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Cognitive, Emotional, and Behavioural Correlates in Children with Psychopathic Traits

Vanessa Leanne Pedden
The University of Western Ontario

Supervisor
Dr. Peter Hoaken
The University of Western Ontario

Graduate Program in Psychology

A thesis submitted in partial fulfillment of the requirements for the degree in Doctor of Philosophy

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COGNITIVE, EMOTIONAL, AND BEHAVIOURAL CORRELATES IN CHILDREN WITH PSYCHOPATHIC TRAITS

(Spine title: Children with Psychopathic Traits)

(Thesis format: Monograph)

by

Vanessa L. Pedden

Graduate Program in Psychology

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

The School of Graduate and Postdoctoral Studies
The University of Western Ontario
London, Ontario, Canada

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THE UNIVERSITY OF WESTERN ONTARIO
School of Graduate and Postdoctoral Studies

CERTIFICATE OF EXAMINATION

Supervisor	Examiners
Dr. Peter Hoaken	Dr. Greg Moran
Supervisory Committee	Dr. Graham Reid
Dr. Greg Moran	Dr. Alan Leschied
Dr. Derek Mitchell	Dr. Karl Hennig

The thesis by

Vanessa Leanne Pedden

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Abstract

Psychopathy is a developmental disorder characterized by deficits in emotional, interpersonal, and behavioural domains. Adult psychopaths commit a disproportionate amount of violent crime and are at a heightened risk for recidivism. Research suggests that youth with psychopathic traits present with deficits similar to their adult counterparts on measures of passive avoidance learning and emotional processing. There is also evidence to suggest that these youth engage in differential forms of aggression. In addition, research suggests that adult psychopathy develops early in life. The purpose of this dissertation was to examine cognitive, emotional and behavioural characteristics in children with psychopathic traits. The first objective of this dissertation was to examine cognitive and emotional processes in a sample of children with conduct problems (n = 56). The second objective of this dissertation was to examine the relationship between dimensions of psychopathic traits in children and two forms of aggression. The callous-unemotional traits, impulsivity, and narcissism dimensions of the Antisocial Process Screening Device (APSD; Frick & Hare, 2001) were examined as predictors of both reactive and proactive aggression. Youth participants completed several behavoural measures and a self-report measure of aggression. Parents or caregivers also completed questionnaires assessing behaviour, personality, and psychopathic traits in their children. As hypothesized, children with high psychopathic traits displayed deficient passive avoidance. Further, children with high psychopathic also showed a bias away from threatening images. Children's self-reported aggression was associated with callous-unemotional traits. These findings provide support for the developmental theory of psychopathy and help to explain the potential role of psychopathic traits in development

of aggressive behaviours. Recommendations for future research and the clinical implications of these findings are discussed.

Keywords: psychopathic traits, children, emotional processing, cognitive processing, reactive aggression, proactive aggression.

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Introduction

Psychopathy is a construct used to describe individuals who display a pattern of callous, manipulative, and deceitful behaviour (Cleckley, 1941; Hare, 1994). Within the criminal justice system, psychopaths commit a disproportionate amount of violent crime (Porter, Birt, & Boer), and the rate of recidivism for these offenders is greater than offenders without psychopathy (Salekin, Rogers, & Sewell, 1996). To date, efforts to rehabilitate psychopathic offenders have been unsuccessful **(**Hare, Clark, Grann, & Thornton, 2000**).** Research with adult psychopaths has found that these individual present with unique cognitive, emotional and behavioural deficits (Blair, Mitchell, Blair, 2005). As such, research has been interested in better understanding the developmental trajectory of psychopathy.

Psychopathy is now considered a developmental disorder (Blair, 2010), and research suggests that characteristics that define psychopathy likely manifest in childhood (e.g., Frick & White, 2008). Within the last two decades, researchers have begun to investigate the development of psychopathic traits in youth. Recent research suggests that there are a subset of youth with severe conduct problems who also present with distinct cognitive, emotional, and behavoural characteristics which are similar to those characteristics seen in adults with psychopathy (Frick & White, 2008).

In an attempt to replicate and extend the current literature, this dissertation further investigated the unique cognitive, emotional and behavoural characteristics seen in children (age 7-12 years) with psychopathic traits. Specifically, this dissertation examined passive avoidance learning and emotional processing using existing and adapted behavioural measures. Additionally, the present dissertation examined the

relationships between domains of psychopathic traits (i.e., callous-unemotional traits, narcissism, and impulsivity) and proactive versus reactive aggression.

Given that the study of psychopathy in children is a downward extension of the adult construct, the first section of the introduction begins with a brief overview of this construct as it is conceptualized in adulthood. This is followed by a discussion of the unique cognitive, emotional and behavoural characteristics seen in adults with psychopathy. Next, the reader is introduced to one theory outlining the development of psychopathy.

The second section of the introduction introduces the reader to the literature on psychopathy in children and adolescents. This begins with a section outlining how the construct of psychopathic traits is conceptualized in youth. Early attempts to classify youth with psychopathic traits are discussed, and the concept of callous-unemotional traits is introduced. This is followed by a description of the unique cognitive and emotional characteristics seen in youth with psychopathic traits. The final section of the introduction outlines the relationship between psychopathic traits and distinct facets of aggression, namely proactive and reactive aggression.

Psychopathy in Adults

The cardinal features of psychopathy were originally outlined by Cleckley (1941) in his influential book, *The Mask of Sanity,* in which he described characteristics of 15 patients who he identified as psychopaths. Although Cleckley noted that these patients were competent, rather intelligent, and by all accounts appeared sane, certain traits set them apart. Interpersonally, he described them as manipulative, egocentric and cold hearted. Affectively, he noted that they displayed shallow emotions, and lacked empathy

and remorse. Behaviourally, he described psychopaths as impulsive, and noted that these individuals displayed a propensity to engage in antisocial behaviour.

Since the time of Cleckley's writings several researchers have identified a constellation of these traits in offender and community samples (e.g., Hare, 2003; McCord & McCord, 1964). Cleckley's description of the psychopath has also been reformulated into what has become the gold standard for assessment of psychopathy in the adult domain: the Psychopathy Checklist–Revised (PCL: R; Hare, 1991, 2003). Using this measure, factor analysis has identified four facets that load onto two higher order constructs (Harpur, Hakstian, & Hare, 1988). Factor 1 reflects the affective (e.g., lack of remorse and empathy) and interpersonal (e.g., superficial charm, manipulativeness) features of psychopathy. Factor 2 reflects the lifestyle (e.g., irresponsibility, need for stimulation) and antisocial behaviour (e.g., juvenile delinquency, criminality) domains. Although the two-factor model of psychopathy is widely supported within the literature, in a controversial article Cooke and Michie (2001) question the PCL-R's (Hare, 1991, 2003) traditional factor structure. They argue that the two-factor four-facet solution places too much emphasis on antisocial behaviour, and they criticize the two-factor structures' ability to adequately capture the construct of psychopathy (Cooke & Michie, 2001). Whereas Hare (1991, 2003) argues that antisocial behavior is a symptom of psychopathy, Cooke and colleagues instead view antisocial behavior as a consequence of psychopathy (Cooke, Michie, Hart, & Clark, 2004). Their three-factor structure of psychopathy places less emphasis on the criminological aspects of this disorder, and includes the affective, interpersonal, and lifestyle facets outlined above. Although Hare's conceptualization of psychopathy, and subsequently the PCL-R (Hare, 1991, 2003), has

been described as the gold standard for the measurement of psychopathy in the adult domain (Acheson, 2005), as will be discussed later, the three-factor model of psychopathy appears to capture this disorder best in children and adolescents.

Psychopathy versus Antisocial Personality Disorder

Psychopathy often co-occurs with antisocial personality disorder (Edens, Poythress, & Watkins, 2001; Lilienfeld & Andrews, 1996), however, a common misconception is that psychopathy and antisocial personality disorder are interchangeable constructs. Although individuals can simultaneously possess characteristics of antisocial personality disorder (e.g., they are impulsive) and psychopathy (e.g., they display shallow affect), to state that antisocial personality disorder and psychopathy are synonymous is incorrect. The essential feature of antisocial personality disorder is, "a pervasive pattern of disregard for, and violation of, the rights of others that begins in childhood or early adolescence and continues into adulthood" (American Psychiatric Association, 2000, p. 701). Antisocial personality disorder is more often expressed behaviorally (e.g., physical fights, arrests and irresponsibility), whereas psychopathy not only encompasses antisocial behavior, it also involves an affective and interpersonal component. In offender populations the prevalence of antisocial personality disorder ranges from 50-80%, yet only 15% of offenders meet the criteria for psychopathy on the PCL-R (Hare, 1991, 2003). Furthermore, the link between antisocial personality disorder and psychopathy is asymmetric. Whereas the vast majority of psychopaths will meet criteria for antisocial personality disorder, research has found that fewer than half of all offenders diagnosed with antisocial personality disorder meet the criteria for psychopathy (Hare, 1996, 2003; Hildebrand, & de Ruiter, 2004).

The Importance of Psychopathy

A substantial literature indicates that psychopaths commit significantly more violent and nonviolent crime than non-psychopaths (Hare & Jutai, 1983; Kosson, Smith, & Newman, 1990; Reidy, Shelly-Tremblay, & Lilienfeld, 2011). For example, adult psychopaths commit, on average, almost twice as many violent crimes than non-psychopathic offenders (Hare & Jutai, 1983; Porter et al., 2001). Furthermore, research has found that PCL-R (Hare, 1991, 2003) scores predict a severe and violent pattern of antisocial behaviour (Hemphill, Hare, & Wong, 1998; Salekin et al., 1996). Studies have found that psychopaths engage in severe forms of sexual violence, including both opportunistic and pervasively angry rape[1] (Brown & Forth, 1997), and that they tend to target many victims (Porter, Campbell, Woodworth, & Birt, 2002). The construct of psychopathy has also demonstrated good predictive utility, which has implications for the criminal justice system. For example, a meta-analysis of 18 studies examining the relationship between psychopathy and recidivism reported an average effect size of .55 for general recidivism, and an effect size of .79 for violent recidivism (Salekin et al., 1996). A second meta-analysis found that psychopathic offenders were four times more likely to engage in violent recidivism than non-psychopathic offenders (Hemphill, Templeman, Wong, & Hare, 1998). Finally, past studies have found that psychopaths show poorer prognosis than non-psychopaths after treatment (Hare et al., 2000; Rice, Harris, & Cormier, 1992). For example, one study found that offenders who had participated in a treatment program and scored high on Factor 1 of the PCL-R (Hare,

[1] Opportunistic and pervasively angry rape are both subtypes of rape using the classification system from the Revised Rapist Typology, Version 3 (Massachusetts Treatment Center: Rapist Typology 3; Knight & Prentky, 1990). Opportunistic rape refers to rape which is motivated by impulsive exploitation of the victim. Pervasively angry rape is motivated by anger.

1991, 2003) recidivated at a much higher rate two years after they were released than those offenders who did not have high Factor 1 scores (Hare et al., 2000). Although the prevailing attitude appears to be that psychopaths cannot be treated, a more recent investigation of studies using stringent research methodologies concluded that the relationship between psychopathy and treatment response cannot be established at this time (D'Silva, Duggan, & McCarthy, 2004).

Characterizations that Define Adult Psychopaths

Adults with psychopathy present with deficits with both cognitive (Newman, Widom, & Nathan, 1985) and emotional processing (Levenstron, Patrick, Bradley, & Lang, 2000; Patrick, 1994). Research with adult psychopathic offenders has also shown that these individuals display both reactive and instrumental aggression (terms that will be defined below), whereas offenders without psychopathy generally engage in aggression that is reactive in nature (Cornell et al., 1996). These findings suggest that the developmental trajectory of antisocial behavior may be quite different from those individuals who present with antisocial behavior in the absence of psychopathy. The cognitive, emotional and behavioral characteristics seen in individuals with psychopathy are outlined below. This is followed by a discussion of one theory outlining the neurocognitive development of psychopathy.

Psychopathy and cognitive processing. It has been well documented that adults with psychopathy present with deficits in specific forms of instrumental learning (Blair, Mitchell et al., 2005). Instrumental learning involves learning to avoid stimuli that have been previously paired with punishment. Passive avoidance paradigms, extinction tasks, and response reversal tasks are all indexes of instrumental learning. Passive avoidance

involves inhibiting a behaviour that would otherwise result in punishment (Newman et al., 1985). Successful passive avoidance requires the formation of stimulus-reinforcement associations (i.e., an association between a stimulus and either reward or punishment; Blair, Mitchell, et. al., 2005). Passive avoidance learning is typically assessed by asking participants to respond to certain stimuli (i.e., S+) and to avoid responding to different stimuli (i.e., S-). In the classic passive avoidance task, participants are rewarded (i.e., given points, money, or tangibles) for responding to an S+, and are punished (i.e., points, money, or tangibles are taken away) for responding to an S- (Newman et al., 1985). Two types of errors can occur on passive avoidance tasks: errors of commission (i.e., responding to an S-), and errors of omission (i.e., failing to respond to an S+). Errors of commission represent a failure of passive avoidance. Numerous studies in the adult domain have consistently shown that psychopaths exhibit impaired passive avoidance learning on classic passive avoidance tasks (Blair, Mitchell, Leonard, et al., 2004; Lykken, 1957; Newman & Kosson, 1986; Newman & Schmitt, 1998; Newman, et al. 1985).

Extinction and response reversal tasks are variants of instrumental learning paradigms in which the participant must learn to withhold or change their responding upon discovering that their original response to a stimulus is no longer rewarded, but rather punished. Success on these types of tasks requires the formation of stimulus-response associations (i.e., an association between a stimulus and a motor response; Blair, Mitchell, et. al., 2005). In extinction tasks, participants respond to stimuli in order to gain rewards. After some time they must then learn to avoid responding to the same stimuli that earlier elicited rewards, as such stimuli now results in punishment. Newman's card

playing task (Newman, Patterson, & Kosson, 1987) is an example of an extinction task. In this task, participants decided whether or not to play a card. In the early stages of this task, the reinforcement (i.e., gaining points) for playing a card is high, however, as participants progress thought the deck, the probability of rewards decreases. Participants should stop playing cards when the proportion of cards punished is greater than the proportion of cards rewarded. Although punishment cues outweigh cues for reinforcement, adults with psychopathy are unable to shift their responding and continue to play cards on this task (Newman et al., 1987). This response style is referred to as a reward-dominant response style.

In response reversal tasks, participants learn to respond to one of a series of stimuli to gain rewards. After some time, they must then learn to reverse responding and respond to a different stimulus, when responding to the previously rewarded stimulus gives rise to punishment. Bechara's four-pack gambling task (Bechara, Damasio, Damasio & Anderson, 1994) is one example of a response-reversal task. In this task, participants choose one card from four decks in an effort to gain rewards (e.g., points). Two of the decks contain high rewards and even higher punishments. The other two decks contain low rewards and even lower punishments. Adults with psychopathy are more likely than healthy controls to choose the high-reward high-punishment deck (Mitchell, Colledge, Leonard, & Blair, 2002).

To summarize, adults with psychopathy show deficits on several instrumental learning tasks. Laboratory studies with adults with psychopathy have consistently shown that they display deficient passive avoidance learning (Blair, Mitchell, Leonard, et al., 2004; Lykken, 1957; Newman & Kosson, 1986; Newman & Schmitt, 1998; Newman, et

al. 1985). Additionally, studies have found that once adult psychopaths adopted a response set to reward, they have difficulty attending to competing response contingencies on extinction and response reversal tasks (Newman et al., 1987; Mitchell et al., 2002).

Psychopathy and emotional processing. Research has shown that adults with psychopathy demonstrate difficulties processing negative emotional stimuli (Levenston et al., 2000; Patrick, 1994; Patrick, Bradley, & Lang, 1993). Emotional processing has been assessed using paradigms that require the individual to name an emotional expression or a vocal tone (i.e., recognition tasks; Blair, Mitchell, Peschardt, et al., 2004), paradigms that measure an individual's automatic responses to emotional stimuli (i.e., skin conductance or startle reflex; Blair, Jones, Clark, & Smith, 1997), and paradigms that assess emotional attention (typically assessed by response latencies; Kimonis, Frick, Fazekas, & Loney, 2006). Studies have found that adult psychopaths present with impaired recognition for fearful expressions (Blair et al., 2004) and fearful vocal tones (e.g., nouns spoken in a manner intended to convey the emotion of fear; Blair, Mitchell, Richell et al., 2002). Other studies have found that psychopaths perform as well as, or better than controls on facial recognition tasks (Glass & Newman, 2006; Kosson, Suchy, Mayer, & Libby, 2002).

When investigating the emotional responding of adult psychopaths by examining skin conductance responses, studies have demonstrated that psychopaths are less responsive to distress cues (e.g., pictures of people crying: Blair et al., 1997). Psychopathic men, however, respond similarly to non-psychopathic men when viewing threatening stimuli (Blair et al., 1997). Additionally, adults with psychopathy show

reduced skin conductance responses to sad, but not angry expressions (Blair, 1999; Blair et al., 1997). These individuals also show reduced skin conductance response to both positive and negative auditory stimuli (Verona, Curtin, Patrick, Bradley, & Lang, 2004).

Finally, studies have shown that psychopaths demonstrate a reduced startle reflex in response to negative emotional stimuli (e.g., pictures of guns and mutilations; Patrick et al., 1993). Startle reflex is the automatic jump reaction when exposed to basic threat, and it is typically measured by the number of reflex eye-blinks in controlled studies. Healthy individuals show larger startle responses during unpleasant visual stimuli compared to pleasant stimuli (Patrick et al., 1993). Psychopaths' startle reflex to pleasant stimuli, however, resembles normal controls (Levenston et al., 2000; Patrick et al., 1993; Vanman, Mejia, Dawson, Schell, & Raine, 2003).

To summarize, adults with psychopathy show impaired processing of negative emotional stimuli. They show impaired facial recognition for fearful expressions and they are less responsive to distressing images.

Psychopathy and aggression. Adults with psychopathy engage in severe and violent patterns of aggression which are both reactive and proactive in nature (Cornell et al., 1996). In order to better understand the relationship between psychopathy and proactive versus reactive aggression, it is important to provide the reader with an overview of the literature outlining the reactive versus proactive distinction. This is followed by a summary of the literature outlining the relationship between adult psychopathy and differential forms of aggression.

Research on aggressive behaviour has identified two dimensions of aggressive responding: reactive and proactive aggression (Dodge, 1991; Dodge & Coie, 1987;

Vitaro & Brendgen, 2005). Reactive aggression (also known as hostile or impulsive aggression in the adult literature) refers to angry and impulsive responding that is usually triggered by provocation, or if provocation was not intended, by the interpretation of provocation, frustration or threat. Proactive aggression (also known as instrumental or premeditated aggression in the adult literature) refers to goal-oriented, predatory aggression that is typically unprovoked (Dodge & Pettit, 2003).

Although the reactive-proactive distinction has proven useful in forwarding theories of aggression, several researchers have challenged this approach, arguing that the distinction is not reliable or valid (see Bushman & Anderson, 2001). Most critics question whether they are indeed distinct constructs, since these two forms of aggression are moderately to strongly correlated (range from .40 to .90 in samples of children and adolescents; Card & Little, 2006; Hubbard, Morrow, Romano, & McAuliffe, 2010; Vitaro & Brendgen, 2005; Vitaro, Brendgen, & Tremblay, 2002). Similarly, Woodworth and Porter (2002) suggest that the underlying motivation for aggression is best captured along a continuum. They argue that aggressive behaviour can be purely reactive, purely proactive, or a combination of both. They further argue that aggression can change in form from instrumental to reactive and vice versa.

Despite this criticism, factor analysis has supported the proactive-reactive distinction in children and adolescents (Poulin & Boivin, 2000; Salmivalli and Nieminen, 2002). In addition, numerous studies and meta-analyses have shown that the subtypes display unique correlations with cognitive, behavioural, social and emotional domains. For example, reactive aggression is positively correlated with a “hostile attribution bias” (i.e., a tendency to misidentify ambiguous behaviour as representing hostile intent; Bailey

& Ostrov, 2008; Crick & Dodge, 1996; Dodge & Coie, 1987), low frustration tolerance, impaired responses to emotional stimuli, and depressive symptoms (Vitaro et al., 2002). A recent study supported the reactive-proactive dichotomy (Tapscott, Hancock & Hoaken, 2012), and an even more recent taxometric analysis indicated that reactive and proactive acts of violence are distinct categorical constructs (J. Tapscott, personal communication, August 23, 2012). The following section examines which forms of aggression are most often perpetrated by psychopathic adults.

Psychopathy and reactive versus proactive aggression. Within the adult literature, it has been well documented that psychopaths commit more violence and aggression than nonpsychopaths (Porter et al., 2001). It has also been shown that psychopaths engage in differential forms of aggression. Whereas nonpsychopathic offenders typically present with a history of reactive aggression, psychopathic offenders are more likely to engage in both reactive and proactive aggression (Cornell et al., 1996; Woodworth & Porter, 2002). Furthermore, studies have found that psychopaths are more likely than nonpsychopaths to commit violent crimes for material gain (Williamson, Hare, & Wong, 1987). Studies have also found that psychopaths are more likely than nonpsychopaths to have committed homicides that are instrumental in nature[2] (Porter & Woodworth, 2006; Woodworth & Porter, 2002).

Summary. Psychopathy is a disorder that is marked by a constellation of affective, interpersonal and behavioral characteristics (Hare, 1996). These individuals present with unique neurocognitive deficits, including impaired instrumental learning and impaired emotional processing. In addition, individuals with psychopathy display a more

[2] Instrumental homicide refers to a homicide that is goal-oriented (e.g., motivated by a clear external goal) with no indication of provocation.

severe, violent and chronic pattern of antisocial and aggressive behavior than individuals without psychopathy (Salekin et al., 1996). The rate of recidivism of violent crime is more than double that of individuals without psychopathy, and most efforts to recidivate psychopaths have been unsuccessful (Hare et al., 2001).

Previous studies have found that adults with psychopathy have a history of antisocial acts that extend well into childhood (Patrick, 2007). This suggests that characteristics that define psychopathy likely manifest early on (e.g., Frick & White, 2008). Given the social costs associated with psychopathy, and given the findings that adult psychopaths have proven to be a difficult population to treat, a large body of research has recently focused on the development of psychopathy.

The Development of Psychopathy

Since Cleckley (1941) first proposed the now classic definition of psychopathy, a number of theories have been developed to account for its etiology, including; cognitive theories (e.g., response modulation hypothesis; Lorenz & Newman, 2002; Newman, 1998), neural theories (e.g., somatic marker hypothesis; Bechara, Damasio, & Damasio, 2000), personality theories (e.g., psychopathy conceptualized as a constellation of traits from the five-factor model of personality; Lynam, 2010) and temperament theories (e.g., low behavioral inhibition; Frick, 2000).

The most recent and empirically supported model of the development of psychopathy has been proposed by Blair and colleagues (Blair, Mitchell et al., 2005; Blair, Peschardt, Budhani, Mitchell, & Pine, 2006). Recognizing that one theory alone cannot account for the many deficits present in individuals with psychopathy, Blair and colleagues' draw from the empirical literature outlining the neurocognitive deficits seen

in these individuals. As such, this theory attempts to explain psychopathy at multiple levels (e.g., biological, cognitive and behavioral) and provides a comprehensive account of its development.

A neurocognitive account of the development of psychopathy. Blair and colleagues (Blair, Mitchell et al., 2005; Blair et al., 2006) argue that there is a genetic contribution to the development of psychopathy, and that genetic abnormalities disrupt the functioning of the amygdala. Amygdala dysfunction leads to an impairment in emotional learning. Impaired emotional learning can account for the cognitive, emotional and behavioral characteristics seen in psychopathy. Further, this emotional dysfunction disrupts the socialization process, thereby placing individuals at a greater risk for learning antisocial behaviors, including proactive and reactive aggression, to achieve their goals. A more detailed description of the neurocognitive development of psychopathy is outlined below. This section begins with a review of studies highlighting the genetic contribution to psychopathy.

Genetic contribution to psychopathy. Studies have found that antisocial behavior is the result of both environmental and genetic effects (Rhee & Waldman, 2002), but there is growing evidence to suggest that the genetic contribution is larger for psychopathy (e.g., Waldman & Rhee, 2006). Rhee and Waldman (2002) conducted a meta-analysis of 51 twin and adoption studies examining the genetic influences of aggression and antisocial behavior. They found moderate genetic (additive a^2=.32; nonadditive d^2=.09), and environmental (shared c^2=.16; nonshared e^2=.43) influences on antisocial behavior. Waldman and Rhee (2006) conducted a follow-up meta-analysis of nine of those studies that explicitly measured the construct of psychopathy. In contrast to

their 2002 findings regarding antisocial behavior, there was *no* evidence for shared environmental influences across the studies of psychopathy. They found a moderate genetic (additive a^2=.49) and environmental (nonshared e^2=.51) influence on self-report measures of psychopathy[3].

Studies examining the heritability of psychopathy in children and adolescents have shown similar findings. For example, Viding and colleagues examined the heritability of teacher rated callous-unemotional traits (e.g., lack of empathy, lack of guilt, callous use of others) in a sample of over 3000 7-year-old twins (Viding, Blair, Moffitt, & Plomin, 2005). Callous-unemotional traits were found to be strongly heritable (67% heritable). Larsson, Andershed, and Lichtenstein (2006) examined the heritability of the dimensions of psychopathy (i.e., callous-unemotional traits, grandiosity/manipulation, and impulsivity/irresponsibility) in a sample of 16-year-old twins. Genetic effects accounted for 43–51 % of the variation in the dimensions. Conversely, the influence of shared environmental effects accounted for little variance in each dimension.

Taken together, these results suggest that there is a moderate to strong genetic contribution to the development of psychopathy. This dissertation will now turn to Blair and colleagues' (Blair, Mitchell et al., 2005; Blair et al., 2006) consideration of the role of the amygdala in the development of psychopathy.

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[3] Genetic influences reflect the amount of variance in a phenotype (e.g., behaviour or characteristic) that is accounted for by genes, whereas environmental influences reflect the amount of variance in the same phenotype that is accounted for by the environment. Additive effects occur when genes combine in a linear fashion (e.g., the average of the gene from the mother and the father), whereas nonadditive effects occur when there is a dominant gene present. Shared environmental effects refers to the things that siblings have in common (e.g., growing up in the same home), whereas non-shared environmental effects refer to things that siblings experience individually (e.g., different teacher or friends; T. Vernon, personal communication, May 29, 2012; Johnson, Vernon, & Fieler, 2008).

Psychopathy and amygdala dysfunction. In order to better understand how the emotional impairment seen in individuals with psychopathy interferes with one's ability to be socialized, it is necessary to provide the reader with a brief overview of the functions of the amygdala. The amygdala has been implicated in the formation of stimulus-reinforcement associations, which is an association between a stimulus and either a reward or punishment (Baxter & Murray, 2002). In laboratory studies, adult psychopaths (Newman & Kosson, 1986) and adolescents with psychopathic traits (Finger et al., 2011; Vitale et al., 2005) demonstrate impaired stimulus-reinforcement learning on passive avoidance tasks. This emotional impairment results in the psychopath being unable to learn from punishment.

The amygdala has also been implicated in the processing of sad and fearful facial expressions. As detailed earlier, in laboratory studies, adult psychopaths present with impairments in processing negative emotional stimuli, including fearful facial expressions (e.g., Patrick, 1994; Patrick et al., 1993). Laboratory studies have also shown that children with callous-unemotional traits shown reduced responsiveness to sad and fearful facial expressions (Blair & Coles, 2000). Imaging studies with adolescents with conduct disorder and callous-unemotional traits show reduced amygdala responses to fearful expression (Marsh et al., 2008). Taken together, these deficits lead to impairment in emotional learning.

Socialization. Blair and colleagues (Blair, Mitchell et al., 2005; Blair et al., 2006) argue that impaired emotional learning disrupts the child's ability to be socialized. Furthermore, this impairment places them at risk for learning to use antisocial behaviors to achieve their goals. Socialization is a process though which caregivers reinforce

wanted behaviors and punish unwanted behaviors, and it occurs through the process of both aversive conditioning and instrumental learning (Blair, Mitchell et al., 2005). It has been suggested that empathy develops when children initially experience emotional distress from punishment, or when they see others in pain (Kochanska, 1993). Sad and fearful facial expressions serve as social reinforcers, and in typically developing children these expressions become associated with a negative valence. The expression of fear and sadness, or more broadly, the distress of others, therefore, is one class of aversive stimuli (Blair, 2003). Typically developing children, consequently, should learn to avoid using antisocial behavior to achieve their goals because they are able to associate the victim's distress with both empathic arousal and the punishment received from engaging in a transgression. According to this theory, children with psychopathic traits (and callous-unemotional traits) are relatively insensitive to the prohibitions and sanctions of parents. In fact, studies have shown that children with callous-unemotional traits are less responsive to standardized parenting techniques than children without callous-unemotional traits (Wootton, Frick, Shelton, & Silverthorn, 1997).

It is further argued that this emotional dysfunction increases the probability that children with this emotional deficit will learn antisocial motor programs (e.g., antisocial behavior; "If I hit this child he will give me his lunch money") to achieve their goals. As a result, children with psychopathic traits are more likely to engage in behaviors that cause other children harm. However, it should be mentioned that the probability that these children will use antisocial behavior to achieve their goals will, in part, depend on their reinforcement history and their social environment. It has been suggested that a child who presents with psychopathic traits and is born into a wealthy environment will

be less likely to need to learn antisocial behaviors (e.g., stealing) to achieve materialistic goods than a child of lower socioeconomic status. Children from wealthy families can afford to purchase material goods, whereas children with fewer resources may need to learn inappropriate methods of obtaining goods – like robbing people for money or tangibles. Further, exposure to role models in the family or on television may also expose these children to antisocial strategies (Blair et al., 2006).

Aggression. Blair and colleagues (Blair, Mitchell et al., 2005; Blair et al., 2006) argue that individuals with psychopathy and youth with psychopathic traits are at a heightened risk for engaging in both reactive and instrumental (or proactive) forms of aggression. Dysfunction in the ability to form stimulus-reinforcement associations is linked to the empathy deficit seen in children with psychopathic traits. This dysfunction is thought to disrupt the child's ability to be socialized, and therefore places the child at risk for learning to use antisocial behavior to achieve their goals. Goal attainment can be achieved through acts of proactive aggression (R.J.R. Blair, 2007).

Blair and colleagues (Blair, Mitchell et al., 2005; Blair et al., 2006) further argue that impairment in the ability to form stimulus-response associations as a function of contingency change places the psychopath at an increased risk for experiencing frustration. Frustration is experienced when behavior is not rewarded, or an anticipated outcome is not provided (Berkowitz, 1993). It has been argued that reactive aggression is triggered by experiencing frustration (Berkowitz, 1993). It is further argued that psychopaths' inability to adapt and shift their behavior interferes with goal attainment, which may lead to frustration, and ultimately reactive aggression.

Laboratory studies have shown that adults with psychopathy show impaired responding on response reversal and extinction tasks (e.g., Mitchell et al., 2002; Newman et al., 1987). Children with psychopathic traits also show a reward-oriented response style on similar tasks (Barry et al., 2000; O'Brien & Frick, 1996). Individuals with psychopathy experience frustration on response reversal tasks when the contingency of reinforcement changes (Blair, 2010). It is argued that their inability to alter behavior (responding) when they are no longer rewarded for doing so, and the subsequent frustration they experience, increases the probability that they will engage in reactive aggression[4] (Blair, 2010).

Summary. Recent studies support the contention that there is a moderate to strong genetic contribution to the development of psychopathy (e.g., Viding et al., 2005). Genetic abnormalities disrupt the functioning of the amygdala, and to a lesser extent the vmPFC. At the cognitive level, this leads to impairment in the ability to form stimulus-reinforcement associations and stimulus-response associations as a function of contingency change. The ability to process negative emotional stimuli is also impaired in individuals with psychopathy. These deficits disrupt children's ability to be socialized. Resultantly, these children are at an increased risk for engaging in both reactive and proactive aggression.

Psychopathy in Children and Adolescents

Although the term psychopath initially emerged to describe a constellation of interpersonal, affective and behavioral correlates seen in adults, research suggests that the

[4] The ventromedial prefrontal cortex (vmPFC) has more recently been implicated as also being impaired in individuals with psychopathy. The vmPFC has been implicated in success on reversal learning tasks (e.g., response reversal and extinction tasks; Blair, 2010). Since these tasks were not central to the research questions in the present dissertation, a detailed description of the role of the vmPFC is beyond the scope of this dissertation. For more information about the role of the vmPFC see Blair, 2010.

characteristics that define psychopathy likely first manifest in childhood. In addition, contemporary conceptualizations of psychopathy acknowledge that it is a developmental disorder (Blair, 2010). Subsequently, researchers have begun to investigate the development and expression of psychopathy in children and adolescents. This section of the dissertation begins with an introduction to the literature on psychopathy in children and adolescents. Previous attempts to classify or define the psychopathic youth are discussed and the construct of callous-unemotional traits is defined and further explored. This is followed by a review of the distinct cognitive, emotional, and behavioural correlates identified in children with psychopathic traits.

Extending the construct of psychopathy to children and adolescents. Interest in studying psychopathy in children and adolescents was prompted by a number of reasons. First, informed by the finding that psychopathy is a robust predictor of violent criminal offending, and that psychopaths rarely benefit from treatment, researchers sought to identify early manifestations of this disorder. This task was undertaken with the goal of eventually establishing intervention programs that would serve to decrease the propensity of future antisocial and criminal behaviours in youth (Caspi, 2000). Second, given the high concordance rate between psychopathy and antisocial personality disorder, it was felt that identification of psychopathic traits at a young age might provide valuable information for developmental theories of psychopathy (e.g., Moffit, Caspi, Dickson, Silva, & Stanton, 1996). Finally, some have argued that assessment during childhood and adolescence may provide case managers with useful information regarding risk assessment (Campbell, Porter, & Santor, 2004; Corrado, Vincent, Hart, & Cohen, 2004).

While investigating the development and expression of psychopathic traits in youth allows us to better understanding the developmental trajectory of adult psychopathy, the extension of this construct to youth has been met with some controversy. For example, some have argued that a large proportion of youth with conduct problems will display symptoms consistent with a psychopathy diagnosis, while failing to take into account that some of these traits may be transient developmental characteristics (e.g., Seagrave & Grisso, 2002). Others have expressed concerns about the construct validity in youth and the temporal stability of such traits (e.g., Hart, Watt, & Vincent, 2002). Finally, there is concern about labeling youth using terms such as "psychopath", "psychopathic traits" or "callous-unemotional traits", and the implications for treatment opportunities and sentencing that these labels may have (Eden, Skeem, Cruise, & Cauffman, 2001).

Concerns of labeling stem from the adult literature which highlights the importance of the construct of psychopathy within the criminal justice system. On two occasions in Canada, judges have used the construct of psychopathy to help support life sentences in adult cases (*R. v. Lyver,* 1986; *R. V. White,* 1986, as cited in Penney & Moretti, 2005). A more recent study investigating expert testimony and trial outcomes (e.g., judges' written and oral decisions) in dangerous and long-term Canadian offenders found that trial judge explicitly mentioned the PCL-R in almost half of the transcripts reviewed (42.6%). The results further suggested that experts' ratings of treatment amenability were related to trial outcomes (Lloyd, Clark, & Forth, 2010).

A handful of studies have investigated the potential negative consequences associated with labeling effects in youth. For example, one study found that the term

"psychopathic personality traits" had no effect on juvenile probation officers recommendations (e.g., legal sanctions and interventions) of a mock hypothetical young offender (Murrie, Cornell, & McCoy, 2005). A more recent study found that juvenile court judges were more likely to recommend psychological treatment for mock youth labeled as psychopaths (or possessing psychopathic traits). No negative labeling effects were found for a psychopathy diagnosis or conduct disorder (Murrie, Boccacini, McCoy, & Cornell, 2007).

While investigating the construct of psychopathy in youth certainly has its advantages, caution must be exerted when applying this construct to youth.

Defining and assessing psychopathy in youth. Two conceptual approaches have been used to study psychopathy in youth. The first approach involves the study of psychopathic traits. Psychopathic traits is a broad term used to describe the affective, interpersonal and behavioural dimensions that align with current conceptualizations of psychopathy found in the adult domain. These include a callous-unemotional dimension (resembling the affective component of adult psychopathy), a narcissism dimension (resembling the interpersonal component of adult psychopathy), and an impulsivity dimension (resembling the behavioural component of adult psychopathy; Frick, O'Brien, Wootton, & McBurnett, 1994; Frick, Bodin, & Barry, 2000). The Antisocial Process Screening Device (Frick & Hare, 2001) is a common assessment tool that measures these dimensions. Researchers who take this approach argue that these dimensions are most reflective of Hare's original conceptualization of the psychopath (Frick & Hare, 2001).

A second approach to extending the construct of psychopathy to youth has been to focus exclusively on the callous-unemotional traits dimension (e.g., lack of guilt, lack of

empathy, callous use of others for one's own gain; see Frick & White, 2008 for an extensive review of studies taking this approach). Researchers who take this approach argue that this affective component is what sets the budding psychopathic youth apart from youth who only display conduct problems. Studies have found that the majority of youth with high conduct problems also score high on the impulsivity and narcissistic dimension of the APSD (Frick & Hare, 2001; e.g., Christian, Frick, Hill, Tyler, & Frazer, 1997). In contrast, only a minority of these youth *also* score high on the callous-unemotional traits dimension. It is this subset of youth who also present with characteristics similar to adult psychopaths (Frick & White, 2008). For the purposes of this dissertation, psychopathic traits is used in the broad sense, whereas callous-unemotional traits refers only to the dimension that reflects the affective component of psychopathy.

Psychopathic traits versus conduct problems. When studying psychopathy in youth, one is faced with the challenge of differentiating children who are merely aggressive (a high base rate phenomenon), from those who display psychopathic traits (a relatively low-base rate phenomenon). The extant literature clearly supports the relationship between conduct problems and psychopathic traits in youth (Caputo, Frick, Brodsky, 1999; Frick et al., 1994: Salekin, Leistico, Neumann, DiCicco, & Duros, 2004). For example, a review of 24 studies found that youth with psychopathic traits virtually always displayed severe conduct problems and had higher rates of delinquency and aggression (Frick & Dickens, 2006). Associations have also been found between psychopathic traits and oppositional defiant disorder and/or conduct disorder (disruptive behavior disorders that are reflective of the most extreme expression of conduct

problems; Frick et al., 1994), as well as conduct problems in clinic-referred (e.g., Christian et al., 1997), incarcerated (e.g., Kruh, Frick, & Clements, 2005), and community youths (e.g., Frick, Cornell, Barry, Bodin, & Dane, 2003; Frick, Stickle, Dandreaux, Farrell, & Kimonis, 2005). Although these associations exist, research suggests that there are conceptual differences between psychopathy and disruptive behavioral disorders. For example, it has been estimated that of all children who meet the criteria for conduct disorder and/or oppositional defiant disorder, only 20–30 % of those display psychopathic traits (Forth & Burke, 1998). Conduct disorder and oppositional defiant disorder are classifications based on behavioural features (e.g., aggression, fire setting), while adult psychopathy not only involves behavioural manifestations, it also encompasses a pervasive pattern of affective deficits (e.g., reduced empathy). In order for us to successfully apply the construct of psychopathy to children and adolescents we must have a clear definition that describes the key manifestations of the disorder, while making a clear distinction from similar constructs. The following section outlines previous attempts to classify traits in youth that have been associated with the construct of adult psychopathy.

Classifying youth with psychopathic traits. An early attempt to differentiate patterns of severe conduct problems was advanced in the Diagnostic and Statistical Manual, third edition (DSM-III; American Psychiatric Association, 1980). In that volume, the distinction was made between children with “socialized” and “undersocialized” conduct disorder. The DSM-III further distinguished between aggressive and non-aggressive conduct disorder, resulting in four subtypes: undersocialized-aggressive, undersocialized-nonaggressive, socialized-aggressive and

socialized-nonaggressive conduct disorder. Characterizations of undersocialized conduct disorder (e.g., lack of empathy, lack of affection, egocentrism, manipulation, lack of guilt) closely resembled those found in contemporary descriptions of the adult psychopath. Studies using the DSM-III subgroups found that children in the undersocialized-aggressive group were more likely than children in the other groups to commit antisocial acts in adulthood. They also demonstrated poorer adjustment in juvenile detention facilities (Frick & Loney, 1999). Additionally, it was found that these children demonstrated unique neurological profiles (e.g., low reactivity of the autonomic nervous system) similar to those previously demonstrated in adult psychopaths (Lahey, McBurnett, Loeber, & Hart, 1995). Although this approach appeared to be a starting point in advancing the construct of psychopathy to youth, the DSM-III revision (American Psychiatric Association, 1987) reflected a simplified subtyping approach with a focus on easily measured behavioural indicators (e.g., destroyed property, ran away from home). As a result, research focused on the developmental trajectories of specific antisocial *behaviours* in youth, at the expense of better understanding the affective and interpersonal underpinnings of antisocial behavior (Frick & Ellis, 1999; Kotler & McMahon, 2005).

Presently, the DSM, Fourth Edition, Text Revision (DSM-IV-TR; American Psychiatric Association, 2000) specifies two subtypes of conduct disorder: childhood- and adolescent-onset conduct disorder. The childhood- versus adolescent-onset distinction was developed based on the seminal findings of Moffit's (1993, 2003) research studying aggression in youth. According to Moffit's theory, aggressive youth can be classified into two groups: adolescent-limited and life-course-persistent. Moffit

(1993, 2003) proposed that the antisocial behaviour displayed by adolescent-limited delinquents is the result of 'social mimicry'. These adolescents likely have a rebellious personality, and in an attempt to obtain a sense of maturity and independence, they mimic the behaviours of life-course-persistent youth. About the time of puberty, they begin to reject authority and rules (Moffitt et al., 1996) and engage in forbidden behaviours to assert their individuation and identity formation. The majority of these youth do not develop criminal careers, and most of their antisocial behaviours diminish significantly in early adulthood. This is largely a result of the maturation process. These youth experience a loss of motivation for delinquency and begin to realize that the consequences of delinquent and antisocial behavior limit future opportunities (e.g., employment, healthy relationships; Moffitt, 1993).

Children who display life-course-persistent antisocial behaviours demonstrate conduct problems (e.g., pushing and kicking peers) and symptoms of oppositional defiant disorder (e.g., disobedient, hostile and defiant behaviour) early in life. These children show moderate forms of aggressive (e.g., fighting, bullying) and antisocial behaviours (e.g., lying, cheating) throughout adolescence and into early adulthood (Lahey & Loeber, 1994). Their antisocial acts tend to increase in severity as they age, and they are more likely to demonstrate severe criminal behaviours as adults (Frick & Loney, 1999; Frick, 1998). These children are characterized by severe aggression and impulsivity, and demonstrate cognitive deficits, including low verbal intelligence and executive function deficits (e.g., inattention, inhibition, poor planning; Frick, 1998; Moffitt, 1993; Moffitt et al., 1996). Studies have also found that children who display life-course-persistent

antisocial behaviours are characterized by poor emotional and behavioural regulation (Frick, 1998; Moffitt, 1993).

Although several of the characteristics shown by children who present with conduct disorder early in life closely resemble those that have been identified in children who display psychopathic traits, there are no criteria within the DSM-IV-TR disruptive behaviors disorders that reflect these traits (Frick & Ellis, 1999).

Callous-unemotional traits. In an effort to better identify children with psychopathic traits, Frick and Moffitt (2010) proposed that the DSM, Fifth Edition (DSM-V) include a specifier to the diagnosis of conduct disorder based on the presence of callous-unemotional traits. They argue that callous-unemotional traits show the least amount of overlap with the current DSM-IV-TR definition of conduct disorder, and that these traits are useful in identifying differential subgroups of antisocial youth (Frick et al., 2000). For example, callous-unemotional traits characterize a subgroup of children with severe conduct problems (Christian et al., 1997; Frick et al., 2000; Frick et al., 1994). These children show a pattern of antisocial behaviour which has an early onset, and is persistent and pervasive in nature (e.g., Christian et al., 1997; Kruh et al., 2005). They have high rates of contact with the police (Christian et al., 1997), and demonstrate severe patterns of violence, including instrumental aggression (Kruh et al., 2005), and violent sexual offending (Caputo et al., 1999). A recent review demonstrated that children with high callous-unemotional traits have distinct emotional (e.g., less responsive to distress cues in others), cognitive (e.g., abnormalities in the processing of reward and punishment), and personality characteristics (e.g., high levels of thrill and adventure seeking; Frick & White, 2008). Additionally, several studies suggest that

callous-unemotional traits are related to poorer treatment outcomes in both criminal justice settings (Spain, Douglass, Poythress, & Epstein, 2004) and community settings (Hawes & Dadds, 2005). For example, one study found that young boys with high callous-unemotional traits had poorer treatment outcomes at six month follow-up than boys with low callous-unemotional traits (Hawes & Dadds, 2005).

In summary, while early definitions of conduct disorder closely resembled descriptions of adult psychopathy, changes in the diagnostic criteria of conduct disorder resulted in a heightened focus on behavioural acts, which interfered with efforts to better understand the affective and interpersonal aspects of antisocial behaviour. A renewed interested in the role of the affective components of antisocial behaviour, as well as a large body of literature exploring the development of psychopathy, led to an increased interest in studying the unique correlates of children who present with psychopathic traits.

Distinct Correlates in Children with Psychopathic Traits

As stated above, children who present with conduct problems and psychopathic traits show a severe pattern of antisocial behaviour, which has been demonstrated to be persistent and pervasive in nature (e.g., Christian et al., 1997; Kruh et al., 2005). Studies have also found that children with psychopathic traits display cognitive, emotional, and behavioral impairments that are troublingly similar to their adult psychopath counterparts (Blair, 2007). This dissertation will now turn to a discussion outlining the extent to which children with psychopathic traits demonstrate deficits in specific domains of cognitive, emotional, and behavioral functioning which have been theoretically linked to the development of psychopathy. As articulated earlier, these include instrumental learning,

emotional processing, and reactive versus proactive aggression. In order to fully summarize and evaluate the extant literature, studies that examine psychopathic traits (recall this is a broad term), as well as studies that focus exclusively on the callous-unemotional traits domain are reviewed.

Psychopathic traits, callous-unemotional traits, and cognitive processing.

Consistent with the adult literature, a handful of studies have also found that children with psychopathic and callous-unemotional traits[5] demonstrate deficits in instrumental learning. Preliminary findings have demonstrated that, among children who exhibit antisocial and aggressive behaviour, only those with psychopathic and/or callous-unemotional traits demonstrate a reward-dominant response style (i.e., fail to incorporate competing cues for punishment), which is similar to the response style found in the adult literature (Barry et al., 2000; O'Brien & Frick, 1996). However, unlike the adult literature, this relationship has only been found in a *subset* of youth with psychopathic traits. For example, one study found that children (age 6–13 years) with callous-unemotional traits and conduct problems exhibited a reward-dominant response style only in the absence of anxiety (O'Brien & Frick, 1996). Barry et al. (2000) found that conduct disordered children (6-13 years) with high callous-unemotional traits and high impulsivity were more likely to display a reward-dominant response set than conduct disordered children with low callous-unemotional traits.

Only a few studies have examined passive avoidance learning using the classic passive avoidance task developed by Newman and colleagues (Newman et al., 1985) in samples of youth. In one of these studies, Vitale et al. (2005) found that male adolescent offenders who were high in psychopathic traits, and low in anxiety, made significantly

[5] The majority of studies investigating this deficit in youth focus on callous-unemotional traits.

more passive avoidance errors than their low-psychopathic traits, low-anxiety counterparts. A more recent study found that adolescents with high psychopathic traits made significantly more errors of commission than healthy controls on a variant of the classic passive avoidance task (Finger et al., 2011). In summary, research has shown that children with psychopathic traits show a reward-dominant response style that is consistent with adult psychopathy. However, only a subset of adolescents with psychopathic traits display deficits that are similar to their adult counterparts on measures of passive avoidance learning. To date, there have been no studies investigating passive avoidance learning in children (under 13 years old) using the classic passive avoidance paradigm.

Psychopathic traits, callous-unemotional traits, and emotional processing.

Numerous studies have demonstrated that children with psychopathic traits show deficits in emotional processing. For example, children with psychopathic traits show little emotional reactivity to distressing images (e.g., child crying; Blair, 1999; Kimonis, Frick, Munoz, & Aucoin, 2007; Kimonis, et al., 2006). These children also present with recognition deficits for sad and fearful expression, but not for angry, disgusted, surprised, or happy expressions (Blair & Coles, 2000; Stevens, Charman, & Blair, 2001). For example, in one study children viewed neutral faces gradually morphing into common expressions (e.g., sadness, fear, happy, surprise, disgust, anger). Children high in psychopathic traits were less sensitive to sad faces (i.e., needed significantly more stages before they could recognize the expression) than a comparison group. Furthermore, children with psychopathic traits made significantly more recognition errors (i.e., mislabeling an expression) for the fearful expression than the comparison group (Blair,

Colledge, Murray, & Mitchell, 2001). Children with psychopathic traits also have difficulty recognizing fearful vocal tones (Blair, Budhani, Colledge, & Scott, 2005). Studies have also found that, compared to controls, children with psychopathic traits show reduced electrodermal response to distressing and threatening images (Blair, 1999), and reduced automatic response to distressing stimuli (Blair et al., 1997). Similar findings have been show when examining callous-unemotional traits. For example, it has been shown that children with high callous-unemotional traits exhibit reduced attentional orienting to words with negative emotional valence (Loney, Frick, Clements, Ellis, & Kerlin, 2003). Additionally, children with callous-unemotional traits show little emotional reactivity to distressing stimuli (e.g. Frick Cornell, Bodin et al., 2003).

Psychopathic traits, callous-unemotional traits, and reactive and proactive aggression. Consistent with the downward extension of psychopathy to children and adolescents, research has begun to explore the relationships between psychopathic traits and both reactive and proactive aggression in youth. Unlike findings from the adult domain, the literature documenting the relationship between psychopathic traits and both reactive and proactive aggression in children and adolescents has been inconsistent. Some studies have found that children with high callous-unemotional traits show aggression that is both reactive and proactive in nature (Enebrink, Andershed, & Langstrom, 2005; Frick, Cornell, Barry et al., 2003), whereas children who present with low callous-unemotional traits tend to engage almost exclusively in reactive aggression (Frick, Cornell, Barry et al, 2003). For example, a recent study of a child psychiatric inpatient unit found positive relationships between callous-unemotional traits and parent reports of both proactive and reactive aggression (Fite, Stoppelben, & Greening, 2009). Using

cluster analysis to create groups of aggressive children (i.e., low aggression, reactive aggression only, combined reactive and proactive aggression), a second study found that children with combined aggression had significantly higher levels of callous-unemotional traits than children with only reactive aggression and children with low aggression. Children with only reactive aggression and children with low aggression displayed similar levels of callous-unemotional traits (Crapanzano, Frick, & Terranova, 2010).

While the studies presented above align with research in the adult domain, other studies have found that children with high psychopathic traits display only proactive aggression. For example, Raine et al. (2006) found that proactive, but not reactive aggression was associated with psychopathy in a sample of adolescent boys. Fanti, Frick, and Georgiou (2009) examined the relationship between callous-unemotional traits and aggression in a community sample of adolescents. Callous-unemotional traits were a significant predictor of proactive aggression; callous-unemotional traits were not a significant predictor of reactive aggression.

Finally, others studies have failed to find a relationship between psychopathic traits and either proactive *or* reactive aggression. For example, using a cluster analytic approach to create groups of aggressive youth, Munoz, Frick, Kimonis, and Aucoin (2008) found that callous-unemotional traits did not differentiate between a group of children with combined aggression and a group of children with high levels of only reactive aggression. Similarly, a second study did not find a correlation between callous-unemotional traits and either proactive or reactive aggression (Barry et al., 2007).

Making matters more complicated are findings from adolescent offender populations. Some studies examining psychopathic traits in incarcerated adolescents have

demonstrated relationships between those traits and proactive aggression (Kruh et al., 2005; Murrie, Cornell, Kaplan, McConville, & Levy-Elkon, 2004). Flight and Forth (2007) found a positive relationship between the interpersonal and affective features of self-reported psychopathy and instrumental violence in a sample of male adolescent offenders. In contrast, the behavioral and antisocial features of psychopathy were stronger predictors of reactive aggression.

As outlined above, the literature documenting the relationships between both proactive and reactive aggression and psychopathic traits in youth is inconsistent. One noted limitation of the literature is that many of the studies cited above focused exclusively on either the broader dimension of psychopathic traits, or the narrow dimension of callous-unemotional traits. The narcissism and impulsivity dimensions although often neglected in research, are likely important risk factors to consider when studying differential forms of aggression.

Narcissism is conceptualized as a grandiose sense of self, and individuals with this trait possess an exaggerated sense of entitlement and self-centeredness (Washburn, McMahon, King, Reinecke, & Silver, 2004). Studies suggest that narcissism is associated with conduct problems and aggression in youth (e.g., Barry, Frick, & Killian, 2003). Furthermore, narcissism has been linked to anger, hostility and aggression in threatening situations (Bushman & Baumeister, 2002). Based on these findings, there is preliminary support to suggest that narcissism may be associated with reactive aggression. Alternatively, it has been argued that narcissism may be more strongly associated with proactive aggression, given the narcissists strong desire to achieve status or attention from others (Barry et al., 2007).

Impulsivity has been described using a broad range of terms, including lack of control, novelty seeking, poor deliberation, excitement seeking, and disinhibition. Impulsive individuals fail to think about the consequences of their behaviour. As result of their impulsive behaviours, they are often in conflict with the law (Cherek, Moeller, Dougherty, & Rhoades, 1997). Findings from the adult domain have linked the behavioural dimensions of psychopathy (i.e., impulsivity domain) to reactive aggression (Hall, Benning, & Patrick, 2004). Given that reactive aggression often involves poor emotional and behavioural control, it is conceivable to assume that the impulsivity dimension of the APSD (Frick & Hare, 2001) would also be associated with reactive aggression (Barry et al. 2007).

To date, only a handful of studies have explored the relationships between dimensions of psychopathy in youth and reactive versus proactive aggression. Barry et al. (2007) investigated the relationships between dimensions of psychopathy and both reactive and proactive aggression in a sample of children with moderate to high aggression. They found that narcissism was a significant predictor of proactive aggression. Narcissism and impulsivity were both significant predictors of reactive aggression. The callous-unemotional traits dimension, however, was not a significant predictor of *either* forms of aggression (Barry et al., 2007). A second study examined the associations between dimensions of psychopathy and both reactive and proactive aggression in a sample of children admitted to an inpatient psychiatric facility. They found that children with high callous-unemotional traits reported engaging in more reactive and proactive aggression than children with low callous-unemotional traits (Fite et al., 2009). Using parent reports of children's aggression, the authors also found that

reactive aggression marginally significantly predicted callous-unemotional traits, and modestly predicted narcissism and impulsivity. Proactive aggression marginally significantly predicted callous-unemotional traits, and modestly predicted narcissism and impulsivity. However, using child reports of aggression, proactive, but not reactive aggression predicted callous-unemotional, narcissism and impulsivity[6]. In a more recent study, Kerig and Stellwagen (2010) found that narcissism and impulsivity significantly predicted reactive aggression, whereas callous-unemotional traits, narcissism and impulsivity significantly predicted proactive aggression in a sample of middle-school children.

In sum, when examining the relationship between individual dimensions of psychopathic traits in youth and differential forms of aggression, research suggests that narcissism and impulsivity also predict aggressive behavior. To date, this research has been conducted with a limited number of populations (e.g., severely aggressive youth in inpatient psychiatric facilities and youth who have been identified as being at-risk for aggression in elementary schools).

An additional limitation of the literature is that the majority of studies outlined above did not take into account how conduct problems may account for the observed relationships between dimensions of psychopathy and subtypes of aggression. To reiterate, psychopathic traits characterize a subgroup of children with severe conduct problems (Frick, Cornell, Barry et al, 2003). The vast majority of children who are diagnosed with oppositional defiant disorder or conduct disorder show high levels of

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[6]These authors were attempting to predict personality based on behaviour. Although this is an unconventional approach to demonstrating the relationship between these two constructs, it is important to present all relevant studies, as relatively few studies have examined the link between psychopathy and differential forms of aggression.

aggression (Rowe et al., 2010), and as stated in previous sections, although conduct problems and psychopathic traits are related, they are none the less distinct constructs. Given that conduct problems often co-occur with psychopathic traits, it seems imperative that studies acknowledge, and subsequently statistically control for levels of conduct problems in their analyses.

In summary, children with psychopathic traits present with unique characteristics that set them apart from children with only conduct problems. As outlined above, a subset of children with psychopathic traits show impaired instrumental learning. In addition, these children show deficits in the way they process emotional information. More specifically, children with psychopathic traits show reduced emotional reactivity to distressing and threatening images, and present with recognition impairments to sad and fearful facial expressions. Finally, there is some evidence to suggest that children with psychopathic traits show aggression that is both proactive and reactive in nature, however, this is not always consistent. The relationship between the impulsivity and narcissism dimensions and the proactive-reactive distinction needs to be further examined. The goals of the present study are now outlined.

The Present Study

The present study aimed to contribute to the literature by detailing the cognitive, emotional, and behavioural characteristics in children (age 7-13 years old) with psychopathic traits and conduct problems. Further examination of these impairments is warranted for a number of reasons. First, findings could suggest a unique etiology to a severe and violent pattern of antisocial and aggressive behaviour (Frick et al., 2000). Second, identification of such traits may aid in the prediction of future aggressive

behaviour. Finally, identifying deficits in cognitive and emotional functioning, as well as differential forms of aggression, may aid in treatment formulation for children who present with psychopathic traits.

In an attempt to replicate and extend previous research, the current study had two main goals. The first goal was to examine cognitive and emotional processing in a sample of children with conduct problems and high psychopathic traits, and compare their abilities to children with conduct problems and low psychopathic traits. The present study investigated two specific domains of functioning: passive avoidance learning and emotional processing. Passive avoidance learning and emotional processing are both central to Blair's neurocognitive theory of the development of psychopathy (Blair, Mitchell et al., 2005; Blair et al., 2006). Surprisingly, no study has yet to examine passive avoidance learning in children with psychopathic traits using the classic passive avoidance task developed by Newman and colleagues (Newman et al., 1985). The present study attempted to add to the literature by examining passive avoidance learning in a sample of children (age 7-13 years) using a passive avoidance task similar to the classic paradigm developed by Newman et al. (1985).

Studies examining emotional processing in children with psychopathic traits have primarily used recognition tasks (e.g., Blair & Coles, 2000) or tasks that assess some type of autonomic responding (e.g., electrodermal response; Blair, 1999). Relatively few studies have examined emotional processing using emotional attention paradigms like the dot-probe task. Those that have been conducted have examined emotional processing of negative emotional images (e.g., children crying; Kimonis, et al., 2006). In order to further contribute to the literature, the present study investigated the emotional processing

of negative emotional images using a similar dot-probe paradigm to the one used by Kimonis et al. (2006) in a sample of children with conduct problems. The present study attempted to add to the extant literature by also investigating the emotional processing of negative facial expressions.

After reviewing the extant literature, it became apparent that researchers studying psychopathy in children and adolescents are interested in different constructs (i.e., psychopathic traits versus callous-unemotional traits). For comparative purposes, the cognitive and emotional functioning of children with high versus low callous-unemotional traits was also examined in this dissertation. In keeping with previous research, psychopathic traits were measured using the APSD (Frick & Hare, 2001) total score. Callous-unemotional traits were measured using the APSD (Frick & Hare, 2001) subscale callous-unemotional traits.

The second goal of this study was to better understand the relationship between psychopathic traits and aggression in children. Previous research has consistently found that children who display psychopathic traits are more aggressive and antisocial in nature (Christian et al., 1997; Rowe et al, 2010). The literature outlining the relationship between psychopathic traits and both reactive and proactive aggression, however, is inconsistent and has several shortcomings. First, studies do not consistently examine how the dimensions of psychopathy are related to reactive versus proactive aggression. Some studies focus exclusively on callous-unemotional traits (e.g., Frick, Cornell, Barry et al., 2003). Others are interested in the individual dimensions of psychopathy (e.g., callous-unemotional traits, narcissism and impulsivity; Fite et al., 2009). Some researchers examine the construct as a whole (e.g., Blair et al., 2005). Second, many studies do not

take into account how conduct problems might affect the relationships between dimensions of psychopathy and reactive and proactive aggression. Given the inconsistencies found in the literature, the present study intended to further this line of scientific inquiry by examining the relationships between dimensions of psychopathy and both proactive and reactive aggression, controlling for conduct problems in children.

Research Questions and Hypotheses

The specific research questions and hypotheses were as follows:

1a. Are children with psychopathic traits impaired on passive avoidance learning tasks? It was hypothesized that children with high psychopathic traits would make more errors of commission than children with low psychopathic traits on passive avoidance tasks.

1b. Are children with callous-unemotional traits impaired on passive avoidance learning tasks? It was hypothesized that children with high callous-unemotional traits would make more errors of commission than children with low callous-unemotional traits on passive avoidance tasks.

2a. Do children with psychopathic traits show reduced responding to emotional stimuli? It was hypothesized that children with high psychopathic traits would show bias away from distressing and threatening images and sad and fearful facial expressions, compared to children with low psychopathic traits. Based on past findings, it was hypothesized that this difference would not be found for angry facial expressions.

2b. Do children with callous-unemotional traits show reduced responding to emotional stimuli? It was hypothesized that children with high callous-unemotional traits would show bias away from distressing and threatening images and sad and fearful facial

expressions, compared to children with low callous-unemotional traits. Based on past findings, it was hypothesized that this difference would not be found for angry facial expressions.

3. Which dimension of the APSD (Frick & Hare, 2001) is the best predictor of reactive aggression in a sample of children with conduct problems? Based on past research, it was hypothesized that the impulsivity dimension would be the best predictor of reactive aggression, but that callous-unemotional traits and narcissism would also be significant predictors of reactive aggression.

4. Which dimension of the APSD (Frick & Hare, 2001) is the best predictor of proactive aggression in a sample of children with conduct problems? It was hypothesized that callous-unemotional traits would be the strongest predictor of proactive aggression, and that narcissism would also be a significant predictor of proactive aggression.

Method

Procedures

Participants. Youth participants were children between the ages of 7 and 13 years ($M = 9.59$, $SD = 1.79$). Thirty-five boys and 21 girls participated in the study ($n = 56$). The majority of the youth (96%) were Caucasian. The remaining 4% of the sample were African American. Fifty-five percent of the participants were recruited from the children's mental health facility, with the remaining participants having been recruited from the community[7].

[7] In an attempt to gain access to a greater number of children with conduct problems, a local non-profit agency that provides services to children involved in the criminal justice system was contacted. However, due to differing requirements by the University of Western Ontario's ethics board and the agency's ethics board, we were unable to recruit from this setting. While the agency's ethics board required that the recruitment poster explicitly state how participants would be compensated for their time, the University of Western Ontario's ethics board would not allow for this to happen.

All but one child was accompanied by a female caregiver. Eighty-four percent of the children were accompanied by their biological parents, with the remaining children being accompanied by legal guardians (e.g., grandmothers, step-mothers). The majority of children lived in households in which their parents were married or living common-law (61.2%), with 8.1% having divorced parents, and 14.5% living in single-family homes. The average family income was $45 000.

In an attempt to obtain a sample of children with conduct problems, potential participants were screened using two subscales of the Brief Child and Family Phone Interview (BCFPI: Cunningham, Pettingill, & Boyle, 2008). The BCFPI (Cunningham et al., 2008) is a mandate by the Ministry of Children and Youth Services as an intake measure for use in agencies providing specialized mental health services for children and youth in the province of Ontario (see Materials section for an overview). Youth participants were included in the study if they had a *t*-score of 65 or higher[8] on either the Cooperativeness scale or the Conduct scale of the BCFPI (Cunningham et al., 2008).

Consistent with previous research in the field (e.g., Marsh et al., 2008; Marini & Stickle, 2010), children were excluded if they had a diagnosis of a pervasive development disorder (PDD) or pediatric bi-polar disorder. Children were also excluded if they had a diagnosis of specific phobia (i.e. dog, snake, wolf, gun, needle, alligator, tank, storm or spider), as required by the University of Western Ontario Research Ethics Board. Finally, children were excluded if they were actively involved in treatment for conduct problems.

Participant recruitment. Participants were recruited from a children's mental health care facility and from a community in southwestern Ontario. If a child from the

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[8] *t*-scores have a mean of 50 and a standard deviation of 10, therefore at *t*-score of 65 approaches the clinical range.

mental health care facility met the inclusion criteria to participate in this study, their parent or legal guardian was asked if they were interested in having the examiner contact them to hear more about a research study. If the parent or legal guardian consented, the parent's name, child's name, contact information, and scores on the BCFPI (Cunningham et al., 2008) Cooperativeness scale and Conduct scale were forwarded to the examiner. Upon receiving the information, the examiner contacted each interested family and provided them with information about the study. If the parent or guardian indicated that they were interested in participating, the examiner administered the screening questionnaire.

Participants from the community were recruited by placing ads for noncompliant children in local newspapers and posters around the community (e.g., coffee shops, doctor's offices). Interested parties who contacted the university were administered a similar screening questionnaire, which included questions from the BCFPI (Cunningham et al., 2008), and if eligible they were scheduled for the study.

Data recruitment was conducted over a period of twenty-three months. Ninety-seven children met the inclusion criteria. Five of those children were unable to be contacted as a result of their telephone being disconnected. Ninety-two potential participants were contacted and given information about the study. One child was excluded because of a diagnosis of PDD. Eleven potential participants were not interested in participating, and two indicated that they were only interested in participating in a "treatment" study. Of the remaining scheduled participants, 20 did not show up for the session, and upon re-contact were either no longer interested in participating, or were unable to be contacted after their scheduled study date. Data were collected for 58

children. Two children refused to complete any of the cognitive tasks and were excluded from the study. Data for 56 children were included in the analyses.

The mean score on the Cooperativeness scale of the BCFPI (Cunningham et al., 2008) was 71. 29 (*SD* = 13.38; range: 54-90), and the mean score on the Conduct scale of the BCFPI (Cunningham et al., 2008) was 68.45 (*SD* = 18.20; range: 45-100). The distribution of scores for the Cooperativeness scale was negatively skewed ($Z_{skewness}$ = -3.69). The vocabulary subtest of the Wechsler Intelligence Scale for Children–fourth edition (WISC-IV; Wechsler, 2003) was used as an estimate of verbal intelligence. The mean score of the vocabulary subtest was 8.08 (*SD* = 1.87), which indicates that the majority of the children presented with average verbal abilities.

Procedure. Upon arriving at the testing location, the examiner explained to the parent and child the purpose of the study, discussed issues of confidentiality, and obtained informed consent from the parent or legal guardian. Both parties were encouraged to ask questions and were informed that they could stop participating at any time during the course of the study, without loss of compensation. The accompanying caregiver completed a demographics questionnaire and a battery of questionnaires designed to assess for internalizing and externalizing behaviours in youth. While the caregiver was completing the questionnaires, the child was escorted to a separate testing room with the examiner. The child was again told the purpose of the study, was given examples of what they were going to doing, and was asked to assent to participating in the study. All children were again reminded that they could take a break if needed, or they could discontinue participating at any time. Youth participants were first administered the vocabulary subtest of the WISC-IV (Wechsler, 2003). They then

completed, in random order, a battery of behavioural measures, including two dot-probe tasks and two passive avoidance tasks. The Reactive-Proactive Aggression Questionnaire (RPAQ: Raine et al., 2006) was then administered. Upon completion of testing the youth joined his/her caregiver and both parties were debriefed.

Testing was conducted in one session and the total testing time was approximately 1.5 hours. The study took place at the children's mental health care facility and at the University of Western Ontario. Caregivers were given twenty dollars as a token of appreciation, and children were given a ten dollar gift certificate to a bookstore or to the theater. This study was conducted in accordance with the ethical review board at the University of Western Ontario (see appendix A and B).

Materials

Screening measure.

The Brief Child and Family Phone Interview (BCFPI: Cunningham et al., 2006). The BCFPI is a computer assisted, clinical intake and outcomes interview, used for children 3–18 years old. The Ontario Government mandates the use of the BCFPI in all Ontario treatment settings, and it is used to assist agencies in providing services to their clients. The BCPFI demonstrates good reliability and validity (Boyle et al., 2009; Cunningham et al., 2006; Cunningham, Boyle, Hong, Pettingill, & Bohaychuk, 2009). For the purpose of this study, a *t*-score of 65 or higher on either the Cooperativeness scale (e.g., defiant or talks back to adults) and/or the Conduct scale (e.g., steals things at home) served as the cut-off score for inclusion to the study.

Potential control variables.

Verbal abilities. The vocabulary subtest of the Wechsler Intelligence Scale for Children–IV (Wechsler, 2003) was administered to assess knowledge of word meaning and language development. Previous studies have used the vocabulary subtest as an estimate of verbal intelligence (e.g., Joormann, Talbot, & Gotlib, 2007). The rationale for including a measure of verbal intelligence was to ensure that children were able to follow the instructions in the protocol. In addition, studies examining psychopathic traits in youth often include an estimate of intelligence in their analyses (e.g., Blair et al., 2001).

Attention problems. The Conners Parent Rating Scale-Revised: Short Form (CPRS-R:S: Conners, 2001) is a widely used measure designed to assess attention-deficit/hyperactivity disorder and related behavioural problems in children and adolescents. The CPRS-R: S has 27-items, which result in four subscales: Oppositional, Cognitive Problems/Inattention, Hyperactivity, and the Attention Deficit/Hyperactivity Disorder (ADHD) Index.

Internal reliability coefficients for the CPRS-R:S ranged from .86 (Hyperactivity scale for females) to .92 (ADHD Index for females). Using a test-retest interval of 6–8 weeks, test-retest reliability coefficients ranged from .62 (Oppositional scale) to .85 (Hyperactivity scale). Correlations between subscales of the CPRS-R:S and subscales of the Conners' Parent Ratings Scales–Revised: Long version ranged from .96 to .98. Correlations between scores on the ADHD scale of the CPRS-R: S and the Conners' Teacher Ratings Scales–Revised were above .40 for both males and females.

For the present study, *t*-scores from the ADHD index were included as an index of attention problems. As noted in the technical manual, the ADHD index contains items

that best distinguish children with attention problems from typically developing children (Conners, 1997). Cronbach's alpha for the ADHD index in the present study was .94.

Conduct problems. The Child Behaviour Checklist (CBCL: Achenbach & Rescorla, 2001) is a 112-item rating scale designed to assess social, emotional, and behaviour problems in children ages 6–18 years. The CBCL yields three scales reflecting externalizing, internalizing, and total problems, as well as empirically derived and DSM-oriented subscales designed to reflect symptoms of DSM-IV-TR psychopathology (e.g., anxious/depressed, conduct problems). The CBCL is a widely used measure which has demonstrated good psychometric properties. For example, one week test-retest reliabilities for scales and subscales range from .80 to .94 (Achenbach & Rescorla, 2001). Scales of interest for the present study included the Oppositional Defiant Problems and Conduct Problems subscales. Internal consistency coefficients for each scale in the present study were as follows: .84 for Oppositional Defiant Problems, and .90 for Conduct Problems.

Major variables of interest.

Psychopathic traits. The Antisocial Process Screening Device (APSD: Frick & Hare, 2001) was used to measure psychopathic traits. The APSD is a 20-item paper-and-pencil rating scale designed to assess these traits in children ages 6-13 years. There are three versions of the APSD: a parent form, a teacher form, and a self-report form. Items on the APSD are rated based on a 3-point scale (0 = not at all true; 1 = sometimes true; and 2 = definitely true). Subscales scores are derived for three factors: 1) Callous-unemotional traits (e.g., is concerned about the feelings of others), 2) Narcissism (e.g., his/her emotions seem shallow and not genuine), and 3) Impulsivity (e.g., engages in

risky or dangerous activities). The three factor structure has been supported in the empirical literature (Frick et al., 2000). Reliability estimates for the APSD are high (.93 across 4 years; Frick, Kimonis, Dandreaux, & Farell, 2003), and it has acceptable interrater reliability (range from r = .26 for the Narcissism scale to r = .43 for the Total score, Frick & Hare, 2001). The APSD has demonstrated acceptable convergent and divergent validity. In a community sample, all three scales demonstrated moderate to strong correlations with DSM-IV-TR diagnosis (e.g., oppositional defiant disorder, conduct disorder, and ADHD).

For the present study, scores from the APSD-Parent Response Form was used to assess overall levels of psychopathic traits, as well as the dimensions of callous-unemotional traits, narcissism and impulsivity. Cronbach's alpha for the APSD total score in the present study was .89. Cronbach's alpha for each dimension in the present study were as follows: the callous-unemotional traits subscale was .70, the narcissism subscale was .82, and the impulsivity subscale was .64.

Reactive and proactive aggression. The Reactive-Proactive Aggression Questionnaire (RPAQ: Raine et al., 2006) is a 23-item paper-and-pencil self-report measure designed to assess proactive and reactive aggression. Reactive aggression (hostile or impulsive aggression) refers to angry and impulsive responding, which is usually triggered by provocation or the interpretation of provocation. Proactive aggression (instrumental or premeditated aggression) refers to goal-oriented (e.g., stealing money, or bullying), predatory aggression which is typically unprovoked. The Proactive Aggression scale is comprised of 12 items (e.g., had fights with others to show who was on top) and the Reactive Aggression scale includes 11 items (e.g., gotten angry when others threatened

you). Each item is rated as 0 (never), 1 (sometimes), or 2 (often). The items reflect physical or verbal aggression. The Proactive, Reactive, and Total Aggression scales have all demonstrated alphas above 0.80 (Raine et al., 2006). Raine et al. (2006) reported internal reliabilities in excess of 0.83 for all three scales across two samples. The RPAQ has also demonstrated good criterion, convergent and discriminant validity (Raine et al., 2006). Confirmatory factor analysis of the RPAQ supports a two-factor, reactive-proactive model (Baker, Raine, Liu, & Jacobson, 2008; Raine et al., 2006). For the present study, Cronbach's alpha for the Proactive Aggression scale was .77, the Reactive Aggression scale was .79, and the Total Aggression scale was .86. As is typical, reactive and proactive aggression were highly correlated in the present study ($r = .635$, $p < .01$).

Behavioural measures.

Standard passive avoidance task. A standard passive avoidance task was used to assess passive avoidance learning. The procedures used for this task were adapted from research by Patterson, Kosson, and Newman (1987). In this study, participants completed a reward-punishment version of the task in which they were presented with eight single digit numbers on a screen: four were paired with positive visual feedback and four were paired with negative visual feedback. In the learning phase, participants learned through visual feedback, which four stimuli were "good" (S+), and which four stimuli were "bad" (S-). Subsequent to the learning phase, participants were told to respond to stimuli which had previously been paired with reward, and to withhold responding to stimuli which had been previously paired with punishment. Each number appeared in random order on a white screen. For the experimental trial, each stimulus was presented 10 times, for a total of 80 stimulus presentations. If participants responded correctly, a message appeared on

the screen stating, “You have earned 10 points”. If participants responded to negative stimuli, the message read, “You have lost 10 points”. If participants did not respond, no feedback was provided. The stimulus remained on the screen for up to 4 seconds, or until the participant responded. The inter-stimulus interval was 1 second. Participants received their total score at the end of the task.

The dependent measure on this task is the total number of errors of commission, which is theoretically thought to represent a passive avoidance deficit. An error of commission occurs when a participant responds to a stimulus that was previously associated with punishment (i.e., S- presentation). Consistent with past research, scores that fell more than two standard deviations above the mean were excluded to control for potential careless responding or lack of effort (n = 3: J. Newman, personal communication, March 22, 2011; Poythress et al., 2010). Data from two participants were removed from the analyses due to programming error.

Categorical passive avoidance task. The categorical passive avoidance task is an adapted version of the passive avoidance task used by Patterson et al. (1987). In this version, the single digit stimuli used in the standard passive avoidance task were replaced with neutral images (S+: hammer, stool, clock, and flower; S-: chair, spoon, and toaster, mushrooms). The instructions of this task mirrored the standard passive avoidance task outlined above. The variable of interest is the total number of errors of commission. Scores that fell more than two standard deviations above the mean were eliminated from the analyses (n = 4).

Emotional images dot-probe task. The dot-probe task is a widely used computerized measure of information processing designed to identify attention biases in

the processing of emotional information (e.g., MacLeod, Matthews, & Tata, 1986). The pictures used in this task were taken from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 1997). Slides chosen for this task were selected to tap distressing (e.g., crying child), threatening (e.g., a snake attacking) and neutral (e.g., fork) content.

In this task, children were presented with one block of practice stimuli (16 neutral-neutral picture pairs), followed by four testing blocks. Each testing block consisted of 34 pairs, for a total of 136 trials. The picture pairs are as follows: distressing-neutral and threatening-neutral. The number and location of the stimuli were counterbalanced across trials. The side of the dot probe (left or right) and whether the probe appeared behind a neutral or emotional image was counterbalanced across trials. In order to control for saliency, the same neutral pictures (n= 34) were used in each block, but they were paired with different emotional pictures across the blocks.

Prior to each presentation, a fixation cross appeared in the center of the screen, lasting 500 ms. Next, two pictures were simultaneously presented on the screen for 250 ms. One picture appeared to the left of the location of the previously presented fixation cross, and one appeared to the right of it. When the pictures disappeared, an asterisk (now on referred to as a “dot-probe”), replaced one of the two pictures on either side of the screen. The goal of this task was to press the key, as quickly as possible, that corresponded to the location of the dot-probe in the previously presented stimuli pair. Consistent with past research, incorrect responses were not included in the calculation of the bias scores (MacLeod & Mathews, 1988) as it is believed that incorrect scores reflect that the participant was not paying attention. Similarly, response times less than 200 ms

or greater than 800 ms were not included in the calculation of bias scores (Monk et al., 2006; Telzer et al., 2008).

The primary dependent variable for this task is the bias score. Scores were calculated to reflect response time differences between congruent and incongruent trials, controlling for probe location. The following formula was used to calculate bias scores for threatening stimuli (MacLeod & Mathews, 1988):

$$\text{Bias score} = \frac{[(\text{TrPl} - \text{TlPl}) + (\text{TlPr} - \text{TrPr})]}{2}.$$

TrPl refers to the response time on trials in which the threat-related stimulus is located on the right (Tr) and the probe is located on the left (Pl; referred to as an incongruent trial). TlPl reflects a congruent trial (Tl; threat left, Pl; probe left). Positive bias scores indicate that the participant selectively attended towards the stimuli, whereas negative bias scores reflect the tendency to look away from the stimuli. Bias scores for the distressing images were calculated using this formula as well.

The normative response pattern on this task is for healthy participants to respond faster to dot-probes replacing emotional pictures than dot-probes replacing neutral pictures. This is based on the theory that, in normal populations, our attention is drawn towards emotional images. If children who display psychopathic traits are deficit in processing emotional images, we would expect them to exhibit lower bias scores for emotional stimuli than children without psychopathic traits. Bias scores that fell more than two standard deviations above or below the mean were eliminated from analyses (Threat bias: $n = 2$; Distress bias: $n = 2$).

Facial expressions dot-probe task. The facial expressions dot-probe task is an adapted version of the emotional images dot-probe task used in this dissertation. In this

version, the emotional images were replaced with pictures of a male face conveying one of a number of emotions (e.g., sadness, fear, anger, and a neutral facial expression). The facial expressions used for this adaptation were those of a 23 year-old white male. The pictures were validated across 35 raters and received extremely high inter-rater reliability (r = 1.0). In this task, children were presented with one block of practice stimuli (16 neutral-neutral picture pairs), followed by four testing blocks. Each testing block consisted of 36 pairs, for a total of 144 trials. The picture pairs for the current version are as follows: sad-neutral, fearful-neutral, and angry-neutral. Presentation of the stimuli is consistent with the emotional dot-probe task, and instructions mirror those of the emotional dot-probe task. Bias scores were generated for sad, fearful, and angry facial expressions. Based on past research, we would expect that children high on psychopathic traits would display lower bias scores than children with low psychopathic traits to dot-probes replacing sad and fearful facial expressions, but not angry facial expressions. Bias scores that fell more than two standard deviations above or below the mean were eliminated from analysis (Sad bias: n = 3; Angry bias: n = 2; Fearful bias: n = 3).

Research Design

A priori analyses using G*Power 3.00 were conducted to determine the number of participants needed to achieve adequate power with medium effect sizes. Results from the a priori analysis for MANOVA with 2 groups and two to three response variables indicated that 44 - 66 participants were needed to achieve power of .80. For multiple regression with 4 predictors, a sample size of 77 participants was needed to achieve power of .80.

Descriptive Statistics and Preliminary Analyses

Univariate normality was assessed by looking at the skew and kurtosis for each variable. If the absolute value of the *z*-score for skewness and kurtosis of a variable is above 1.96 the score is considered significant at the $p < .05$, which suggests that the data for that variable is not normally distributed (Fields, 2009). Multicollinearity was assessed by conducting *t*-tests and Pearson bivariate correlations on the dependent and independent variables. Multivariate outliers were assessed by examining Mahalanobis distance. Assumptions that were unique to specific analyses were tested on a case-by-case basis.

Statistical Approach

The main research design utilized ANCOVA, followed by a series of hierarchical multiple regressions. Initially, MANOVA was chosen to test the hypothesis that children with high psychopathic traits (and high callous-unemotional traits) would make more errors of commission than children with low psychopathic traits on measures of passive avoidance learning. MANOVA was also originally chosen to test the hypothesis that group differences would be found on measures of emotional processing in children with high versus low psychopathic traits (and high versus low callous-unemotional traits). The rational for initially choosing this approach was based on the idea that MANOVA allows the researcher to detect groups differ among a combination of variables. However, examination of the bivariate correlations between the dependent variables did not allow for this approach. MANOVA warrants that the dependent variables be at least moderately correlated with each other (Tabchnick & Fidell, 2007), and as can be seen in Table 4, none of the dependent variables were correlated with each other. Finally, a series of hierarchical multiple regressions were run to examine the relationships between

dimensions of psychopathy and both reactive and proactive aggression, respectively.

Results

The present study examined the relationship between psychopathic traits, cognitive and emotional processes, and aggression in children with conduct problems. Analyses were performed using SPSS version 18.0.

Forming Subgroups of Children with Psychopathic Traits

There is no established cut-off score on the APSD (Frick & Hare, 2001) for classifying children into high versus low psychopathic traits. Some researchers use a cut-off score of 20 (Marsh et al., 2008), whereas others use a cut-off score of 25 (Budhani & Blair, 2005). Others researchers use a median-split (Vitale et al., 2005). For the present study, the median of the callous-unemotional traits subscale (*Mdn* = 5) and the median of the total score (representative of overall psychopathic traits: *Mdn* = 16) of the APSD (Frick & Hare, 2001) was calculated. Due to the low sample size in the present study, groups were formed by collapsing the median score in the "low traits" groups, resulting in the following groups: low callous-unemotional traits (n = 30), high callous-unemotional traits (n = 26), low psychopathic traits (n = 28) and high psychopathic traits (n = 28). See Table 1 and Table 2 for the means and standard deviations of each group.

Table 1

Means and Standard Deviations for Subgroups of Children with High versus Low Psychopathic Traits.

	APSD total score	
Subgroup	*M*	*SD*
Low psychopathic traits	10.11	4.37
High psychopathic traits	22.75	4.61

Note. APSD = Antisocial Process Screening Device.

Table 2

Means and Standard Deviations for Subgroups of Children with High versus Low Callous-unemotional Traits.

	Callous-unemotional traits subscale score	
Subgroup	*M*	*SD*
Low Callous-unemotional traits	2.93	1.48
High Callous-unemotional traits	7.19	1.39

Identification of Potential Confounding Variables

The first preliminary analyses examined gender differences on the major study variables. Independent samples *t*-tests were utilized to determine if gender needed to be added as a covariate in the main analyses. The assumption of homogeneity of variance was met for all tests. Boys scored higher on reactive aggression ($M = 10.66$, $SD = 3.94$) than girls ($M = 8.05$, $SD = 3.71$), $t(54) = 2.45$, $p = .017$. Gender differences were not found for callous-unemotional traits, $t(54) = .01$, $p = .989$, narcissism, $t(54) = -.18$, $p = .856$, impulsivity, $t(54) = 1.57$, $p = .122$, psychopathic traits, $t(54) = .25$, $p = .806$, or proactive aggression, $t(54) = .54$, $p = .589$.

Age, verbal abilities and attention were examined as potential covariates in the main analyses, given that these variables have been associated with both psychopathy and aggression in previous studies of youth (Blair et al., 2001; Kerig & Stellwagen, 2010). Identification of covariates was accomplished by examining the bivariate correlations between the potential covariates and the major study variables. A significant correlation was found between verbal abilities and both callous-unemotional traits ($r = -.31$, $p = .028$) and psychopathic traits ($r = -.30$, $p = .029$). A significant association was found between attention problems and both callous-unemotional traits ($r = .65$, $p < .001$) and psychopathic traits ($r = .69$, $p < .001$). There were no significant associations found between age and either callous-unemotional traits or psychopathic traits. As a result of these preliminary analyses, verbal abilities and attention problems were included as covariates in the main analyses.

A significant association was found between age and proactive aggression (r = -.28, p = .039), indicating that older children reported engaging in fewer acts of proactive aggression than younger children. There were no significant associations found between either verbal abilities or attention and proactive or reactive aggression, respectively. With respect to the regression analyses, variables that were significantly correlated ($p < .05$) with either proactive or reactive aggression were entered as covariates in both of the regression models (i.e., both the model in which the outcome variable is proactive aggression and the model in which the outcome variable is reactive aggression). This approach is useful for identifying covariates for multivariate analysis when working with a small sample size and limited power (e.g., Brookman-Frazee, Haine, Gabayan, & Garland, 2008). Therefore, age was included as a covariate in the regression analyses.

Descriptive Statistics and Tests of Normality

The means, standard deviations, and normality statistics for all questionnaires and performance measures are reported in Table 3. Univariate normality was assessed by examining the skew and kurtosis for each variable. The distribution for proactive aggression was significantly leptokurtic and positively skewed. The distribution for the standard passive avoidance task was significantly leptokurtic and positively skewed. The distribution for the categorical passive avoidance task was significantly positively skewed. Although appropriate transformations were able to normalize some of the variables (square root transformation for proactive aggression and log transformation for the categorical passive avoidance task), the decision was made to not transform that data. Transformations essentially change the hypothesis being tested, and since the construct being transformed is no longer comparable to the other variables, interpretation is

Table 3

Descriptive Statistics of the Major Study Variables.

Variables	*M*	*SD*	Range	Skew	Kurtosis
APSD					
CU traits	4.91	2.57	0 – 11	0.26	-0.90
Narcissism	5.18	3.38	0 – 12	0.79	-1.45
Impulsivity	5.5	2.05	1 – 10	-1.08	-0.5
Psychopathic traits	16.43	7.78	1 – 33	0.24	-1.06
RPAQ					
Reactive aggression	9.68	4.03	1 – 21	0.73	0.17
Proactive aggression	2.91	3.09	0 - 13	4.42*	3.11*
Passive Avoidance Tasks					
Standard EoC	7.08	6.45	0 – 27	4.25*	2.94*
Standard RT	1304.92	476.5	362.5 – 2392.55	1.63	.43
Categorical EoC	5.31	5.03	0 – 21	3.80*	1.74
Categorical RT	1388.88	628.79	356 – 2871.0	1.87	.42
Bias					
Distress	-1.99	25.30	-48.85 – 47.78	.603	-.85
Threat	1.82	24.59	-50.62 – 47.95	.40	-1.16
Sad	8.15	21.84	-42.68 – 48.58	.53	1.16
Anger	-5.81	25.94	-55.20 – 50.78	.72	-.76
Fearful	5.14	26.44	-46.90 – 56.34	-.21	-.68

Note. CU = Callous-unemotional. APSD = Antisocial Process Screening Device. RPAQ = Reactive Proactive Aggression Questionnaire. Skewness and kurtosis are reported in z-scores (i.e., statistic/standard error). EoC = Error of commission; RT = response time for EoCs.
*$p < .05$.

extremely difficult (Grayson, 2004). Additionally, ANCOVA is robust in the face of most violations of the assumption of normality, provided that group sizes are fairly equal (Lunney, 1970; Donaldson, 1968). Finally, when using regression techniques, the assumption of normality assumes that the residuals in the model are randomly distributed (Fields, 2009).

Hypothesis Testing

Correlation analyses were preformed to examine the zero-order correlations among aggression, subscales of the APSD (Frick & Hare, 2001), and performance measures (see Table 4). Correlations among impulsivity, callous-unemotional traits, and narcissism were all positive and significant (ps < .001). Callous-unemotional traits were weakly correlated with both reactive (r = .29, p = .028) and proactive aggression (r = .27, p = .044). Neither impulsivity nor narcissism was significantly correlated with either reactive or proactive aggression. Consistent with previous research, the correlation between children's self-reported reactive and proactive aggression was large (r = .64, p < .001). Children with higher callous-unemotional traits made more errors of commission on the categorical passive avoidance task then children with lower callous-unemotional traits (r = .28, p = .042).

Children with higher psychopathic traits were slower to respond to threatening images than children with lower psychopathic traits (r = -.29, p = .035). Children who reported engaging in more acts of both reactive and proactive aggression responded faster to angry facial expressions than children who reported engaging in fewer acts of reactive and proactive aggression (r = .33, p = .014; r = .29, p = .035, respectively).

Table 4

Correlations Between Subscales of the APSD, Aggression, and Performance Measures.

	Variables	1	2	3	4	5	6	7	8	9	10	11	12
1	Psychopathic traits	—											
2	CU traits	.83**	—										
3	Narcissism	.88**	.60**	—									
4	Impulsivity	.78**	.67**	.57**	—								
5	Reactive aggression	.20	.29*	.15	.25	—							
6	Proactive aggression	.19	.27*	.20	.15	.64**	—						
	Passive Avoidance												
7	Standard EoC	-.13	-.10	.08	.16	.13	.15	—					
8	Categorical EoC	.27	.28*	.19	.23	.01	.20	.03	—				
	Emotional Stimuli												
9	Threat bias	-.29*	-.26	-.24	-.13	-.06	.01	.03	-.33*	—			
10	Distress bias	.04	.06	.10	.01	.08	.24	.16	.08	.06	—		
11	Sad bias	-.18	-.13	-.17	-.09	-.06	-.12	.11	.04	.05	.15	—	
12	Angry bias	.02	.15	-.01	-.01	.33*	.29*	.05	-.07	.04	-.05	-.13	—
13	Fearful bias	.16	.21	.18	.05	.17	.19	.05	-.03	-.04	.08	-.02	.19

Note. APSD = Antisocial Process Screening Device. CU = callous-unemotional. EoC = Error of Commission.
*$p < .05$. **$p < .001$.

A series of one-way ANCOVAs were conducted to test the hypothesis that children with high psychopathic traits - and children with high callous-unemotional traits in particular - would demonstrate impaired passive avoidance learning and impaired responding to emotional stimuli. Based on the preliminary analyses indicating that verbal abilities and attention problems were both correlated with psychopathic traits and callous-unemotional traits, these variables were included as covariates in each ANCOVA.

Testing of the assumptions. The assumption of homogeneity of variances was violated for research question 1a ANCOVA, standard passive avoidance task. The assumption of homogeneity of variances was met for research questions 1b, 2a, and 2b. The assumption of the homogeneity of regression slopes was met for all analyses for research questions 1a, 1b, 2a, and 2b. The assumption of independence of the covariate and treatment effect was violated for the covariates verbal abilities and attention problems. Results of each analysis are reported below.

Research question 1a. Are children with psychopathic traits impaired on passive avoidance learning tasks? Results demonstrated that children with high psychopathic traits made just as many errors of commission as children with low psychopathic traits on both the standard passive avoidance task, F (1, 47) = .80, p = .377, *partial* η^2 = .02, and the categorical passive avoidance task, F (1, 49) = 2.87, p = .097, *partial* η^2 = .06. Neither verbal abilities nor attention problems were significantly related to either of the dependent variables. See Table 5 for a summary of the results.

Research question 1b. Are children with callous-unemotional traits impaired on passive avoidance learning tasks? Results indicated that children with high callous-unemotional traits made just as many errors of commission as children with low callous-

unemotional traits on both the standard passive avoidance task, F (1, 47) = 2.53, p = .119, *partial* η^2 = .06, and the categorical passive avoidance task, F (1, 49) = 1.77, p = .190, *partial* η^2 = .04. Neither verbal abilities nor attention problems were significantly related to any of the dependent variables. See Table 6 for a summary of the results.

Research question 2a. Do children with psychopathic traits show reduced responding to emotional stimuli? As presented in Table 7, a trend was observed in that children with high psychopathic traits had lower bias scores in response to sad facial expressions than children with low psychopathic traits, F (1, 48) = 3.55, p = .066, *partial* η^2 = .08[9]. Results indicated that children with high psychopathic traits showed similar responding to children with low psychopathic traits on all of the remaining emotional stimuli. See Table 7 for a summary of the results.

Research question 2b. Do children with callous-unemotional traits show reduced responding to emotional stimuli? A trend was observed in that children with callous-unemotional traits had lower bias scores in response to threatening stimuli than children with low callous-unemotional traits, F (1, 49) = 3.81, p = .057, *partial* η^2 = .08. Children with high callous-unemotional traits did not differ from children with low callous-unemotional traits for all remaining emotional stimuli. See Table 8 for a summary of the results.

[9] It is not uncommon to report trends within the child psychopathy literature (e.g., Fite et al., 2009; Sylvers, Brennan, & Lilienfeld, 2011; Woodworth & Waschbusch, 2007).

Table 5

Means and Standard Deviations for Children with High versus Low Psychopathic Traits on Passive Avoidance Tasks.

	High psychopathic traits		Low psychopathic traits			
Passive avoidance task	*M*	*SD*	*M*	*SD*	*p*	ηp^2
Standard EoC	6.87	4.63	7.67	8.26	.377	.02
Categorical EoC	7.26	5.50	3.81	4.25	.097	.06

Note. EoC = Error of commission. ηp^2 = partial eta squared.

Table 6

Means and Standard Deviations for Children with High versus Low Callous-Unemotional Traits on Passive Avoidance Tasks.

	High callous-unemotional traits		Low callous-unemotional traits			
Passive avoidance task	*M*	*SD*	*M*	*SD*	*p*	ηp^2
Standard EoC	6.33	3.73	8.04	8.34	.119	.06
Categorical EoC	7.28	5.52	4.04	4.41	.190	.04

Note. EoC = Error of commission. ηp^2 = partial eta squared.

Table 7

Means and Standard Deviations for Children with High versus Low Psychopathic Traits on Measures of Emotional Processing.

	High psychopathic traits		Low psychopathic traits			
Bias	*M*	*SD*	*M*	*SD*	*p*	ηp^2
Threat	-7.18	22.67	6.12	23.92	.403	.02
Distress	-1.43	26.57	-5.46	25.26	.631	.01
Sad	2.80	19.64	14.85	19.21	.066 [t]	.08
Angry	-4.42	28.9	-7.08	24.35	.793	.00
Fearful	11.73	25.07	1.97	27.3	.897	.00

Note. [t]$p < .09$. ηp^2 = partial eta squared.

Table 8

Means and Standard Deviations for Children with High versus Low Callous-Unemotional Traits on Measures of Emotional Processing.

	High callous-unemotional traits		Low callous-unemotional traits			
Bias	*M*	*SD*	*M*	*SD*	*p*	ηp^2
Threat	-11.23	22.94	8.21	21.69	.057 [t]	.08
Distress	-1.17	24.77	-5.07	26.71	.646	.01
Sad	3.67	19.24	12.83	20.29	.232	.03
Angry	-1.62	29.33	-9.27	23.79	.606	.01
Fearful	13.56	24.0	1.54	27.43	.707	.00

Note. [t]$p < .09$. ηp^2 = partial eta squared.

Exploratory post-hoc analyses. It is possible that significant group differences were not detected due to insufficient power. Power may have been lowered due to the inclusion of covariates that account for little variance in the dependent variable (Tabachnick & Fidell, 2007). Since verbal abilities and attention problems were not significantly related to any of the dependent variables in the ANCOVAs, a liberal approach was taken, and for exploratory purposes, one-way ANOVAs were run to determine if children with high psychopathic traits (and high callous-unemotional traits) displayed deficient passive avoidance learning and impaired emotional processing.

Children with high psychopathic traits (M = 7.04, SD = 5.34) made more errors of commission on the categorical passive avoidance task than children with low callous-unemotional traits (M = 3.70, SD = 7.95), F (1, 52) = 6.31, p = .015, η^2 = .112. Similarly, children with high callous-unemotional traits (M = 6.79, SD = 5.37) made more errors on the categorical passive avoidance task than children with low callous-unemotional traits (M = 4.04, SD = 4.42), F (1, 52) = 4.12, p = .048, η^2 = .076. Children with high callous-unemotional traits showed a bias away from threatening stimuli, F (1, 53) = 4.74, p = .034, η^2 = .085. No other group differences were found.

Regression analyses. In order to investigate whether callous-unemotional traits, narcissism and impulsivity independently predicted different forms of aggression, hierarchical multiple regressions were performed separately for each dependent variable: reactive aggression and proactive aggression. Given the relationship between conduct problems and psychopathic traits in youth, conduct problems were statistically controlled for by using two scale scores of the CBCL (Achenbach & Rescorla, 2001): oppositional

defiant problems and conduct problems. Two hierarchical multiple regression analyses were performed for each dependent variable.

Research question 3. Which dimension of the APSD (Frick & Hare, 2001) is the best predictor of reactive aggression in a sample of child with conduct problems? To test this hypothesis a series of two-step hierarchical regression analyses were conducted with reactive aggression as the dependent variable. Based on results from the preliminary analyses, age and gender were entered as covariates in Step 1. In order to control for conduct problems, two separate regression analyses were run in which oppositional defiant disorder or conduct disorder were also entered in Step 1. In Step 2, callous-unemotional traits, narcissism and impulsivity were regressed onto reactive aggression. The assumptions of normality, multicollinearity and homoscedasticity were met for both analyses. In the first regression analysis, the covariates gender and oppositional defiant disorder were both significant predictors of reactive aggression. In the second regression analysis, the covariates gender and conduct disorder were both significant predictors of reactive aggression. A trend was observed in that the callous-unemotional traits subscale was a weak predictor of reactive aggression, but only when controlling for oppositional problems, not conduct problems. Contrary to prediction, the impulsivity and narcissism subscales of the APSD (Frick & Hare, 2001) did not exhibited unique associations with reactive aggression. See Table 9 for a summary of the results.

Table 9

Hierarchical Regression Analysis Predicting Reactive Aggression.

Model 1 Step and variable entered	*F*	R^2	ΔR^2	*B*	*SE* of	β
Step 1: Covariates	5.09*	.22				
Age				-.271	.28	-.12
Gender				2.62	1.03	-.32*
Oppositional defiant problems				.14	.05	.34*
Step 2: APSD subscale	3.22*	.28	.06			
Callous-unemotional traits				.49	.27	$.31^t$
Narcissism				-.22	.21	-.19
Impulsivity				-.31	.37	-.16
Model 2 Step and variable entered	4.47*	.21				
Step 1: Covariates						
Age				-.20	.29	-.09
Gender				-2.48	1.05	-.30*
Conduct problems				.11	.05	.30*
Step 2: APSD subscale	2.62*	.24	.04			
Callous-unemotional traits				.40	.29	.25
Narcissism				-.19	.22	-.16
Impulsivity				-.20	.38	-.10

Note. APSD = Antisocial Process Screening Device.
* $p < .05$. $^t p < .09$.

Research question 4. Which dimension of the APSD (Frick & Hare, 2001) is the best predictor of proactive aggression in a sample of children with conduct problems? To test this hypothesis a series of two-step hierarchical regression analyses were conducted with proactive aggression as the dependent variable. Consistent with the previous set of regression analyses, age and gender were entered as covariates in Step 1, as well as oppositional defiant problems or conduct problems in two separate analyses. In Step 2, callous-unemotional traits, narcissism and impulsivity were regressed onto proactive aggression. The assumption of normality and homoscedasiticy were violated for both analyses. As such, the results should be interpreted with caution. Age was a significant predictor of proactive aggression in both models. A trend was observed in that the callous-unemotional traits subscale was a weak predictor of proactive aggression in both models. Contrary to prediction, the narcissism subscale of the APSD (Frick & Hare, 2001) did not exhibit strong unique associations with proactive aggression. See Table 10 for a summary of the results.

Table 10

Hierarchical Regression Analysis Predicting Proactive Aggression.

Model 1 Step and variable entered	*F*	R^2	ΔR^2	*B*	*SE* of	β
Step 1: Covariates	2.82*	.14				
Age				-.52	.23	-.30*
Gender				-.74	.83	-.12
Oppositional defiant problems				.07	.04	.22
Step 2: APSD subscale	2.14[t]	.21	.07			
Callous-unemotional traits				.43	.29	.36[t]
Narcissism				.02	.17	.02
Impulsivity				-.36	.30	-.24
Model 2 Step and variable entered						
Step 1: Covariates	3.09*	.15				
Age				-.47	.23	-.27*
Gender				-.64	.83	-.10
Conduct problems				.07	.04	.24
Step 2: APSD subscale	2.07[t]	.20	.05			
Callous-unemotional traits				.40	.23	.33[t]
Narcissism				.02	.17	.021
Impulsivity				-.33	.30	-.22

Note. APSD = Antisocial Process Screening Device.
* $p < .05$. [t] $p < .09$.

Discussion

The purpose of this dissertation was to examine the cognitive, emotional, and behavioural characteristics in children with psychopathic traits. Children with psychopathic traits engage in severe antisocial behaviour and present with a number of distinct cognitive and emotional impairments (Frick & White, 2008). In an attempt to replicate and extend the research, this dissertation investigated two specific impairments that have been linked to adult psychopathy: passive avoidance learning and emotional processing. It was also the intent of this dissertation to help clarify the relationship between dimensions of psychopathic traits in children and reactive versus proactive aggression. The following sections summarize the results and limitations of this dissertation, and make suggestions for futures studies in the specific domains of cognitive functioning, emotional processing, and aggression in children with psychopathic traits. This is followed by a discussion of the theoretical and clinical implications of these findings.

Psychopathic Traits, Callous-unemotional Traits, and Cognitive Processing.

Numerous studies have found that adults with psychopathy display deficits in instrumental learning (e.g., Blair, Mitchell, Leonard et al., 2004; Newman & Kosson, 1986; Newman et al., 1987). Only a handful of studies have investigated the relationship between psychopathic traits and forms of instrumental learning in child (e.g., O'Brien & Frick, 1996) and adolescent (e.g., Vitale et al., 2005) samples. Preliminary evidence suggests that adolescents with psychopathic traits present with similar deficits to their adult counterparts on measures of passive avoidance learning (Vitale et al., 2005). Several studies have also found that children with callous-unemotional traits demonstrate

a reward-dominant response study, however, this response style has only been demonstrated when investigating the moderating role of other variables, including; anxiety (e.g., O'Brien & Frick, 1996) and impulsivity (e.g., Barry et al., 2000).

The present study attempted to replicate the findings found in the adult domain by examining passive avoidance learning in children with high and low psychopathic traits and high and low callous-unemotional traits using a classic passive avoidance task. When controlling for attention problems and verbal abilities, children with high psychopathic traits (and high callous-unemotional traits) performed similarly to children with low psychopathic traits (and low callous-unemotional traits) on tasks of passive avoidance learning. When attention and verbal abilities were excluded from the analyses, the present study found that children with high psychopathic traits made significantly more errors of commission than children with low psychopathic traits on the passive avoidance task that required them to respond (or not respond) to neutral images. When isolating the callous-unemotional traits dimension of the APSD (Frick & Hare, 2001), this finding was also replicated.

The fact that group differences were only detected in the absence of covariates which have been theoretically linked to psychopathic traits may be the result of a number of factors. First, failure to replicate the findings from existing studies may be a result of slight differences between the passive avoidance learning task used in this dissertation, and passive avoidance tasks used in previous research. For example, in the passive avoidance task used in this dissertation, children did not immediately receive tangible rewards, they were informed of their progress via the immediate feedback of a silent message on the screen, and they were not given a running total of their points during the

task. In the Vitale et al. (2005) study, quarters were used as monetary incentives, and each response resulted in immediate visual, auditory, and monetary feedback. The stimuli (i.e., two digit numbers) used in historical adult studies and studies with children and adolescents (e.g., Vitale et al., 2005) were similar to the stimuli used in this dissertation's standard passive avoidance task (i.e., single digit numbers). However, group differences in the present dissertation were only significant in the task in which the stimuli were neutral images (not numbers). It is possible that these small methodological differences impacted the extent to which group differences could be detected.

Second, several studies have found that the relationship between psychopathic traits and passive avoidance learning in adolescents is moderated by levels of trait anxiety (e.g., Vitale et al., 2005). For the present dissertation, trait anxiety was measured by one subscale of the CBCL (Achenbach & Rescorla, 2001). This dissertation did not have a sufficiently large sample size which would allow one to examine the interaction between anxiety and psychopathic traits. However, an examination of the bivariate correlation between anxiety and psychopathic traits was positively significant ($r = .331$, $p < .01$). Future studies investigating passive avoidance learning in children with psychopathic traits are advised to use methodologies similar to those used by Vitale et al. (2005). Additionally, exploring the moderating effects of anxiety and impulsivity in larger samples is a worthwhile endeavor.

Psychopathic Traits, Callous-unemotional Traits, and Emotional Processing.

Previous studies have demonstrated that children with psychopathic traits present with impaired emotional processing of sad and fearful expressions (Blair & Coles, 2000; Stevens et al., 2001), as well as threatening and distressing images (Blair, 1999). This

dissertation attempted to add to the literature by examining emotional processing using an attentional paradigm (i.e., the dot-probe task). As predicted, children with high psychopathic traits showed a bias away from threatening images. A trend was observed in that children with high psychopathic traits showed deficient emotional processing of sad facial expressions. As expected, children with high psychopathic traits showed a similar pattern of responding seen in children with low psychopathic traits in response to angry facial expressions. When examining the specific dimension of callous-unemotional traits, a trend was observed in that children with high callous-unemotional traits showed a bias away from threatening images. Post-hoc analysis revealed that this difference became statistically significant when removing the covariates from the analysis.

The results of this dissertation provide some support for the hypothesis that children with psychopathic traits display impaired emotional processing. Unlike other studies (e.g., Blair, 1999; Blair & Coles, 2000), children with high psychopathic traits did not display deficient emotional processing of distressing images or fearful facial expression. The failure to observe such impairments in this dissertation may have been the result of a number of factors. First, group differences may not have been detected due to issue related to the methodology used to assess emotional processing in this dissertation. As stated to by Kimonis et al. (2006), the dot-probe paradigm is more commonly used to assess attention bias in the anxiety domain. A handful of researchers have only recently begun to use this paradigm to assess emotional processing in children with psychopathic traits (e.g., Kimonis, et al., 2007). Additionally, although the facial images used in this dissertation were validated, they have not been used with children. As a result, the stimuli may not have been as effective as other facial stimuli used for

research in the child domain. For example, using images from the Pictures of Facial Affect Series (Ekman & Friesen, 1976), Blair et al. (2001) found that children with psychopathic traits had difficulty recognizing sad and fearful expressions.

It has been argued that the emotional deficits seen in adult psychopaths is what separates them from individuals who are merely antisocial. As such, understanding how these processes develop at an early age is of utmost importance to developmental theories of psychopathy. Future studies investigating the emotional processing deficits in children with psychopathic traits are advised to use stimuli that have been previously validated in youth, and perhaps more reflective of their chronological age.

Psychopathic Traits, Callous-unemotional Traits, and Reactive and Proactive Aggression.

Whereas the literature supports a relationship between psychopathy and differential forms of aggression in the adult domain (Cornell et al., 1996), this relationship has not been as well established in child and adolescent samples. Preliminary findings suggest that callous-unemotional traits are correlated with both reactive and proactive aggression (Enebrink et al., 2005; Frick et al., 2003), although this finding has not always been consistent (e.g., Munoz et al., 2008). The literature also suggests that the narcissism and impulsivity dimensions of psychopathy may also be important predictors of aggression. For example, some studies have found that children high on the narcissism subscale of the APSD (Frick & Hare, 2001) engage in more acts of reactive and proactive aggression than children low on the narcissism subscale (e.g., Barry et al., 2007). Other studies have found that children who score high on the impulsivity dimension engage in reactive, but not proactive, aggression (Kerig & Stellwagen, 2010).

In an attempt to address the limitations of previous studies, this dissertation tested which dimension of the APSD (Frick & Hare, 2001) was the best predictor of reactive and proactive aggression in a sample of children with conduct problems. As hypothesized, the callous-unemotional traits dimension was the best predictor of proactive aggression. The callous-unemotional traits dimension was also the best predictor of reactive aggression. However, these results were trend-level results only. Contrary to prediction, narcissism was not predictive of either reactive or proactive aggression. Surprisingly, impulsivity was not a significant predictor of reactive aggression.

The finding that the callous-unemotional traits dimension was a predictor of both reactive and proactive aggression is consistent with recent research that highlights the importance of the affective component of psychopathy in understanding aggression. Although narcissism has been linked to hostile and explosive reactions to criticism, sense of entitlement and anger - all of which could place a child at risk of engaging in reactive or proactive aggression (Barry et al., 2003) - the present study did not support this prediction. The finding that impulsivity was unrelated to reactive aggression is surprising given that reactive aggression is often the result of impulsive responding and behavioural deregulation.

The failure to find stronger relationships between dimensions of psychopathy and aggression in the present study may be a result of how reactive and proactive aggression were assessed. Although many studies that assess dimensions of aggression in children and adolescents use the six-item questionnaire developed by Dodge and Coie (1987), this dissertation attempted to utilize a more comprehensive measure. The RPAQ (Raine et al.,

2006) is a brief self-report measure that assesses reactive and proactive aggression in youth. Despite the comprehensiveness of the RPAQ (Raine et al., 2006), it has been argued that several of the items on this measure do not assess aggression, but rather assess anger (e.g., “Reacted angrily when provoked by others”; “Gotten angry when frustrated”; “Become angry or mad when you don’t get your way”; Hubbard et al., 2010). This is problematic because anger and aggression are distinct constructs, and anger does not always lead to aggression. Second, this measure relies on children’s self-report of their own aggressive behaviour. Fite et al. (2009) found marginal support for the relationship between dimensions of psychopathic traits and aggression with parent reports, but *not* child reports of aggression. It may be the case that children are not as accurate as their parents at reporting their aggressive actions, or understanding the motivation behind such acts. Finally, the RPAQ (Raine et al., 2006) has primarily been used in older samples. Resultantly, it may not have been the most appropriate measure for the children in this study.

Much information remains to be learned about the mechanisms driving children with psychopathic traits to engage in reactive and proactive aggression. Future studies investigating differential forms of aggression in children with psychopathic traits are advised to use multiple types of assessments (e.g., parent, teacher, child, behavioural observation). Studies of children residing in clinical facilities or juvenile detention centers may hold the most promise for investigating these relationships, as one would be able to gain access to file reviews and official police records. In fact, a comprehensive coding scheme has been develop based on the influential work of Cornell et al. (1996) to assess the continuum between instrumental (proactive) and reactive aggression in

juvenile detention centers (e.g., ARF: Vitacco, Neumann, Caldwell, Leistico, & VanRybrock, 2006).

Contribution to the Neurocognitive Theory of the Development of Psychopathy

The results of the present study provide support for Blair's (Blair, Mitchell et al., 2005; Blair et al., 2006) neurocognitive theory of the development of psychopathy. The present study found that children with psychopathic traits showed a trend towards a bias away from negative emotional stimuli. These children also displayed a passive avoidance deficit on one measure of passive avoidance learning. Impaired passive avoidance learning and negative emotional processing are both aspects of what Blair (Blair, Mitchell et al., 2005; Blair et al., 2006) refers to as the core emotional deficit seen in psychopathy. Both processes have been implicated in interfering with a child's ability to be socialized. Furthermore, a relationship was found between callous-unemotional traits and both reactive and proactive aggression.

Clinical Implications

Children with psychopathic traits form homogeneous groups with distinct cognitive, emotional, and behavioural impairments. Findings from the current and extant literature have important implications for existing, as well as developing treatment packages for children with psychopathic traits. Many of the empirically supported interventions for aggressive and antisocial behaviour have multiple components, including: parent training (e.g., providing parents with effective methods to manage behaviour), cognitive therapy (e.g., generating alternative ways of handling situations), behavioural therapy (e.g., modeling, role play, reinforcement), and family therapy (e.g., focusing on parent-child interactions). Sadly, the message received by the clinical

community is that individuals with psychopathy and children with psychopathic traits rarely benefit from intervention (Salekin, 2002; Spain et al., 2004). Targeting the unique deficits of children with psychopathic traits may hold the most promise. For example, children with psychopathic traits exhibit a reward-dominant style and are relatively insensitive to punishment cues. These children may respond better to reward-based interventions (e.g., positive reinforcement, token economy), whereas interventions based on punishment (e.g., timeout) may prove to be relatively ineffective. In fact, a recent study found that parents of young boys (age 4–8) reported that disciplinary techniques were more effective for boys with *low* callous-unemotional traits than boys with high callous-unemotional traits (Hawes & Dadds, 2005). In the same study, reward-based interventions were equally effective for boys with and without callous-unemotional traits.

Another intervention that could target the unique deficits seen in children with psychopathic traits involves explicitly teaching children to recognize emotions. One promising approach may be to have children focus on specific regions of the face. This approach is based on the findings by Dadds et al. (2006). These researchers found that children with callous-unemotional traits made fewer recognition errors on a fearful facial recognition task when they were directed to focus on the eye region. In contrast, this recognition deficit was evident in both a free gaze condition (no instructions given) and in a condition in which children were directed to attend to the mouth region.

Finally, interventions programs for children with psychopathic traits should target both reactive and proactive aggression. However, many of these techniques involve stressing the negative consequences of aggressive behaviour, as well as attempting to develop empathy by helping these children see how their negative behavior affects

others. Given that children with psychopathic traits demonstrate an inability to learn from punishment and present with deficient emotional processing abilities, these approaches may be ineffective.

On a final note, results of this dissertation found that psychopathic traits were highly and significantly correlated with callous-unemotional traits ($r = .833$, $p < .05$). This begs the question of whether these domains are in fact measuring distinct constructs. A review of the literature indicates that researchers are not always consistent in how they assess the construct of psychopathy in children. Researchers who focus their efforts exclusively on the callous-unemotional traits domain argue that this domain represent the core affective deficit seen in psychopathy (Frick & White, 2008). Researchers who use a more inclusive construct – psychopathic traits – appear to be measuring a higher-order construct that more closely aligns with the key characteristics present in adult psychopaths (i.e., affective, interpersonal and behavioral). Based on the findings from this dissertation, researchers are urged to think clearly about how they conceptualize psychopathy in children and choose the dimension appropriately.

Limitations

A number of important methodological limitations have been addressed in the sections above, but several additional limitations need to be articulated. First, the sample size was relatively small, which may have resulted in a lack of statistical power to detect significant differences between groups of children with high and low psychopathic traits. Although every attempt was made to obtain a larger sample size, data collection faced several challenges. First, data were collected over an extremely long period of time, and of the 97 participants who showed interest in participating, only 60% actually completed the

study. A second agency that supports children with conduct problems was approached in an attempt to gain access to more children, however, due to differing ethics board's requirements, recruitment from this agency was not possible. In addition, conducting research with families of children with conduct problems is extremely difficult. These families face many hardships, including: issues with access to clinical services, transportation, finances, and parental psychopathology. These barriers made it difficult for families to schedule, maintain, and get to their appointments. Other researchers have had similar difficulties recruiting children with conduct problems for laboratory research (e.g., Marsh et al., 2010). Given the limitations of the study, the results need to be interpreted with caution.

Future Directions

The present dissertation provides some support for Blair's (Blair, Mitchell et al., 2005; Blair et al., 2006) neurocognitive theory of the development of psychopathy, however, it also highlights the need for the development of standardized measures of cognitive and emotional processing, and reactive and proactive aggression in children. The passive avoidance learning task and the emotional-dot probe task utilized in the present study were adapted versions of measures currently used in samples of children and adolescents. However, these measures have not been standardized in samples of healthy children, and as a result, there are no norms to compare children's responding to. Similarly, while there are numerous standardized questionnaires to assess general aggression (e.g., CBCL: Achenbach & Rescorla, 2001), these measures do not differentiate between dimensions of aggressive behavior. If cognitive and emotional differences between groups of children with and without psychopathic traits are

established using standardized measure, it would provide stronger support for the developmental theory of psychopathy. Furthermore, creating standardized measures with normative samples would allow one to track the emergence of these characteristics (e.g., emotional deficits) overtime, and would aid in further understanding the developmental trajectory of psychopathy.

Finally, a relatively neglected aspect of Blair's (Blair, Mitchell et al., 2005; Blair et al., 2006) neurocognitive model of the development of psychopathy concerns the statement that, whether or not children with psychopathic traits learn to use antisocial behaviors (or what he calls antisocial motor programs) to achieve their goals is dependent on their social environment and learning history. Blair (Blair, Mitchell et al., 2005; Blair et al., 2006) argues that certain family variables (e.g. socioeconomic status, domestic violence, family criminality) may create environments which model antisocial behavior, or may provide children with motive for engaging in antisocial behavior, however, little research has been conducted in this area. More research is needed to identify variables that increase the probability that at-risk children will engage in antisocial acts and to also identify protective factors.

Conclusions

Psychopathy is a developmental disorder characterized by deficits in the emotional, interpersonal and behavioral domains. Research suggests that children with psychopathic traits show impaired emotional processing of negative emotional stimuli and also present with impaired passive avoidance learning. The relationships between the dimensions of psychopathic traits and reactive versus proactive aggression remains unclear, however, this dissertation suggests that the affective dimension of psychopathy

(i.e., callous-unemotional traits) is likely useful in identifying antisocial youth who are at risk for severe aggressive behaviour. Further identification of the unique correlates in children with psychopathic traits can guide the development of individualized interventions designed to treat these youth.

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Appendix A

Western

Office of Research Ethics

The University of Western Ontario
Room 4180 Support Services Building, London, ON, Canada N6A 5C1
Telephone: (519) 661-3036 Fax: (519) 850-2466 Email: ethics@uwo.ca
Website: www.uwo.ca/research/ethics

Use of Human Subjects - Ethics Approval Notice

Principal Investigator: Dr. P.N.S. Hoaken
Review Number: 15373S **Review Level:** Full Board
Review Date: August 8, 2008
Protocol Title: Cognitive Functions and Social Information Processing in Children with Callous-Unemotional Traits
Department and Institution: Psychology, University of Western Ontario
Sponsor: SSHRC-SOCIAL SCIENCE HUMANITIES RESEARCH COUNCIL
Ethics Approval Date: September 11, 2008 **Expiry Date:** September 30, 2010
Documents Reviewed and Approved: UWO Protocol, Letter of Information and Consent, Assent Form, Debriefing Form.
Documents Received for Information:

This is to notify you that The University of Western Ontario Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the applicable laws and regulations of Ontario has granted approval to the above named research study on the approval date noted above.

This approval shall remain valid until the expiry date noted above assuming timely and acceptable responses to the NMREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the UWO Updated Approval Request Form.

During the course of the research, no deviations from, or changes to, the study or consent form may be initiated without prior written approval from the NMREB except when necessary to eliminate immediate hazards to the subject or when the change(s) involve only logistical or administrative aspects of the study (e.g. change of monitor, telephone number). Expedited review of minor change(s) in ongoing studies will be considered. Subjects must receive a copy of the signed information/consent documentation.

Investigators must promptly also report to the NMREB:

a) changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
b) all adverse and unexpected experiences or events that are both serious and unexpected;
c) new information that may adversely affect the safety of the subjects or the conduct of the study.

If these changes/adverse events require a change to the information/consent documentation, and/or recruitment advertisement, the newly revised information/consent documentation, and/or advertisement, must be submitted to this office for approval.

Members of the NMREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the NMREB.

Chair of NMREB: Dr. Jerry Paquette

Appendix B

Western

Office of Research Ethics

The University of Western Ontario
Room 4180 Support Services Building, London, ON, Canada N6A 5C1
Telephone: (519) 661-3036 Fax: (519) 850-2466 Email: ethics@uwo.ca
Website: www.uwo.ca/research/ethics

Use of Human Subjects - Ethics Approval Notice

Principal Investigator: Dr. P.N.S. Hoaken
Revision Number: 4
Review Number: 15373S
Approved Local # of Participants: 100
Review Date: August 24, 2010
Review Level: Expedited
Protocol Title: Cognitive Functions and Social Information Processing in Children with Callous-Unemotional Traits
Department and Institution: Psychology, University of Western Ontario
Sponsor: SSHRC-SOCIAL SCIENCE HUMANITIES RESEARCH COUNCIL
Ethics Approval Date: August 24, 2010
Expiry Date: December 31, 2010
Documents Reviewed and Approved: Revised study end date.
Documents Received for Information:

This is to notify you that The University of Western Ontario Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the applicable laws and regulations of Ontario has granted approval to the above referenced revision(s) or amendment(s) on the approval date noted above.

This approval shall remain valid until the expiry date noted above assuming timely and acceptable responses to the NMREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the UWO Updated Approval Request Form.

During the course of the research, no deviations from, or changes to, the study or consent form may be initiated without prior written approval from the NMREB except when necessary to eliminate immediate hazards to the subject or when the change(s) involve only logistical or administrative aspects of the study (e.g. change of monitor, telephone number). Expedited review of minor change(s) in ongoing studies will be considered. Subjects must receive a copy of the signed information/consent documentation.

Investigators must promptly also report to the NMREB:

a) changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
b) all adverse and unexpected experiences or events that are both serious and unexpected;
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If these changes/adverse events require a change to the information/consent documentation, and/or recruitment advertisement, the newly revised information/consent documentation, and/or advertisement, must be submitted to this office for approval.

Members of the NMREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the NMREB.

Chair of NMREB: Dr. Riley Hinson
FDA Ref. #: IRB 00000941

CIRRICULUM VITAE

Vanessa L. Pedden, M. Sc

Department of Psychology
The University of Western Ontario
London, Ontario, Canada

EDUCATION

Doctor of Philosophy Candidate, University of Western Ontario, 2006 – present
Area: Clinical Psychology
Advisor: Peter Hoaken, Ph. D., C. Psych
Dissertation title: *Cognitive, Emotional and Behavioural Correlates in Children with Psychopathic Traits*
Internship: Holland Bloorview Kids Rehabilitation Hospital

Master of Science, University of Western Ontario, 2006
Area: Clinical Psychology
Advisor: Peter Hoaken, Ph. D., C. Psych
Thesis title: *The Multifaceted Construct of Impulsivity*

Honours Bachelor of Arts, University of Western Ontario, 2003

CLINICAL EXPERIENCE

Psychometrist, Private Practice
2011 – present

Counsellor, Woodstock Probation and Parole
Ministry of Public Safety and Security
2008 – 2010

Teaching Assistant
The University of Western Ontario
2004 – 2011

Part-Time Instructor, Kings College University, London, ON
Psychology 120a/b: Addictive Behaviours
2007 – 2008

PEER-REVIEWED PUBLICATIONS

Drug use & abuse and human aggressive behaviour. Hoaken, P.N.S., **Pedden, V.**, Ross, E.H., Hancock, M., Lau, M.J. & Tapscott, J.L. (In Press) In: Verster, J., Brady, K., Strain, E., Galanter, M., & Conrod, P. Drug Abuse and Addiction in Medical Illness: Causes, Consequences, and Treatment". Springer, USA.

CONFERENCE PRESENTATIONS

Hamill, V. & Hoaken, P.N.S. (2007). The multifaceted nature of impulsivity: A factor analytic study of self-report and behavioural measures of impulsivity and disinhibition. Presented at the annual meeting of the Canadian Psychological Association, Ottawa, ON.

Hamill, V., & Hoaken, P.N.S (2005). An investigation of the cognitive and social-perceptual abilities of adult male violent offenders, non-violent offenders and community controls. Presented at the annual meeting of the Canadian Psychological Association, Montreal, PQ.