you fighting?]
8. Were you ever suspended or expelled from school as a child? [How many times? What happened?]

The next set of questions ask about school from when you were 11 years old until right now.

9. What was the last grade you completed? Are you currently attending school?
10. What has school been like for you? [How do you feel about school now? Is school more about friends, getting an education or something else? Do you find it boring? Do you find it difficult to pay attention in class?]
11. How would your teachers describe you? [What would they say about the way you act at school? What would they say about your attitude towards school? What do you think about their impressions?]
12. How do/did you get along with other kids at school? [How well respected are you at school? What is your reputation at school? What kind of crowd do you hang out with? Do you have any close friends at school? Tell me about them. What do you do together?]
13. What has your attendance been like? [How often have you skipped school? What makes you want to skip out? What do you do when you skip school?]

14. What kind of grades do/did you usually get in school? [Did you ever fail a grade? When? What happened? What are your grades like now?]
15. Have you gotten into trouble for not completing your homework or school assignments? [How often does this happen?]
16. Have you ever convinced other students or your siblings to do your homework or assignments for you? What happened?]
17. How much time do you spend preparing for exams at school? [Have you ever intentionally missed school on the day of an exam? What happened?]
18. When you do not do well on an exam who or what is to blame?
19. Have you ever cheated on a test or exam? [How many times? What happened?]
20. How often do you get into physical fights? [At what ages? How do these fights start? Were the people older or younger than you? Have you ever hurt anyone during a fight at school? What happened?]
21. Has anyone ever called you a bully at school? [Why have they said this? Do you ever bully anyone?]
22. Have you been having problems in school? [What type of problems? Have you got into a lot of trouble at school for disturbing the class? Stealing? Coming to school drunk or stoned? How many times?]
23. Were you ever suspended? [How many times? Why were you suspended?]
24. Were you ever expelled? [How many times? Why were you expelled?]
25. Did you graduate from high school? [Why was graduating important to you? *If has not graduated, ask:* How important is it for you to graduate from high school? Why is graduating important to you? What will it get you? *If graduating is not important, ask:* Tell me about why you feel it is not important. What are your plans?]
26. Have you ever quit school? [How long did you about quitting before you did? What did you do while not in school?]

Work History and Money

The next questions ask about your work history and money.

27. Have you ever done any volunteer work? [Why did you volunteer? Would you be interested in volunteering?]

28. Have you ever been required by court to do volunteer or service work? [Did you complete the court order?]
29. Have you ever had a part-time or full-time job where you got paid? [What did the job involve? How many different jobs have you had? What were your duties? Why did these jobs end? What was the longest job you had?]
30. How would you boss have described your work performance? [How would you have described your boss?]
31. Have you ever quit a job? [What happened? Did you tell your boss you were quitting?]
32. Have you ever left a job because you knew you were going to be fired? [Which ones?]
33. How often would you come in late to work? [Why? What would happen when you did?]
34. Have you ever intentionally missed work when you were not sick? [What happened?]
35. Did you ever use drugs or alcohol at work or come to work drunk or stoned?
36. Did you ever get into trouble with not obeying the rules or regulations? [What did you do?]
37. How have you supported yourself when you are not working? (e.g., social assistance, parents, crime)
38. Have you ever relied on someone other than your parents for food, money or lodging? [At what age? For how long? Why did you need to stay with them]
39. How often do you parents or friends help you out financially? [What do you need the money for? Did you ever lie to them about what you needed the money for?]
40. Have you ever owed people money and not paid them back? [How many times? What happened? Have you ever had drug debts?]
41. Have you ever had to pay bills like rent, telephone, or electricity? Did you ever fail to pay these bills?

Career Goals

I would like to talk about your future plans.

42. What would you like to do in the future? [How worried are you about the future?]
43. Is having a job important to you? [Why/Why not?]

44. Is there any job or occupation you would like to have? [How long have you wanted to do this? Have you planned or prepared for this trade/occupation? What training would you need in order to obtain this trade/occupation?]
45. What are your long-term goals? [What would you like to be doing 5 years from now?]
46. Do you think you will have any problems accomplishing your goals? [What impact will your criminal history have on accomplishing your goals?]

Family Life

I am going to now ask you about your family.

47. Tell me about your family? [Who raised you? What was life like at your home? How would you describe your mother/father/caregiver? How well did you get along with your parents/caregiver? How close were you to your parents/caregiver?]
48. Did your parents get along? [Did they argue much? Did they ever have physical fights? Did they ever separate? What was that like?]
49. Did you ever live with anyone else (step/adoptive/foster family, group home, etc.)? Were you ever removed from your home because of problems at school or home? [At what age(s)? How did you come to live there? What was it like?]
50. Do you have any brothers or sisters? How did you get along with them? [How often did you make them do your chores for you?]
51. I am going to ask you some questions about your behavior as a child (age 10 or younger). Did you ...
 - Get into trouble for not obeying the rules?
 - Run away from home overnight? Longer periods?
 - Lie a lot to your parents?
 - Steal from your parents/caregiver?
 - Treat your parents/caregivers or siblings badly? [Threatened to hurt them?]

The next set of questions refer to your behavior since you turned 11 years old until right now.

52. How strict are things at your house? What kind of rules are there? [How much trouble do you have following these rules? How is your behavior as compared to your brothers and sisters?]
53. How often did people in the neighborhood complain to your parent/caregiver(s) about the trouble you caused in the neighborhood? [What happened? What did you parents do?]

54. When you go out do your parents/caregiver know where you are? [How often did you stay out at night against your parent's wishes?]
55. Have you ran away from home overnight or for longer periods? [Did you contact your parents?]
56. Have you stolen anything from your parents or siblings?
57. Have you ever threatened to hurt your parents/caregivers or hit your parents/caregivers? [What happened? How did it make you feel?]
58. How old were you when you left home? [What was happening? What did you do?]
59. What is your relationship with your family like now? [How often do you have contact with them? Would you like more contact? What are they doing now? How are they?]

Peer/Sexual Relationships and Interpersonal Traits

Let's talk about your friends and relationships.

60. How many friends do you have? [How long have you been friends with them? What separates a friend from an acquaintance? How do they provide you with support when you going through "tough" times? How do you provide them with support?]
61. Do you change friends often? [Why does this happen?]
62. Who are you closest to now? [How important is that person to you? How would you feel if you could never see that person again?]
63. What age did you start dating? [What attracts you to a girl/boyfriend?]
64. Have you ever had a girlfriend or boyfriend? Do you have a girl/boyfriend right now? [Excluding your current girl/boy friend, how many girl/boy friends have you had? *If relevant, ask:* Why do you think you have had so many relationships?]
65. *If there are more than 2 relationships, ask the questions below about the 2 longest, most significant, or most recent relationships:* What were they like? [What did you like about them? What did you not like about them? Did you ever live together? How often did you argue? Did you ever physically fight with them? How long were you together? How did the relationship end? How long did it take you to get over him/her?]
66. Tell me about your current girl/boy friend? What is she/he like? [What did you like about her/him? What did you not like about her/him? Are you or have ever live together? How

often do you argue? Have you ever physically fight with her/him? Are you in love with her/him? How long have you been together? Have you ever break up? If you did break up how long would it take for you to get over her/him?]

67. Have you ever been deeply in love? With who? What was that like?
68. How old were you when you first had a sexual relationship? [Was it with a stable partner, or a casual acquaintance?]
69. How many different sexual partners have you had? [How many were casual acquaintances ("one night stands")? Have you ever had sex with a prostitute?]
70. Have you ever had relationships with more than one person at the same time? [Tell me about it. Did they know about each other?]
71. Have you ever been unfaithful to any of your partners? [How often? Did your partner ever find out? How did your partner react? *If no, ask:* How do you feel about cheating on someone? Have you ever been cheated on? What did you do? How did you react?]
72. Do you have any children or step-children? [Who was the mother? How long did you know her? How many? How old are they? What are their birthdates? What grade are they in at school? How is your relationship with your children? How often do you have contact with them? In what ways do you take care of them? Have anyone said you do not take proper care of them? Why have they said that?]
73. How good are you at getting what you want from your parents, partners, friends or others? [What do you do when you really want your own way?]
74. Has anyone told you that you can talk your way out of anything? [Has anyone ever accused you of being manipulative? Have you ever lead a double life? How do you fool others?]
75. How often do you lie to your parents, partners, friends or others? [Have people said that you lie a lot? What do you lie about?]
76. Have you ever taken on a fake identity? [Have you used an alias?]

Substance Use and Lifestyle

I would like to ask about alcohol and drug use.

77. How many cups of coffee or tea do you drink daily?
78. How old were you when you started drinking? [How often and how much do you drink alcohol? Why do you drink?]

79. How old were you when you started to use drugs? [How often and much? How many different types of drugs have you tried? Why do you use drugs? What do you like about them? Do they affect your life in anyway? Do you have any plans to stop taking drugs? Have you ever gone through withdrawal (become sick because you stopped using drugs)?]
80. Have you ever used alcohol or drugs while institutionalized (e.g.,detention center, hospital)?
81. Do you ever do anything dangerous or get into trouble when you are stoned or drunk?
82. Do you drive? Do you have a driver's license? [Do you like to speed or take chances when you drive? Have you ever been stopped by the police for speeding or reckless driving? Have you ever driven while stoned or impaired? How often?]
83. What do you do with your free time? [What sort of sports and hobbies do you do? How long have you done them?]
84. How often do you get bored? [What bores you most? What do you do when you get bored?]
85. Do you enjoy taking risks? What kind of crazy or dangerous things have you done? [What is the riskiest thing you have done?]
86. When you have to make a decision, how long do you think about the pros and cons? [Do you get into trouble for decisions you have made?]
87. Would your parents, partner or friends describe you as reliable? [Do you follow through on plans you have made?]
88. Other than being on vacation, have you ever traveled without knowing where you were going to stay? [At what age(s)? What was the longest time you were gone? Where did you go? What did you do? Did you tell anyone you were going?]
89. Have you ever done anything that has made you feel guilty or that you were really sorry you had done? [How long did you feel this way?]

Emotions and Intervention Programs

I would like to talk now about your emotions.

90. How often do you get angry? [What kinds of things get you angry? What do you usually do when you are angry? When was the last time you got really angry? What did you do? How long does it take you to calm down?]
91. Has anyone told you that you have a "bad temper"? [What have they said this?]
92. How often do you get into physical fights? [Are you good at fighting? Who starts these fights?]

93. Have you ever "lost control"? [What was the worse injury you caused someone? How did you feel afterward?]
94. Are you the kind of person that has strong feelings? [Do you sometimes pretend you are upset or sad because other people expect you to?]
95. What is the saddest you have felt? [What was happening to make you feel this way?]
96. What is the happiest you have felt? [What was happening to make you feel this way?]
97. Is there anyone in your life whose death would really upset you? [Who? How would their death affect you? How long would it take you to get over it?]
98. Have you seen a doctor/psychologist/counselor because of behavior problems at home, school or in the community? [How old were you? What happened?]
99. Has a doctor/psychologist/counselor ever recommend any intervention or treatment programs for you either in an institution or in the community? [Do you think you needed the treatment they recommended? What were they? Did you participate in any treatment programs? Did you complete these programs?]

Childhood/Adolescent Antisocial Behaviors

I would like to ask about some specific things you may have done in the past.

100. Have you ever been scratched by a cat or has a dog ever bitten you? What did you do? [If you did pick up a cat and it scratched you what would you do? If you reached down to pat a dog and it bite you what would you do?]
101. Have you ever hurt animals on purpose? [What did you do? How do you feel about it?]
102. How old were you when you first started doing crime? [What kinds of things did you do? Did you ever commit crimes and not get caught? What?]
103. As a child (before age 11) did you ever get in trouble with the police? [What for?]
- 104. Since you were aged 11 have you ever**
Number of times

Deliberately destroyed other people's property?	No	Yes: _____
---	----	------------

Escaped or fail to show up for court?	No	Yes: _____
---------------------------------------	----	------------

Committed a fraud?	No	Yes: _____
Possessed or sold drugs?	No	Yes: _____
Stolen anything worth more than \$50?	No	Yes: _____
Broken into a building, house or school?	No	Yes: _____
Stolen a car?	No	Yes: _____
Given a false name to the police or lied in court?	No	Yes: _____
Possessed a weapon (e.g, gun, knife, excluding pocket knife)	No	Yes: _____
Driven a car while intoxicated or stoned?	No	Yes: _____
Threatened someone with a weapon?	No	Yes: _____
Set fires on purpose to cause serious damage?	No	Yes: _____
Robbed someone?	No	Yes: _____
Assaulted someone?	No	Yes: _____
Forced anyone to engage in sex with you?	No	Yes: _____

105. Have you ever been arrested? [At what age(s)? If I looked at your criminal record how many charges or convictions would you have on it? Can you tell me what they were about?]
106. Do you think your criminal record will have any effect on your life?
107. What sort of court sanctions/sentences have you received? [What do you think about these?]

If the youth admits to any antisocial or criminal behaviors ask the questions below:

108. What is it that you like about engaging in these kinds of activities? [Why did you think you do these things? How do you feel while it is happening (e.g., scared, excited, nervous)? What about when it is over?]
109. Are your criminal activities usually planned or "spur of the moment"?
110. How serious do you think these things are? [What effect have they had on other

people? How do you feel about that?]

111. What is the most serious aggressive act you have done? [What happened? Why do you think you did this? How do you feel about it? Would you do it again? If the victim were here, what would you say to him/her?]
112. What happened in your most current offence? [Why do you think you did this? Would you do it again?]
113. Who or what is to blame for your criminal activities? [What could you have done to avoid committing these crimes?]
114. Have you ever felt guilty/remorse for the crimes you have committed? [Why/why not? What does it feel like?]
115. Do you regret having committed these acts? [Why/why not?]
116. What effect do you think they had on the victims? [How do you feel about the effect on the victims? How often do you think about the victims?]
117. What things would help keep you out of trouble in the future? [What kinds of things have you done in the past to stay out of crime? What is the longest period of time you have been in the community and been crime-free?]

Satisfaction and Traits

I want to ask you about your opinions and how you feel about yourself.

118. Have other people ever told you that you have too high an opinion of yourself? Why have they said this?]
119. Are there anybody's opinions that you value? [Whose opinion is important to you?]
120. What do you think about the police? [How do you feel about the law? Do you believe in obeying the law?]
121. How would you say you compared to your friends or other students in terms of intelligence? [How do you compare to others in terms of your other abilities or skills (street smarts, making money, getting what you want etc)?]
122. Some people are skillful at using others or taking advantage of them to get what they want. [Are you able to do this?]

123. Have you ever tried to control other people by being verbally or physically threatening?
124. Have others ever told you that you are not concerned about others or how they feel? [Why have they said this?]
125. Are you satisfied with your life if it were to stay the way it is? [What would you change?]
126. What would you describe as your main failures?
127. What are your main accomplishments?
128. Have other people ever told you that you have too high an opinion of yourself? [Why have they said this?]
129. What would you say is your biggest problem? [Are you concerned about this problem? How do you plan to deal with this problem?]
130. How do you feel about yourself? [Rate how you feel about yourself on a scale of 1 to 10, with 1 being really bad and 10 being really good.]
131. If you could go back and change what you have done, what would you change?
132. Are there things that we didn't talk about today, that you think it is important for people to know about you?

Interview Notes

Rate the clarity and coherence of the youth's responses during the interview:

- _____ Responses clear and coherent
- _____ Some mild problem understanding responses
- _____ Some moderate problems understanding responses
- _____ Responses almost totally unclear or incoherent

Rate consistency of the individual's responses during the interview:

- _____ Responses were consistent
- _____ Some mild inconsistencies were apparent
- _____ Some moderate inconsistencies were apparent
- _____ Responses were almost totally inconsistent

Describe any aspects of the youth's demeanor and behavior during the interview that seem important, such as style of speech, nonverbal behaviors, interpersonal style, or self-image.

Appendix G

Psychopathy Checklist: Youth Version File Information Sheet

FILE INFORMATION FORM

Subject #: _____

Date: _____

Date admitted:

Institution: _____
Remand ()

Status: Sentenced ()

DEMOGRAPHIC DATA

Age at assessment: _____

Date of Birth: _____

Ethnic Background:

EMPLOYMENT

Any paid employment: No () Yes ()

List and describe any part-time and full-time employment (age onset)

Performance on jobs

Goals and attitude toward work

SCHOOL

Grade Completed: _____ (*in community*) *GED level:* _____

Elementary School (performance, interest, attendance, behavior)

High School (including Junior, performance, interest, attendance, behavior)
(grades 7 – 12)

Institution School (performance, behavior, interest)

FAMILY BACKGROUND

Birth order: _____ of _____

Indicate age and gender of siblings and half-siblings

Raised by: Biol. Father () Biol. Mother () Step-Mother () Step-Father () Relative ()
 Other: _____
 (check all that apply)

Drug Abuse: Biol. Father () Biol. Mother () Step-Mother () Step-Father () Relative ()
 Other: _____
 (check all that apply)

Alcohol Abuse: Biol. Father () Biol. Mother () Step-Mother () Step-Father ()
 Relative () Other: _____
 (check all that apply)

Family Life: Good () Average () Poor () Very Poor ()

Ever removed from home: No () Yes () [describe reason, age, length]

Quality of family life (stability, abuse, supervision)

Past relationship with parents/caregiver

Current relationship with parents/caregiver

PEERS/RELATIONSHIPS

Quality of peer relationships

Quality of relationships with girlfriends/boyfriends

Number of intimate partners: _____ Unknown ()

INSTITUTIONALCurrent Adjustment: Excellent () Good () Slight problem () Behavior problem ()
Chronic problem ()Past Adjustment: Excellent () Good () Slight problem () Behavior problem ()
Chronic problem ()

Placement in segregation: Never () Once/Twice () Three or more ()

Placement in special needs unit: Never () Once/Twice () Three or more ()

Number of attempted escapes/escapes: _____

Type of institutional problems

	None	Once/Twice	Occasional	Frequent
Verbal aggression				
Resident	1	2	3	4
Staff	1	2	3	4
Physical aggression				
Resident	1	2	3	4
Staff	1	2	3	4
Disruptive behavior (destroying property, flooding, fires)	1	2	3	4

Refusing orders	1	2	3	4
Possession of contraband	1	2	3	4
Suicide attempts	1	2	3	4
Slashing	1	2	3	4

Comments:

SUBSTANCE USE

Nonuser (☐) Infrequent user (☐) User of soft drugs (☐) User of hard drugs (☐) Addicted (☐)
(marijuana, hash)

Age of onset: _____

Description of use

Association between drug use and antisocial behavior

ALCOHOL USE

Nondrinker (☐) Social drinker (☐) Problem drinker (☐) Alcohol abuse (☐)
(weekly, gets drunk)

Age of onset: _____

Description of use

Association between alcohol use and antisocial behavior

ANTISOCIAL BEHAVIOR

Age of onset of criminal behavior: _____ Unknown ()

Age at first charge: _____ Charged with: -
_____Age at first conviction: _____ Convicted of :

Present Charge/Conviction

Disposition

Level of aggression in criminal behavior: () None () Minor () Moderate () Severe

Behavior on probation/bail (describe any violations, compliance with supervision)

Description of past criminal behavior (motive, planning, involvement with peers)

Police/court report concerning current charge/conviction

PERSONALITY/PSYCHOLOGICAL/PSYCHIATRIC REPORTS

Test used IQ _____ IQ Total: _____ Verbal IQ: _____
Performance IQ: _____

Diagnoses (check those present): Oppositional defiant disorder ()
Conduct disorder ()
ADHD/ADD ()

Other Diagnoses (list all):

Description (List source and date)

PERSONALITY/PSYCHOLOGICAL/PSYCHIATRIC REPORTS (continued)

MISCELLANEOUS ADDITIONAL REPORTS (List source and date)

Appendix H

Lexical Decision Task

Positive Words

bliss
calm
happy
dove
heaven
vigor
cheer
eager
joke
prayer
charm
tribute
laugh
smile
proud
sunset
kiss
creator
love
trust
medal
warmth
ocean
goddess

Concrete

bean
cage
desk
mole
nail
oven
bush
belt
curb
fang
heel
knob

Negative Words

abuse
curse
gloom
murder
shotgun
slave
awful
cramp
doom
victim
gore
devil
grief
regret
tears
misery
shock
hostage
hurt
sorry
worry
injury
tomb
perjury

Abstract

able
from
just
kept
lack
main
more
wish
said
than
upon
when

Neutral Words

zero
dune
gear
herd
maple
total
bowl
custom
algebra
figment
event
hound
dutch
gene
lock
quote
steel
yard
errand
code
salute
lecture
gallery
piano
grass
kitty
moss
porch
scan
taste
profile
deed
edition
mileage
plain
array
green
lawn
pave
salad
slope
wrist
foam
reflex
vessel
vacuum
sulphur
pupil

Appendix I

Affective Matching Task Pictures

Incongruent Condition IAPS Numbers

positive/negative	neutral
-------------------	---------

3530	9050	7010
4250	9250	7004
5621	9630	7020
6230	9810	7170
8034	9921	7200
8080	8170	7234
8185	6550	7150
8190	6350	7034
8370	3170	7002
8400	6821	2495
8501	6242	2214

Congruent Condition IAPS Numbers

positive/negative	neutral
-------------------	---------

4660	8420	7050
5470	8380	7000
6250	8470	7190
6313	9600	7224
6370	8030	7233
6510	6530	7060
6560	6260	7080
6570	4608	2514
8200	4150	1670
8180	3500	7705
8260	8340	7235

Appendix J

Picture Word Task

Gyl	Liy	Lig	Kun
Zat	Ven	Yat	Fyt
Boc	Mog	Wok	Fow
Ler	Boy	Lup	Guk
Cag	Fot	Pog	Kew

Appendix K

Results Using Median Split for Analyses

Inter-rater reliability coefficients were conducted for PCL:YV total score and for each factor score using a Pearson Correlation Coefficient. These analyses revealed a very high agreement was obtained for total scores ($r = .99$) and across each of the Factor scores, $r = .93$ for Factor 1, $r = .94$ for Factor 2, $r = .92$ for Factor 3, and $r = .99$ for Factor 4. Alpha reliabilities were also calculated for each of the factor scales and for the overall PCL:YV scores. The total factor score yielded an alpha reliability of $\alpha = .93$, with factor scores ranged from $\alpha .73$ to $.87$. These scores are similar to reliability measures found in similar studies on juvenile samples (Forth et al., 2003).

Lexical Decision Task – Emotional Valance Condition

Preliminary Analyses. Correlation coefficients suggest that a relation exists between which hand was used for this task and response facilitation as it relates to psychopathic traits. A significant correlation was found between total PCL:YV scores and response time facilitation for negative words for left handed responses, $r(45) = -.39, p < .006$, indicating that those who score high on psychopathy have faster reaction times for negative words. This effect was significant for Factor 1 scores, $r(45) = -.41, p < .005$ and Factor 2 scores, $r(45) = -.41, p < .005$, but not for Factor 3, $r(45) = -.24, p = .11$ or Factor 4 scores, $r(45) = -.11, p = .48$. This relation appears to indicate that young offenders in this sample, who score high on psychopathic traits such as interpersonal (Factor 1) and affective abnormalities (Factor 2) show faster reaction times to negative words. This effect was not found for left handed responses to positive words. No significant relations were found for positive, negative, or neutral words and total psychopathy or factor scores when participants responded with their right hand. However, when positive and

negative words were collapsed together to form an emotional facilitation score (average of neutral words minus the average of positive and negative words for correct responses), a significant relation was noted on right handed responses and Factor 4 scores (antisocial behaviour), $r(45) = .33, p < .03$, suggesting that those who have a high score on antisocial behavioural showed greater emotional facilitation when responding with their right hand.

To examine if group differences would be found on overall reaction time and accuracy for words and nonwords, four mixed model analyses of variance (ANOVA) were conducted. Groups were divided based on their total PCL:YV scores into two groups based on a median split: high psychopathic traits (PCL:YV score > 20) and low psychopathic traits (PCL:YV score ≤ 20). The first analysis examined group differences on word reaction time, therefore, a 2 (Group: high psychopathic traits, low psychopathic traits) $\times$ 2 (Hand: left, right) mixed model ANOVA with group as a between subjects factor and hand as a within subjects factor. This analysis yielded a significant main effect for group, $F(1, 43) = 4.10, p < .05$, indicating that those who scored high on psychopathic traits responded significantly faster ($M = 1433.99, SD = 192.95$) than those who scored low on psychopathic traits ($M = 1534.11, SD = 134.95$). Main effects for hand and interaction effects were not significant.

A 2 (Group: high psychopathic traits, low psychopathic traits) $\times$ 2 (Hand: left, right) mixed model ANOVA was conducted on accuracy ratings for real words on this task. A main effect for hand was marginally significant, Wilks's $\Lambda = .93, F(1, 43) = 3.38, p = .073$, indicating that those who responded with their left hand ($M = 32.11, SD = 5.95$) were slightly more accurate overall than when participants responded with their right hand ($M = 30.73, SD = 5.91$). Main effects for group and interaction effects for this task were not significant.

To explore group differences on reaction time for nonwords, a 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Hand: left, right) mixed model ANOVA was conducted. This analysis did not reveal any main effects for group or hand, as well, interaction effects were not significant. Further, a 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Hand: left, right) mixed model ANOVA was conducted on overall accuracy for nonwords, again revealing no significant main effects or interaction effects.

Main Analyses. The hypothesis of whether group differences would be found on emotional facilitation between those who score high on psychopathic traits when responding with either their left or right hand than those who score low on psychopathic traits was explored through a 2 (Group: high psychopathic traits, low psychopathic traits) by 2 (Hand: left, right), by 2 (Valence: positive, negative) mixed-model ANOVA with group as the between-group factor and hand and valence as the within-group factors on measures of reaction time. The following summary, however, must be interpreted with caution. The analysis was conducted using the entire sample of young offenders, however the accuracy ratings for this group ranged from 33% to 100% across hand and valance, with mean accuracy ratings across groups ranging from 62% to 68%. Further one participant scored above 3 standard deviations on reaction time for both emotional facilitation scores, thus his score was adjusted to 3 standard deviations on reaction time. This analysis revealed a significant interaction effect for Hand x Group x Valance, Wilks's $\Lambda = .90$, $F(1, 43) = 4.95$, $p < .03$, $\eta^2 = .10$. To examine simple main effects associated with this 3-way interaction, the file was split on the between factor group and a repeated measures ANOVA was conducted with response time facilitation associated with hand and valance. For the low scoring psychopathic group, a marginally significant interaction effect was observed between hand and valance, Wilks's $\Lambda = .86$, $F(1, 22) = 3.73$, $p < .05$, indicating that that low

scoring psychopathic youth offenders who responded with their left hand had greater response facilitation to positive words ($M = 18.10, SD = 84.32$) than to negative words ($M = -11.14, SD = 57.45$), whereas when they responded with their right hand, the opposite effect was noted. In the low psychopathic group, when they responded with their right hand, they had greater response facilitation to negative words ($M = -19.19, SD = 72.22$) than to positive words ($M = -30.86, SD = 76.22$), however for left handed responses to negative words and right handed responses to both negative and positive words, this group responded faster to neutral words than to emotional words. For the high scoring psychopathic group, a significant main effect for valence was found, Wilks's $\Lambda = .78, F(1, 21) = 5.80, p < .03$. This suggests that high scoring psychopathic youth show greater response facilitation to negative words ($M = 13.34, SD = 55.67$) than to positive words ($M = -9.85, SD = 48.37$). This group responded faster to neutral words than to positive words regardless of which hand was used for responding.¹

Exploratory Analyses. Based on the theoretical framework that those who score high on Factor 2 (affective) scores show an abnormality when processing emotional material, a hierarchical regression was conducted with emotional facilitation as the outcome variable. When emotional facilitation was examined, collapsing across handedness, with Factor 2 entered at step 1, it accounted for a significant percentage of variance, $R^2 = .10, F(1, 43) = 4.58, p = .038$. When Factor 1, Factor 3, and Factor 4 were entered at step 2, no significant increase in variance was found (R^2 change = .05).

To examine the association between Factor 2 and emotional facilitation for left hand responses, another hierarchical regression was conducted. When Factor 2 was entered at step 1 in the regression analysis, it accounted for only .6% of the variance ($R^2 = .06, F(1, 43) = .25, p$

¹ By examining the groups based on high (≥ 28) versus low (≤ 17) with 31 participants, the 3-way interaction effect was no longer significant. However, main effects were noted for the reduced sample.

> .05. Factor 1, Factor 3, and Factor 4 entered at step 2 of the analysis did not account for a significant increase in variance accounted for on emotional facilitation. A similar analysis was examined on emotional facilitation for right handed responses. When Factor 2 was entered at step 1, it accounted for 5% of the variance of emotional facilitation, however this model was not significant, $F(1, 43) = 2.15, p > .05$. Similar to the previous analysis, when Factor 1, Factor 3 and Factor 4 were entered at step 2, the factors did not account for a significant increase in the variance accounted for in emotional facilitation.

Lexical Decision Task – Concrete/Abstract Condition

Preliminary Analyses. Correlational analyses for the variables on this task revealed that as participants responded faster with their left hand for concrete words they also had higher scores on Factor 3 (behavioural), $r(45) = .30, p < .05$. Those who had high Factor 4 (antisocial) scores had a significant relation to responses on abstract words, indicating that high scores on Factor 4 resulted in slower response times to abstract words for left handed responses, $r(45) = -.31, p < .04$. Similarly, those who scored high on Factor 1 scores, also responded slower to abstract nonwords when responding with their left hand, $r(45) = -.32, p < .03$. All other correlations were not significant.

Main Analyses. A 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Hand: left, right) x 2 (Condition: concrete, abstract) mixed model ANOVA with group as a between subjects factor and hand and condition as within subjects factors on response time facilitation was conducted revealing a marginally significant main effect of condition, Wilks's $\Lambda = .92, F(1, 43) = 3.73, p < .06$. This indicates that young offenders responded slower to concrete words (M

= 503.78, $SD = 42.55$) than to abstract words ($M = 490.73$, $SD = 42.61$). All other interaction effects and main effects were not significant.²

A 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Hand: left, right) x 2 (Condition: concrete, abstract) mixed model ANOVA was conducted on accuracy ratings for this task. A significant interaction was found between hand x condition, Wilks's $\Lambda = .83$, $F(1, 43) = 8.57$, $p < .006$, revealing that young offenders when responding with their left hand were more accurate to responses for concrete words, ($M = 8.27$, $SD = 1.97$) than to abstract words ($M = 7.93$, $SD = 1.85$), whereas, when young offenders responded with their right hand, they were more accurate to abstract words ($M = 9.16$, $SD = 2.42$) than to concrete words ($M = 8.20$, $SD = 1.82$). Further, a significant main effect was found for condition, Wilks's $\Lambda = .85$, $F(1, 43) = 7.45$, $p < .01$, which indicates that participants were more accurate on abstract words ($M = 8.54$, $SD = 1.85$) than they were on concrete words ($M = 8.23$, $SD = 1.64$).³

Affective Matching Task

Preliminary Analysis. A significant positive relation was found for those who responded in the congruent condition and Factor 3 scores, $r(45) = .31$, $p < .03$, revealing that those who had a high reaction time for this task had a high score on Factor 3 (behavioural). Further, those who scored high on Factor 4 (antisocial) also had a slower reaction time on the congruent condition, $r(45) = .39$, $p < .008$. Lastly, those who had a high score on the incongruent condition, reflecting slower reaction time, had a significant relation with Factor 4 scores, $r(45) = .31$, $p < .04$. All other correlations were not significant.

A 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Condition: congruent, incongruent) mixed model ANOVA with group as a between subjects factor and condition as a

² In the reduced sample ($n = 31$), no significant main effects or interactions effects were found for this analysis.

³ Similar results were obtained in the reduced sample.

within subjects factor on reaction time was conducted yielding no significant interactions or main effects on this task. A 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Condition: congruent, incongruent) mixed model ANOVA on accuracy ratings was conducted which revealed a significant main effect for condition, Wilks's $\Lambda = .55$, $F(1, 43) = 34.75$, $p < .001$. This suggests that young offenders were more accurate when they responded to the congruent condition ($M = 8.58$, $SD = 2.01$) than when they responded to the incongruent condition ($M = 5.96$, $SD = 2.53$).

Main Analysis. Examining responses on the congruent condition only, a 2 (Group: high psychopathic traits, low psychopathic traits) x 2 (Valance: positive, negative) mixed model ANOVA on reaction time with group as the between group factor and valance as a within group factor was conducted. A main effect for valance was found, Wilks's $\Lambda = .64$, $F(1, 43) = 23.78$, $p < .001$, indicating that young offenders scored significantly faster on negative picture matching ($M = 728.98$, $SD = 321.16$) than when they responded to positive picture matching ($M = 935.48$, $SD = 372.56$).⁴

Picture-Word Emotional Stroop Task

A 2 (Group: high psychopathic traits, low psychopathic traits) x 4 (Card: card 1, card 2, card 3, card 4) mixed model ANOVA with group as a between subjects factor and card as a within subjects factor was conducted on overall reaction time to the cards presented in this task. As expected, a significant main effect was observed on picture word cards, Wilks's $\Lambda = .32$, $F(3, 41) = 28.67$, $p < .001$, indicating that young offenders were significantly faster when presented with card 1 (words) than cards two, three and four. Further, no significant differences were found between the means on the interference condition ($M = 19.99$, $SD = 4.47$) and trigram

⁴ Similar results were obtained for the reduced sample.

condition ($M = 18.76$, $SD = 4.80$). No significant main effects on group and no interaction effects were found for this task.

To assess group differences on accuracy for the trigram and interference conditions, a 2 (Group: high psychopathic offenders, low psychopathic offenders) x 2 (Card: trigram, interference) mixed model ANOVA was conducted with group as a between groups factor and card as a within groups factor. A significant main effect for card was observed, Wilks's $\Lambda = .84$, $F(1, 43) = 8.01$, $p < .008$, indicating that young offenders on this task had more errors on the interference condition ($M = .60$, $SD = .92$) than on the trigram condition ($M = .16$, $SD = .39$).⁵

⁵ The reduced sample revealed a significant group main effect, indicating that those who scored high on psychopathic traits did not show the interference effect on accuracy ratings on this task.