

Maltreatment and Psychopathy Subtypes in High-Risk Adolescent Females

by

Ruth Louise Coupland

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B.A. (Hons.), University of Manitoba, 2004

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Approval

Name: Ruth Louise Coupland
Degree: Doctor of Philosophy (Psychology)
Title of Thesis: *Maltreatment and Psychopathy Subtypes in High-Risk Adolescent Females*

Examining Committee:

Chair: Dr. Robert McMahon, Professor

Dr. Marlene Moretti
Senior Supervisor
Professor

Dr. Arlene Young
Supervisor
Associate Professor

Dr. Jodi Viljoen
Supervisor
Associate Professor

Dr. Margaret Jackson
Internal Examiner
Professor Emerita, School of Criminology

Dr. Randall Salekin
External Examiner
Professor, Department of Psychology
University of Alabama

Date Defended/Approved: December 9th, 2011



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Abstract

Psychopathy is often viewed as a unitary construct, however, research with adults and adolescent males has revealed two heterogeneous subtypes. Primary psychopathy is presumed to have biological underpinnings and is associated with low levels of anxiety and psychological distress. In contrast, secondary psychopathy is believed to result from exposure to adversity, including childhood maltreatment, and is associated with emotional reactivity, impulsivity, and comorbid psychological problems. The current study tested for psychopathy subtypes in a sample of 141 forensic adolescent girls. Given that secondary psychopathy is thought to develop in response to adversity, the current study also explored the relationships between childhood maltreatment and psychopathy. Following procedures used in previous studies, a model-based cluster analysis of the Psychopathy Checklist: Youth Version factor scores and anxiety (as measured by the Youth Self-Report) was conducted. Three groups were found including a low psychopathy group, a moderate psychopathy group with low anxiety, and a high psychopathy group with high anxiety. These groups were then compared on relevant external correlates. The high psychopathy group had significantly higher rates of social problems, somatic complaints, and attention problems than both other groups. Maltreatment was significantly related to psychopathy regardless of group membership. Findings are discussed from a developmental perspective and theories of primary and secondary psychopathy are considered.

Keywords: Psychopathy Subtypes; Childhood Maltreatment; Cluster Analysis; Adolescent Females; Primary Psychopathy; Secondary Psychopathy

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Table of Contents

Approval.....	ii
Abstract.....	iii
Acknowledgements.....	iv
Table of Contents.....	v
List of Tables.....	vi
INTRODUCTION.....	1
Psychopathy.....	2
A Developmental Psychopathology Perspective.....	4
Psychopathy Subtypes.....	4
The Development of Primary and Secondary Psychopathy.....	8
Maltreatment and Psychopathy.....	10
Current Study.....	11
Hypotheses.....	12
METHOD.....	13
Participants and Procedure.....	13
Measures.....	14
The Family Background Questionnaire.....	14
The Psychopathy Checklist: Youth Version.....	14
Youth Self-Report.....	16
Analytical Strategy.....	17
Missing Data.....	17
Psychopathy Subtypes.....	17
External Validation.....	19
Childhood Maltreatment and Psychopathy Subtypes.....	19
RESULTS.....	20
Psychopathy Subtypes.....	22
Cluster Analysis.....	22
Cluster Descriptions.....	23
External Validation.....	25
Childhood Maltreatment and Psychopathy Subtypes.....	26
DISCUSSION.....	29
Heterogeneity in Adolescent Psychopathy.....	30
Developmental Considerations.....	32
Evidence for Primary and Secondary Psychopathy.....	34
Implications for Theory and Practice.....	34
Limitations and Directions for Future Research.....	36
REFERENCES.....	38

List of Tables

Table 1. Model Descriptions.....	18
Table 2. Descriptive Data of Study Variables	21
Table 3. BIC Values for Tested Models	23
Table 4. Means of Psychopathy Factor Scores for Psychopathy Subtypes	24
Table 5. Psychopathy Groups and External Correlates	26
Table 6. Maltreatment and Psychopathy Subtypes ANOVAs	27
Table 7. Correlations between Maltreatment and Psychopathy Total Scores	28

INTRODUCTION

Psychopathy refers to pervasive personality characteristics including lack of conscience and empathy (Lykken, 2006; Porter, 1996). Originally, the construct of psychopathy was applied only to adult populations. This concept has now been extended to adolescence. While there are several reasons to support this extension, there are also reasons to remain cautious, including the possibility that psychopathy is not a uniform construct (Poythress & Skeem, 2006) and a dearth of empirical support for using this construct with females (Forth, Kosson, & Hare, 2003; Odgers, Reppucci, & Moretti, 2005; Vincent, Odgers, McCormick, & Corrado, 2008). These concerns have prompted the application of a developmental perspective in studying psychopathy in adolescents. The developmental psychopathology framework posits that there is a dynamic interplay between biology, individual characteristics, and the environment across the lifespan (Masten, 2006).

Researchers have recently begun to explore the possibility of subtypes of psychopathy in adults males (for a review see Poythress & Skeem, 2006) and females (Hicks, Vaidyanathan, & Patrick, 2010), and male adolescents (Lee, Salekin, & Iselin, 2010; Vaughn, Edens, Howard, & Toney Smith, 2009). The two subtypes that have received the most attention are primary and secondary psychopathy (Karpman, 1948a; Karpman, 1948b). Individuals with primary psychopathy tend to have lower anxiety and distress, less reactive aggression, and fewer comorbid psychiatric disorders than individuals with secondary psychopathy, who are prone to experience emotional reactivity and psychological turmoil. Research with adult (Hicks et al., 2010; J. Skeem, Johansson, Andershed, Kerr, & Loudon, 2007; Vassileva, Kosson, Abramowitz, & Conrod, 2005) and adolescent (Lee et al., 2010; Vaughn et al., 2009) males shows support for these subtypes. Currently, only one study has tested for primary and secondary psychopathy subtypes in adult females (Hicks et al., 2010). One adolescent study did include females, but too few were included to be able to generalize the results

to adolescent females (Vaughn et al., 2009). As such, no research has reported on these subtypes in adolescent females.

While primary psychopathy is thought to have biological underpinnings, secondary psychopathy is believed to result from environmental circumstances including childhood maltreatment (Karpman, 1948a; Karpman, 1948b; Porter, 1996). A relationship between psychopathy and childhood maltreatment has been established in adults of both sexes (Koivisto & Haapasalo, 1996; Verona, Hicks, & Patrick, 2005; Weiler & Widom, 1996) and appears to be present in adolescent males (O'Neill, Lidz, & Heilbrun, 2003). However, only two studies (Krischer & Sevecke, 2008; Odgers et al., 2005) have reported on this relationship in female adolescents and these studies produced inconsistent results. Given that maltreatment is believed to play differing roles in the development of primary and secondary psychopathy subtypes, it is possible that the relationship between maltreatment and psychopathy varies across psychopathy subtypes thus obscuring the results of these studies, which did not test for psychopathy subtypes.

To address these gaps in the literature the current study had two objectives: first, to determine if primary and secondary psychopathy subtypes are present in adolescent females; and second, to assess if maltreatment varies across these subtypes.

Psychopathy

Psychopathy characteristics include personality features in interpersonal, affective, lifestyle, and behavioural domains (see Frick & Marsee, 2006), with the central feature being a lack of conscience and empathetic concern for others (Lykken, 2006; Porter, 1996). Behaviourally, psychopathy is expressed in externalizing problems such as difficulty controlling anger and serious criminal behaviour; lifestyle characteristics include sensation seeking and being irresponsible and impulsive. Interpersonal characteristics include grandiosity, pathological lying, being conning and manipulative, and impression management. At the core of the disorder is a fundamental disturbance of affective experience, which is expressed as lack of remorse, shallow affect, callousness, and not taking responsibility for one's actions.

The concept of psychopathy has been applied to adult populations for approximately 200 years (for a review see Lykken, 2006). Only recently has this concept been extended to adolescent populations. Many researchers have emphasized the value of examining psychopathy in adolescents (Frick, 2002; Salekin, Leistico, Neumann, DiCicco, & Duros, 2004, also, see Salekin, 2006) as psychopathy characteristics in adults are generally viewed as difficult or impossible to treat (Harris & Rice, 2006). Because personality is still developing, adolescence may serve as a unique period where maladaptive personality characteristics are more amenable to change and as such, treatment may be more effective than later in life. In addition, an understanding of how psychopathy characteristics develop through adolescence and into adulthood may improve our understanding of risk and resiliency factors and thus our ability prevent or intervene in the development of the disorder. Studying psychopathy in adolescence may be helpful in determining if psychopathy characteristics can be used to predict aggressiveness, criminality, and recidivism in adolescents.

While there are obvious merits to these arguments, there are reasons to remain cautious about the application of the concept of psychopathy within adolescent populations. High rates of comorbid psychopathology have been found in adolescent samples, particularly in girls (Sevecke, Lehmkuhl, & Krischer, 2009), and it is not clear how these co-occurring symptoms may interact with or alter the presentation or assessment of psychopathy (Seagrave & Grisso, 2002). Similarly, there is evidence that there are subtypes of psychopathy that may differ in terms of comorbid psychopathology, risk level, and treatment needs; however, little is known about the heterogeneity of psychopathy in adolescence. In addition, it is not clear if the construct of psychopathy is appropriate for use with female adolescents. Most studies examining psychopathy (in both adults and adolescents) do not include females, and those that do seldom report results by sex (Forth et al., 2003). Adult literature (Salekin, Rogers, & Sewell, 1997; Salekin, Rogers, Ustad, & Sewell, 1998) and one study with adolescent females (Schrum & Salekin, 2006) suggests that affective and interpersonal characteristics of psychopathy may better represent psychopathy in females than behavioural characteristics. In addition, in adolescent females, the relationship between psychopathy and outcomes is unclear. For example, Vincent, Odgers, McCormick, and Corrado, (2008) found that higher psychopathy scores did not predict recidivism or time to reoffending in female adolescents. On the other hand, Penney and Moretti, (2007)

found that higher psychopathy ratings predicted higher overt and relational aggression for both male and female adolescents.

A Developmental Psychopathology Perspective

A developmental psychopathology framework is helpful when studying psychopathy in adolescence. This perspective (see Masten, 2006) presumes that there is a dynamic interplay between biological processes and the environment across the lifespan. It also presumes that there is the possibility for the same pathway to lead to many different outcomes (multifinality) as well as the possibility for different pathways to lead to the same outcome (equifinality). This means that two people with the same presentation may have had very different histories, and that there may be heterogeneity, or subtypes, within a particular disorder. Within this framework, psychopathology is defined in terms of normal development, and an understanding of normative development is considered essential to understanding how development can deviate from normal. In the following two sections, theory and research on heterogeneity in psychopathy is reviewed, and possible developmental pathways are considered in relation to normative development.

Psychopathy Subtypes

Psychopathy is generally regarded as a unitary construct with primarily biological underpinnings. In recent years, researchers have begun to identify subtypes of psychopathy. The majority of this work is based on the theory of Karpman (1948a; 1948b) who proposed that there is a secondary form of psychopathy resulting from environmental circumstances such as childhood maltreatment. Karpman argued that, similar to primary psychopaths, secondary psychopaths lack feelings and empathy for others, are conning and manipulative, and do not learn from experience. Similar to Cleckley's (1950) portrayal of psychopathy, Karpman described primary psychopaths as unable to experience anxiety and distress and acting out in a calm and deliberate manner. In contrast, secondary psychopaths were seen as neurotic, impulsive, and highly prone to emotional reactivity and psychological turmoil. According to Karpman (1955), as summarized by Skeem, Poythress, Edens, Lilienfeld, and Cale (2003; p. 520), "the primary psychopath often acts purposefully and directly to maximize his gain or excitement, whereas the secondary psychopath typically acts out of such emotions as

hatred and revenge, often in reaction to circumstances that exacerbate his neurotic conflict.”

Building on Karpman's theory, Lykken (1957) proposed that it should be possible to empirically differentiate primary psychopaths (as described by Cleckley, 1950) from other “psychopathic personalities.” Given that a key feature of Cleckley's description of psychopathy is a lack of anxiety, Lykken proposed that primary psychopaths would show low levels of manifest anxiety and be unable to learn from fear-based classical conditioning. In the first study of its kind, Lykken used galvanic skin conductance tests, an avoidance learning task, and measures of anxiety to test this hypothesis. He found that inmates fully meeting Cleckley's criteria (primary psychopaths as judged by institutional psychologists) had lower skin reactivity in response to classical conditioning to shocks, poorer avoidance of punishment (of shocks), and lower anxiety scores than controls. In addition, he found that a group he labelled “neurotic sociopaths” did not differ from non-criminal controls on skin conductance or avoidance learning, however, they had significantly higher anxiety scores than the control group. Lykken's finding - that primary psychopathy is associated with lower levels of anxiety on a variety of indices - has since been replicated in numerous studies (see Lewis, 1991).

Similar to Karpman's theory, Porter (1996) proposed that secondary psychopathy results from environmental circumstances, specifically exposure to trauma. He posited that some children respond to maltreatment and trauma by dissociating their emotions from their experiences thus avoiding negative emotions caused by trauma. As a result these children have difficulty forming bonds with others and a corresponding lack of empathy and conscience. Consistent with Karpman's theory, Porter posited that secondary psychopathy appears nearly identical to primary psychopathy with only slight differences in manifestation.

Over the past decade, using modern measures of psychopathy and advanced statistical methods, researchers have attempted to empirically identify these subtypes in adult males (for a review see Poythress & Skeem, 2006). One of the first studies to successfully demonstrate empirical support for these subgroups (Hicks, Markon, Patrick, Krueger, & Newman, 2004) used a model-based cluster analysis including the 11 primary trait scales of the Multidimensional Personality Questionnaire (MPQ) in a sample

96 male prisoners who had scored higher than 30 on the Psychopathy Checklist Revised (PCL-R; Hare, 2003). A problem with traditional cluster analyses is the requirement that the number of clusters be specified *a priori* by the researcher. As a result, the number of groups specified will always be found (Fraley & Raftery, 2002b). This is not required for model-based cluster analysis. Rather, model-based cluster analysis tests for the possibility of one to nine clusters in differing conditions regarding volume, shape, and orientation of the clusters. The models are then compared to identify the best fitting model. The authors found that a two-cluster model consistent with primary (labelled *emotionally stable*) and secondary (labelled *aggressive*) psychopathy best fit the data. Consistent with theoretical conceptions of primary and secondary psychopathy, the primary group scored higher on well-being, achievement, and control, and also lower on alienation, stress reaction, and aggression compared to the secondary group.

Using a similar procedure, (Skeem et al., 2007) identified subtypes by conducting a model-based cluster analysis of trait anxiety and psychopathy in 123 male prisoners meeting criteria for psychopathy using the PCL-R. Their underlying assumption was that individuals with primary psychopathy are biologically predisposed to display low levels of anxiety and distress and therefore individuals displaying higher levels of anxiety and distress should fall into the secondary subtype. This assumption is consistent with Karpman's theory of secondary psychopathy (Karpman, 1948a; Karpman, 1948b). Similar to Hicks et al.'s (2004) findings, they identified two clusters that best fit the data. Again, these groups were consistent with primary and secondary psychopathy subtypes with the secondary group scoring high on anxiety and the primary group scoring low. Using traditional cluster analyses, other researchers have also been able to identify primary and secondary psychopathy subtype in adult males (Poythress et al., 2010; Swogger & Kosson, 2007; Swogger, Walsh, & Kosson, 2008; Vassileva et al., 2005).

Only one study has examined primary and secondary psychopathy subtypes in adult women. Hicks et al. (2010), paralleling Hicks et al. (2004), used a model-based cluster analysis of MPQ personality traits in 70 female prisoners who scored 25 or higher on the PCL-R. They found two groups consistent with primary and secondary psychopathy. The secondary subtype had an increased propensity to experience negative emotions (including increased anxiety, mood instability, suspiciousness, feelings of victimization, interpersonal hostility and vindictiveness) and lower levels of

control (planful and reflective behaviour, preference of routine over risk, and conservative attitudes) than a non-psychopathic control group. They also had greater co-morbid mental health problems such as substance use, posttraumatic stress disorder and suicide attempts compared to controls and the primary psychopathy group. Compared to Hick et al. (2004), the authors reported that psychopathy subtypes in females are generally consistent with those found in males. However, women in both the primary and secondary subtypes of psychopathy showed poorer levels of psychological adjustment than their male counterparts examined by Hick et al. (2004).

Two studies have explored primary and secondary psychopathy in adolescents (Lee et al., 2010; Vaughn et al., 2009). The first study (Vaughn et al., 2009) examined subtypes in a sample of 110 male and 22 female juvenile offenders. They selected a group of high psychopathy youth who scored one standard deviation above the mean on the Antisocial Process Screening Device. Finite mixture modelling based on measures of psychological distress was then used to test for groups. Two groups consistent with primary and secondary psychopathy were found. Both groups had higher rates of antisocial behaviours (including substance use, self-reported delinquency, and offending) than controls. However, the secondary subtype had higher levels of psychological distress (including anxiety, attention problems (i.e., ADHD diagnosis), somatisation, and interpersonal sensitivity), antisocial behaviour, and rates of trauma than the primary subtype.

The second study (Lee et al., 2010) used a method similar to Skeem et al. (Skeem et al., 2007) described above. They performed a model-based cluster analysis of psychopathy factor scores (measured by the Psychopathy Checklist: Youth Version (PCL: YV) a downward extension of the PCL-R) and self-reported anxiety in a forensic sample of adolescent males. Unlike previous studies, the researchers chose not to limit their sample to participants with high psychopathy scores. Three groups were found reflective of low, moderate, and high psychopathy traits. The high psychopathy group also scored highest in anxiety and had fewer positive personality traits than the other groups. In contrast, the moderate psychopathy group had low levels of anxiety, some positive, and some negative personality traits, and scored lower on a measure of treatment amenability. The authors concluded that the moderate and high psychopathy groups might represent primary and secondary psychopathy (respectively), but that they

may also reflect developmental differences in the relationship between anxiety and psychopathy in adolescents versus adults. Together, these studies appear to provide support for the presence of primary and secondary psychopathy in adolescent males, however, it is not clear if these results can be extended to female adolescents.

The Development of Primary and Secondary Psychopathy

The distinguishing feature of both psychopathy subtypes is a lack of conscience. While people with primary psychopathy are thought to be completely lacking a conscience, people with secondary psychopathy are thought to have a damaged, but existing, conscience. The main focus of research on the development of conscience has been on two pathways (Blair, Colledge, Murray, & Mitchell, 2001; Kochanska & Murray, 2000; Kochanska & Aksan, 2004).

The first pathway involves feelings of distress following a moral transgression. There is evidence that humans are biologically predisposed to experience distress (e.g., fear and sadness) when we observe others who are in distress. As a result, children are likely to feel distressed when they cause distress to others and, therefore, learn to avoid causing distress to others and thus themselves in the future. Blair and colleagues (Blair et al., 2001) have labelled this predisposition the Violence Inhibition Mechanism and have found evidence that it is strongly associated with amygdala functioning. Improper functioning of this mechanism may account for cases of primary psychopathy. Blair et al. (2001) found deficient amygdala functioning in individuals meeting criteria for psychopathy, as well as decreased physiological and psychological distress in these individuals (Blair, 1999). These findings suggest biological mechanisms that may underlie some forms of psychopathy.

The second pathway of conscience development involves parental socialization (Kochanska & Murray, 2000; Kochanska & Aksan, 2004). Research has also focused on parental modelling and parent-child discourse regarding transgressions. When children engage in moral transgressions, they are likely to be punished (including disapproval and removal of affection) by their parents. Punishment leads to distress, which teaches the child to avoid future moral transgressions. Children with a biological predisposition to not experience distress when faced with others' distress may not be able to understand these messages. Children who experience maltreatment, on the other hand, may not be

socialized in these ways by their parents. For example, maltreating parents may be less responsive to the child's transgressions, they tend to provide less emotional feedback to children, and expose their children to fewer positive role models (Kimonis, 2009).

Aside from interfering with conscience development, Weiler and Widom (1996) discuss other ways that maltreatment may increase risk for psychopathy. First, maltreatment may lead to maladaptive coping strategies. For example, children in abusive homes may learn that expressing their emotions exacerbates already dangerous situations and that telling the truth about misdeeds leads to severe punishment. They may need to be conning and manipulative to have their needs met. While these strategies may be useful to the child when he or she is in abusive situations, these strategies become maladaptive in other settings. Maltreatment may also lead to physiological changes which contribute to the development of psychopathy. For example, areas of the brain associated with identifying dangerous situations have reduced functioning in individuals who have experienced trauma (Shin, Rauch, & Pitman, 2006; Stam, 2007) and several studies have demonstrated that individuals with psychopathy characteristics also have deficits in fear conditioning (see Lewis, 1991 and Fowles & Dindo, 2006).

There is some evidence that maltreatment may play a particularly prominent role in the development of psychopathy in adolescent females. Research has shown that female adolescent offenders report experiencing more childhood maltreatment than adolescent males (Krischer & Sevecke, 2008) and some authors have argued that maltreatment is essential in the development of aggression and delinquency in females (Chamberlain & Moore, 2002). In regards to psychopathy, one study found that childhood maltreatment experiences fully accounted for the relationship between psychopathy and aggression in adolescent females (Odgers et al., 2005). In other words, psychopathy characteristics were not related to adolescent girls' aggression after considering their history of maltreatment. Given the key role that maltreatment appears to play in adolescent females' delinquency, aggression, and psychopathy, it is especially important to examine the relationship between maltreatment and psychopathy in this population.

Maltreatment and Psychopathy

The relationship between maltreatment and psychopathy characteristics is well established in adult community and forensic samples (Hodge, 1992; Koivisto & Haapasalo, 1996; Verona et al., 2005; Weiler & Widom, 1996). In a prospective study following abused and neglected children, Weiler & Widom (1996) found that male and female adults with a history of childhood maltreatment were significantly more likely to have psychopathy characteristics than a matched control group even when controlling for criminal history and demographics. Similar results have been found in other studies (Koivisto & Haapasalo, 1996). Maltreatment experiences are also related to psychopathy characteristics in adolescent males (Krischer & Sevecke, 2008; O'Neill et al., 2003).

While a relationship between psychopathy and overall maltreatment has been established in adults and adolescent males, only two studies have reported specifically on the relationship between maltreatment and psychopathy in female adolescents. The first study (Odgers et al., 2005) examined the relationships between maternal perpetrated maltreatment and psychopathy with aggression in a sample of 125 female adolescents (ages 13-19). While the main goal of this study was to examine the interplay between psychopathy and maltreatment on aggression outcomes, the authors reported that maternal maltreatment was related to psychopathy in adolescent girls.

Building on the work of Odgers et al. (2005), Krischer and Sevecke (2008) explicitly examined the relationships between maltreatment subtypes (emotional, physical and sexual abuse and neglect) and psychopathy (measured by the PCL-YV) dimensions in German youth. This study had a sample of 89 female and 96 male juvenile offenders as well as a comparison sample of 53 male and 45 female non-offenders (ages 14 to 19). They found that offenders experienced significantly more maltreatment than the non-offender group and that female offenders experienced more maltreatment than male offenders. Neglect was related to the behavioural dimension of psychopathy for both males and females. Sexual abuse was not related to psychopathy dimensions for males or females, though the authors reported that the incidence of sexual abuse in this study was low. Contrary to the findings of Odgers et al., they found that physical and emotional abuse were related to psychopathy in males but not in females.

The inconsistencies in research on maltreatment and psychopathy in adolescent females may partially result from not accounting for psychopathy subtypes. As discussed above, it is likely that primary psychopathy results from a biological predisposition, while secondary psychopathy results from environmental factors such as maltreatment. If these two pathways exist, then it is likely that rates of maltreatment vary across psychopathy subtypes.

Current Study

The purpose of the current study was two-fold. First, previous research has demonstrated that primary and secondary subtypes of psychopathy exist in adults and adolescent males, but this relationship has not been assessed in adolescent females. The current study tested for subtypes of psychopathy in female adolescents using a model-based cluster analysis. Second, given the important role that maltreatment appears to play in psychopathy in adolescent females and its theoretical role in the development of psychopathy subtypes, a wide range of childhood maltreatment was assessed and compared across psychopathy subtypes.

Adopting procedures used in previous studies, psychopathy factor scores and anxiety were included in the model-based cluster analysis. Following the cluster analysis, groups were compared on external constructs theoretically related to primary and secondary psychopathy. Consistent with Karpman's theory and previous research, it was predicted that secondary psychopathy would be associated with substantial psychological distress (or neuroticism), impulsivity, and social problems; these associations were expected to be more modest or absent in primary psychopathy. In addition, it was predicted that both primary and secondary psychopathy would be highly related to acting out behaviour.

Identifying psychopathy subtypes in adolescent females is important for several reasons. Psychopathy is generally viewed as a homogeneous construct which is difficult or impossible to treat. This perception is problematic as there is evidence that subtypes of psychopathy with subtle differences in manifestation exist. It is likely that these subtypes differ in respect to etiology, comorbid psychological symptoms, and outcomes following treatment. If it is possible to identify subtypes of psychopathy in female

adolescents, this will have important implications for future research on psychopathy, and for the development of appropriate assessment and treatment practices.

Hypotheses

1. Consistent with theory and research in adults and adolescent males, two subtypes of psychopathy will exist in adolescent females. It is expected that there will be one subtype with high psychopathy and high anxiety (i.e., secondary psychopathy), and a second subtype with high psychopathy and low anxiety (i.e., primary psychopathy). Because all participants, regardless of psychopathy scores, will be included in the cluster analysis, it is also expected that a low psychopathy group will exist.
2. Subtypes will differ on external correlates. The high anxiety high psychopathy subtype will score higher on levels of psychological distress (withdrawal/depression and somatic complaints), impulsivity (attention problems), and social problems than the high psychopathy low anxiety subtype and the low psychopathy subtypes. Both high psychopathy groups will score high on rule breaking and aggressive behaviours.
3. The relationship between maltreatment and psychopathy will differ by psychopathy subtype such that the high psychopathy high anxiety subtype will report greater levels of maltreatment than both other groups.

METHOD

Participants and Procedure

All female adolescents sentenced to custody at a correctional facility in the state of Virginia during a 14 month period were approached to participate in the study. Approximately 93% of the girls participated in the research. This sample included 141 adolescent incarcerated females who resided in various locations across the state. Participants ranged from 13 to 19 years of age ($M = 16.7$, $S.D. = 1.3$). The majority of participants belonged to an ethnic minority group, with 49% self-identifying as African American, 3% as Native American, and 2% as Hispanic. Thirty-eight percent of participants identified as Caucasian and the remainder reported belonging to another ethnicity. Active voluntary consent was obtained from participants and active parental consent was obtained for all girls under the age of 18.

The measures for the current study were embedded in a larger battery of measures comprising a broad program of research examining gender and aggression in high-risk adolescents. Youth who agreed to participate completed approximately 6-8 hours of individual assessments, including semi-structured clinical interviews, computerized diagnostic assessments, and a battery of self-report measures. Data from official files, including social history, psychological, institutional, and educational reports were coded. All sessions were digitally recorded. A Federal Certificate of Confidentiality from the Department of Health and Human Services was obtained in order to ensure the investigators could not be forced (e.g., by court subpoena) to disclose information that may identify participants in any federal, state, or local civil, criminal, administrative, legislative, or other proceedings. All measures were approved by the Institutional Review Board at the University of Virginia and as well as the Internal Review Board at the Virginia Department of Juvenile Justice which oversees the correctional facility.

Measures

The Family Background Questionnaire

The Family Background Questionnaire (FBQ; McGee, Wolfe, & Wilson, 1997) was used to assess maltreatment history. The FBQ consists of 33 global severity ratings for key maltreatment subtypes. Participants were asked to rate how often each event occurred in their relationships with their mother and father (defined as the people the youth identified as being most like a mother or father to them) in their life. Items were rated from 0 to 3 (0 = never happened, 1 = happened a few times, 2 = happened sometimes, and 3 = happened often or very often). Maltreatment subtypes included were psychological abuse (8 items; e.g., insulted you, put you down or called you names), physical abuse (3 items; e.g., hit, punched or kicked you), neglect (5 items; e.g., fed you properly – reverse coded) and exposure to domestic violence (4 items; e.g., threw something at his/her partner). McGee et al. (1997) reported retest reliabilities of 0.70 for this instrument.

The Psychopathy Checklist: Youth Version

The Psychopathy Checklist: Youth Version (PCL: YV; Forth et al., 2003) is a modified version of the Psychopathy Checklist Revised (PCL-R), which is the gold-standard measure of psychopathy in adults. It is a 20-item symptom rating scale that measures interpersonal, affective, and lifestyle characteristics of psychopathy as well as antisocial behaviour. Four trained assessors¹ rated the severity of each symptom based on a semi-structured interview, a review of case history information, and information from

¹ Prior to beginning data collection, each of the assessors completed a PCL-YV training session and rated five 'file-only' PCL-YV cases which had been previously rated by six experts in the field. Individual feedback was then provided to each rater. The ICC1 for PCL-YV 'file only' total scores, using a two-way random effects model, was 0.72 (C.I. = 0.32–0.96). Inter-rater agreement for the PCL-YV interviews was computed based on paired ratings of 12 cases. In order to avoid rater drift, paired interviews were also conducted at the 1/3 and 2/3 points of data collection.

collateral informants. Each of the 20 items was scored on a three-point scale (0 = item doesn't apply, 1 = item may or may not apply, 2 = item definitely applies). Items are summed to yield a total score ranging from 0 to 40, with higher scores reflecting the increased presence of psychopathic features. Reliability studies have demonstrated acceptable levels of internal consistency and inter-rater agreement (e.g., $r = 0.81$ to $r = 0.93$; see Brandt, Kennedy, Patrick, & Curtin, 1997; A. E. Forth, Brown, Hart, & Hare, 1996). The ICC_1 for the current study was 0.89 (C.I. = 0.63–0.97).

The PCL: YV manual (Forth et al., 2003) does not provide categorical diagnostic cut scores as a result of lack of empirical evidence for the use of specific cut scores in adolescents. The authors note that for research purposes, investigators often divide samples into high (30 or above), medium (scores ranging approximately from 20-30) and low (scores under 20) psychopathy groups. In the adult literature, a score of 30 and above is usually considered psychopathic. Research with adult females has demonstrated that women tend to score 0.5 deviations lower than men on psychopathy (measured by the Psychopathy Checklist: Revised; Bolt, Hare, Vitale, & Newman, 2004) and using receiver operating characteristic curves, Kennealy, Hicks, and Patrick (2007) found cut scores of 27 had sensitivity and specificity comparable to that of the cut score of 30 traditionally used for males. Some researchers have used cut scores as low as 25 to define psychopathic groups in adult females (Hicks et al., 2010). Given that there is little empirical support for the use of cut scores with adolescents (Forth et al., 2003) and that cut scores for adult females are not used consistently in the literature, cut scores were not used in the current study.

Consistent with the PCL-R factor structure, the PCL: YV items were originally divided into two factors (interpersonal/affective features and antisocial behaviours). Several factor analyses have since indicated that the two-factor model provides a poor fit to adolescent data (Forth et al., 2003; Odgers et al., 2005; Salekin, Brannen, Zalot, Leistico, & Neumann, 2006) and that a three factor (Cooke & Michie, 2001) or four factor (Hare, 2003) structure may better fit the data (Forth et al., 2003; Jones, Cauffman, Miller, & Mulvey, 2006; Salekin et al., 2006). Although most studies have found the three and four factor models of the PCL: YV to both provide good overall fit, recently, some studies have found advantages of the four-factor model. For example, Neumann, Kosson, Forth, and Hare (2006) argue that the four factor model is statistically more desirable as it has

more degrees of freedom (and thus performed better in their factor analyses) and subsumes the three factor model. In addition, Vitacco, Neumann, Caldwell, Leistico, and Van Rybroek (2006) found that the four factor model of the PCL: YV accounted for greater variance (20%) of instrumental aggression than did the three factor model (8%). Given these findings, the four factor model (Hare, 2003) was used in the current study. Factors represent interpersonal, affective, and lifestyle characteristics and antisocial behaviour.

Youth Self-Report

The Youth Self-Report is of part of the Achenbach System of Empirically Based Assessment (Achenbach et al., 2003) and is a standardized clinical measure of general psychopathology and behavioural difficulties in youth aged 11-18. It contains 112 self-report items measuring eight syndrome scales. It has been extensively validated and has good reliability. Test-retest reliability ranges across scales from .71 - .95 and scores on self-report scales correlate highly ($r = .40 - .55$) with parent ratings (Achenbach et al., 2003).

Responses were measured on a three point scale (0 = never or not true, 1 = sometimes or somewhat true, 2 = often or very true). The 13 item Anxious/Depressed subscale of this measure was used to assess trait anxiety (e.g., I am nervous or tense, I am too fearful or anxious, I worry a lot). The aggressive behaviour, rule breaking, attention problems, withdrawn/depressed, and social problems subscales were used to externally validate groups found in the cluster analysis.

Analytical Strategy

Missing Data

Only a small amount of data (4.5%) was missing from the dataset ranging across variables from 0% to 13.9%. Missing data² was imputed using the expectation/maximization (EM) algorithm with the Missing Value Analysis module in SPSS Version 18 (SPSS, Inc., 2009). The EM method is superior to simple regression imputation because regression imputation underestimates the variability in the data as estimates of missing values have no added error (Howell, 2008). After using regression imputation to estimate missing values from existing data (using estimates of the means, variances, and covariances), the algorithm uses the parameters of the imputed dataset to recalculate missing data, and repeats the process until the parameters of the imputed data and the original data converge. By repeating the imputation process using variance and covariance in the estimations, EM includes error in the estimated values thereby producing significantly less biased values than regression imputation alone.

Psychopathy Subtypes

Hypothesis 1 predicted that subtypes of psychopathy exist in adolescent girls. A model-based cluster analysis was performed using the MCLUST library (Fraley & Raftery, 2002a; Fraley & Raftery, 2006) within the SPLUS 8 statistical software program to test this hypothesis. Cluster analysis uses multivariate data (i.e., anxiety scores and PCL: YV scores) and tests for unobserved groups or clusters (i.e., primary and secondary psychopathy) based on underlying probability distributions (Vermunt & Magidson, 2004). The probability of each participant belonging to a particular group is then calculated allowing participants to be separated into subtypes.

² Sixteen participants did not complete the paternal sections of the FBQ and five participants did not complete the maternal sections of the FBQ. Because it is possible that these participants did not identify with a paternal and/or maternal figure, this data was not treated as missing and therefore was not imputed.

Model-based cluster analysis provides several advantages over more traditional types of cluster analysis. Other types of cluster analysis require *a priori* specification of the number of clusters in the data. Conversely, Model-based cluster analysis tests the relative fit of one to nine clusters across variations in the distribution, shape, volume, and orientation of clusters (Table 1). A fit statistic (the Bayesian Information Criterion; BIC³) is calculated for each model and the best fitting model can be identified by comparing the BIC statistics without a priori information about the underlying groups. As a result, this approach makes it possible to test hypotheses regarding the number of underlying groups that best fit the data.

Table 1. Model Descriptions

Model	Distribution	Volume	Shape	Orientation
1. EII	Spherical	Equal	Equal	–
2. VII	Spherical	Variable	Equal	–
3. EEI	Diagonal	Equal	Equal	Coordinate Axes
4. VEI	Diagonal	Variable	Equal	Coordinate Axes
5. EVI	Diagonal	Equal	Variable	Coordinate Axes
6. VVI	Diagonal	Variable	Variable	Coordinate Axes
7. EEE	Ellipsoidal	Equal	Equal	Equal
8. EEV	Ellipsoidal	Equal	Equal	Variable
9. VEV	Ellipsoidal	Variable	Equal	Variable
10. VVV	Ellipsoidal	Variable	Variable	Variable

Participants' z-scores on the PCL: YV factors (Affective, Interpersonal, Lifestyle, and Antisocial) and on YSR anxiety were entered into the model-based cluster analysis. A multivariate analysis of variance (MANOVA) was then conducted to compare the

³ A BIC is a form of Likelihood Ratio used for comparing models in a dataset. BICs calculate the probability of each model fitting the data while adding penalties for each additional parameter and for increasing sample size. BICs are not independently meaningful and because they are specific to a particular dataset, they can only be interpreted in comparison to other BICs within the same dataset and (Raftery, 1995).

psychopathy factor scores and an ANOVA was conducted to assess anxiety across the psychopathy subgroups identified in the model-based cluster analysis.

External Validation

Hypothesis 2 predicted that subtypes would differ on relevant external correlates. A MANOVA was used to compare psychopathy subtypes on levels of aggressive and rule breaking behaviours (acting out), attention problems (impulsivity), withdrawn/depressed symptoms and somatic complaints (psychological distress) and social problems and as measured by the YSR. *Post hoc* comparisons were then conducted.

Childhood Maltreatment and Psychopathy Subtypes

Hypothesis 3 predicted that the secondary psychopathy subtype would experience more maltreatment than the other groups. ANOVAs were conducted to examine the relationships between childhood maltreatment and the psychopathy group.

RESULTS

Descriptive statistics and internal consistency for all study variables are presented in Table 2. A wide range of scores was seen on all scales. The majority of scales demonstrated acceptable to good internal consistency.

Table 2. Descriptive Data of Study Variables

	<i>M</i>	<i>SD</i>	<i>SEM</i>	Min.	Max.	α
PCL: YV						
Total	24.6	5.3	.45	9	35	0.64
Interpersonal	3.9	2.1	.18	0	8	0.62
Lifestyle	6.2	1.8	.15	2	10	0.32
Affective	4.4	2.1	.17	0	8	0.64
Antisocial	7.7	1.9	.16	2	10	0.43
YSR						
Anxious /Depressed	6.9	4.6	.38	0	23	0.79
Rule Breaking Behaviour	8.4	4.0	.33	1	18	0.74
Aggressive Behaviour	11.6	6.3	.53	0	28	0.86
Withdrawn/Depressed	5.1	2.6	.22	0	12	0.62
Somatic Complaints	5.8	4.0	.34	0	18	0.78
Social Problems	4.2	3.2	.27	0	16	0.68
Attention Problems	5.1	2.8	.24	0	12	0.70
FBQ						
Combined Maltreatment	23.0	19.4	1.73	0	100	0.92
Maternal Maltreatment						
Total Maternal	9.3	9.2	.79	0	44	0.87
Psychological Abuse	5.0	5.1	.44	0	23	0.83
Partner Abuse	1.4	2.6	.22	0	12	0.81
Neglect	1.3	1.9	.16	0	9	0.41
Physical Abuse	1.6	2.2	.19	0	9	0.72
Paternal Maltreatment						
Total Paternal	13.6	13.3	1.19	0	58	0.91
Psychological Abuse	5.8	6.2	.55	0	24	0.86
Partner Abuse	1.9	3.4	.31	0	12	0.89
Neglect	4.0	4.3	.38	0	14	0.80
Physical Abuse	1.9	2.7	.24	0	9	0.81

Psychopathy Subtypes

Hypothesis 1 predicted that three groups would be found. Consistent with theory and past research with adults and adolescent males, it was expected that two subtypes of psychopathy would be found, one with low anxiety consistent with primary psychopathy and one with high anxiety consistent with secondary psychopathy. Given that the cluster analysis was not limited to those participants who had high levels of psychopathy, it was also expected that a low-psychopathy group would be found.

Cluster Analysis

BIC values from the cluster analysis are displayed in Table 3. Less negative values indicate a better model fit. A BIC difference of 6 or more is required to determine that one model is significantly different ($p = .05$) from other models (Raftery, 1995). The two best fitting models are in bold in Table 3. The first model (EEI4) had four clusters ($n = 41, 92, 3, 5$) with a spherical distribution, equal volume, and equal shape. The second model (VII3) had three clusters ($n = 46, 86, 9$) with a spherical distribution, variable volume, and equal shape. These two models resulted in very similar group assignments (absolute agreement intraclass correlation coefficient = .90, $p < .001$), except that clusters three and four from the first model appeared to be combined into a single cluster in the second model. Because clusters three and four included so few participants in the first model ($n = 3$ and $n = 5$, respectively), which reduces the statistical power of subsequent analyses, and because the second model had nearly identical groups to the first model when clusters 3 and 4 were combined (absolute agreement intraclass correlation coefficient = .93, $p < .001$), the three-cluster model was used in all subsequent analyses. For this model, uncertainty values showed that three-quarters of the sample had a better than 80% likelihood of being correctly classified in the cluster solution.

Table 3. BIC Values for Tested Models

Clusters	Models									
	EII	VII	EEI	VEI	EVI	VVI	EEE	EEV	VEV	VVV
1	-2025	-2025	-2050	-2050	-2050	-2050	-2030	-2030	-2030	-2030
2	-2020	-2025	-2034	-2039	-2052	-2051	-2053	-2079	-2083	-2074
3	-2014	-2009	-2036	-2029	-2067	-2065	-2068	-2094	-2100	-2122
4	-2004	-2036	-2062	-2055	-2079	-2112	-2077	-2143	-2169	-2181
5	-2026	-2049	-2052	-2063	-2112	-2137	-2081	-2179	-2220	-2267
6	-2044	-2075	-2076	-2081	—	—	-2103	-2229	-2288	-2295
7	-2062	-2085	-2079	-2089	—	—	-2101	-2300	-2331	—
8	-2080	-2093	-2091	-2113	—	—	-2112	-2330	-2342	—
9	-2097	-2125	-2707	-2136	—	—	-2132	-2400	-2398	—

Note: Best fitting models are in bold. Models that do not have values were not able to be tested with the dataset. For model descriptions, see Table 1.

Cluster Descriptions

A MANOVA indicated that the clusters reflected low ($n = 46$; psychopathy total $M = 18.8$, $SD = 3.1$), moderate ($n = 86$; psychopathy total $M = 27.2$, $SD = 3.6$), and high ($n = 9$; psychopathy total $M = 29.6$, $SD = 3.4$) psychopathy groups. These groups differed significantly on all of the psychopathy factors (Wilks $\lambda = .27$, $F(8, 270) = 31.37$, $p > .001$). *Post hoc* Tukey's HSD tests (see Table 4) revealed that the low psychopathy group had significantly lower Interpersonal, Lifestyle, and Affective psychopathy scores than both other groups. The low psychopathy group also had significantly lower Antisocial scores compared to the moderate group. The moderate group had significantly lower Interpersonal and Affective scores compared to the high psychopathy group. Finally, the moderate group had higher level of Antisocial scores than the high psychopathy group.

Table 4. Means of Psychopathy Factor Scores for Psychopathy Subtypes

Psychopathy Factors	Psychopathy Groups					
	Low Psychopathy <i>n</i> = 46		Moderate Psychopathy <i>n</i> = 86		High Psychopathy <i>n</i> = 9	
	M	SD	M	SD	M	SD
Interpersonal	3.08 ^{ab}	1.91	3.98 ^{ac}	1.83	7.41 ^{bc}	1.79
Lifestyle	4.96 ^{ab}	1.75	6.80 ^a	1.45	7.10 ^b	2.00
Affective	2.40 ^{ab}	1.61	5.30 ^{ac}	1.38	6.58 ^{bc}	1.66
Antisocial	6.27 ^a	1.57	8.60 ^{ac}	1.23	6.60 ^c	3.44

Note: Using Tukey's HSD tests, means within the same rows that have the same superscripts were found to be significantly different at the $p < .05$ level.

An ANOVA revealed that anxiety levels differed by psychopathy subgroups ($F(2, 140) = 25.89, p < .001$). *Post hoc* comparisons using the Tukey HSD test indicated that the low ($M = 6.3, SD = 4.0$) and moderate psychopathy ($M = 6.3, SD = 3.7$) groups had equal levels of anxiety, and the high psychopathy group ($M = 16.0, SD = 5.6$) had significantly higher levels of anxiety compared to both other groups.

Participants in the low-psychopathy group had a mean age of 17.2 ($SD = 1.08$) and was composed of 45.7% Caucasian, 45.7% African American, and 8.7% other ethnicities. The moderate-psychopathy/low-anxiety group had a mean age of 16.5 ($SD = 1.29$) and was 30.1% Caucasian, 55.4% African American, and 14.4% other ethnicities. The high-psychopathy/high-anxiety group had a mean age of 16.5 ($SD = 1.62$) and was 77.8% Caucasian and 22.2% African American. There were two significant differences

across the groups: The low-psychopathy group was significantly older⁴ than the moderate-psychopathy/low-anxiety group, and the high-psychopathy/high-anxiety group had significantly more participants who identified as Caucasian than the moderate-psychopathy/low-anxiety group.

These results provide partial support for Hypothesis 1. As predicted three groups were found including a low-psychopathy group and a high-psychopathy/high-anxiety group. Consistent with Hypothesis 1, the remaining group had low levels of anxiety and higher psychopathy than the low-psychopathy group. Unexpectedly it had lower levels of overall psychopathy than the psychopathy group with high anxiety.

External Validation

Hypothesis 2 predicted that if psychopathy subtypes were found, they would differ on external correlates. It was predicted that the high anxiety high psychopathy subtype would report greater psychological distress (as measured by withdrawn/depressed and somatic complaint scales), greater impulsivity (measured by the attention problem scale), and social problems than the high psychopathy low anxiety subtype and the low psychopathy subtype. In addition, it was expected that both high psychopathy groups would score high on rule breaking and aggressive behaviours.

A MANOVA was conducted to compare the psychopathy subtypes on levels of aggressive and rule breaking behaviours, attention problems, withdrawn/depressed symptoms and social problems as measured by the YSR. Significant differences were found across the groups (Wilks' $\lambda = .69$, $F(12, 266) = 4.51$, $p < .001$). *Post hoc*

⁴ Overall psychopathy scores tend to decrease across adolescence as high levels of psychopathy tend to decrease over time for some youth while it is rare for youth who initially score low on psychopathy to have subsequent increases in levels of psychopathy (Frick, Kimonis, Dandreaux, & Farell, 2003). A MANCOVA indicated that age did not significantly affect the relationship between psychopathy factors and group membership [$F(4, 134) = 1.30$, $p = .27$]. Similarly, an ANCOVA showed that age did not significantly affect the relationship between anxiety and group membership [$F(1, 141) = 1.07$, $p = .30$]. As such, age was not included in any further analyses.

comparisons revealed that, as expected, the high-psychopathy/high-anxiety group had higher rates of rule breaking and aggressive behaviour, somatic complaints, and attention and social problems than the other two groups. Also as expected, the moderate-psychopathy/low-anxiety group had significantly higher rates of rule breaking and aggressive behaviour than the low-psychopathy group (see Table 5). Groups did not vary on the withdrawn/depressed scale. Rather, all groups were somewhat elevated on this scale (> 85th percentile when compared to normative data).

Table 5. Psychopathy Groups and External Correlates

External Correlates	Psychopathy Groups					
	Low Psychopathy		Moderate Psychopathy		High Psychopathy	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Rule Breaking	6.61	3.71	8.88	3.75	12.44	3.21
Aggressive Behaviour	9.35	5.30	12.02	6.30	18.31	5.84
Withdrawn/Depressed	4.72	2.43	5.20	2.66	6.11	2.89
Somatic Complaints	5.48	4.27	5.47	3.51	10.52	4.78
Attention Problems	4.42	2.66	5.09	2.81	8.33	1.66
Social Problems	3.54	2.70	4.05	2.89	9.45	3.51

Childhood Maltreatment and Psychopathy Subtypes

Hypothesis 3 predicted that the secondary psychopathy subtype would experience more maltreatment than both other groups. Given that the data for all of the maltreatment variables had substantial positive skew, all variables were transformed using a log transformation. A series of ANOVAs was then conducted to test if maltreatment scores varied by psychopathy subtype. None of the ANOVAs were significant (see Table 6).

Table 6. Maltreatment and Psychopathy Subtypes ANOVAs

Maltreatment Type	<i>F</i>	<i>df1</i>	<i>df2</i>	<i>p</i>
Total Combined Maltreatment	1.40	2	122	0.25
Maternal				
Total Maltreatment	1.70	2	133	0.18
Psychological Abuse	1.74	2	133	0.18
Physical Abuse	0.15	2	133	0.86
Partner Abuse	2.56	2	133	0.08
Neglect	2.42	2	133	0.09
Paternal				
Total Maltreatment	1.20	2	122	0.30
Psychological Abuse	0.87	2	122	0.42
Physical Abuse	1.44	2	122	0.24
Partner Abuse	1.44	2	122	0.24
Neglect	0.63	2	122	0.53

Contrary to Hypothesis 3, exposure to maltreatment did not vary by psychopathy subtype. While these findings suggest that maltreatment does not differentially impact psychopathy subtypes, it does not indicate that maltreatment does not play an important role in the development of psychopathy. To further assess the relationship between maltreatment and psychopathy, correlation analyses (Table 7) were conducted between maltreatment scores and psychopathy scores irrespective of group membership. With the exception of physical abuse, all maternal maltreatment was significantly related to psychopathy. Paternal maltreatment, on the other hand, was not related to psychopathy.

Table 7. Correlations between Maltreatment and Psychopathy Total Scores

Maltreatment	<i>r</i>	<i>p</i>
Total Combined Maltreatment	0.16	0.07
Maternal Maltreatment		
Total Maltreatment	0.27	< .01
Psychological Abuse	0.28	< .01
Physical Abuse	0.11	0.23
Partner Abuse	0.18	0.03
Neglect	0.23	< .01
Paternal Maltreatment		
Total Maltreatment	0.02	0.81
Psychological Abuse	0.02	0.81
Physical Abuse	0.13	0.15
Partner Abuse	0.00	0.99
Neglect	0.03	0.75

DISCUSSION

The current study is the first to test for subtypes of psychopathy in adolescent females. Studies with adults and adolescent males (Hicks et al., 2004; Hicks et al., 2010; Lee et al., 2010; Vaughn et al., 2009; also see Poythress & Skeem, 2006) have found evidence for two subtypes labelled primary and secondary psychopathy. Individuals with primary psychopathy tend to have lower anxiety and distress, less reactive aggression, and fewer comorbid psychiatric disorders than individuals with secondary psychopathy, who are prone to experience emotional reactivity and psychological turmoil. Consistent with previous studies, a model-based cluster analysis of psychopathy factor scores and anxiety was conducted to test for psychopathy subtypes. Groups were then compared across several external correlates theoretically related to primary and secondary psychopathy. Given that secondary psychopathy is thought to develop in response to trauma such as childhood maltreatment, the current study also explored the relationships between childhood maltreatment and psychopathy.

The model-based cluster analysis revealed three groups. These groups differed in overall levels of psychopathy creating low (33%), moderate (61%), and high psychopathy (6%) groups. The low psychopathy group had low levels of interpersonal, lifestyle, and affective psychopathy characteristics, moderate antisocial characteristics, and low levels of anxiety. The high psychopathy group exhibited high levels of interpersonal, affective, and lifestyle psychopathy characteristics and moderate antisocial characteristics. The high psychopathy group also had extremely high levels of anxiety (which were in the clinical range when compared to normative data for the YSR). The moderate psychopathy group had higher rates of all psychopathy characteristics than the low psychopathy group and lower interpersonal and affective scores than the high psychopathy group. In addition, they had higher antisocial characteristics and much lower anxiety scores than the high psychopathy group. Thus, the clusters represented a low-psychopathy group, a moderate-psychopathy/low-anxiety group, and a high-psychopathy/high-anxiety group.

In regards to external correlates, the high-psychopathy/high-anxiety subtype reported elevated levels of psychological distress (somatic complaints), impulsivity (attention problems), and social problems. The remaining two groups reported low levels of these problems. The low-psychopathy group reported lower levels of rule breaking and aggressive behaviour, while the moderate-psychopathy/low-anxiety and high-psychopathy/high-anxiety groups reported substantially higher levels of these behaviours. In addition to reporting much higher amounts of these behaviours than the low-psychopathy group, the high-psychopathy/high-anxiety group also reported much greater levels of rule breaking and aggressive behaviour than the moderate-psychopathy/low-anxiety group. Unexpectedly, maltreatment did not vary by psychopathy subtype. However, overall maternal maltreatment, and more specifically maternal neglect, exposure to domestic violence, and psychological maltreatment were all significantly related to psychopathy regardless of psychopathy subtype. Maternal physical abuse and all forms of paternal abuse were not related to psychopathy.

Heterogeneity in Adolescent Psychopathy

The findings of the current study differ from studies of psychopathy subtypes in the adult literature, which tend to find that a similar number of participants fall into primary and secondary psychopathy subtypes and that higher levels of anxiety are associated with lower levels of psychopathy. Nonetheless, the current findings are consistent with recent studies examining heterogeneity in adolescent psychopathy. Lee et al. (2010), who studied adolescent boys, used a similar method to the current study including the use of model-based cluster analysis and the inclusion of a broad sample of forensic youth (regardless of their overall levels of psychopathy). They also found three groups with high, moderate, and low levels of psychopathy. Similar to the current study, the moderate psychopathy group contained the most participants (46%) followed by the low psychopathy group (38%), while the high psychopathy group contained substantially fewer participants (16%). As in the current study, Lee et al.'s high psychopathy group had the highest rates of anxiety. In addition (and unlike the current study), their moderate psychopathy group also had higher levels of anxiety than their low psychopathy group.

With regards to external correlates, Lee et al. (2010) focused on personality variables. They found that the high psychopathy group had fewer positive personality traits (extraversion, agreeableness, conscientiousness) and higher levels of neuroticism than the low psychopathy group, and higher conscientiousness and neuroticism than the moderate group. Their moderate group was similar to the low psychopathy group but had lower levels of neuroticism. Both the high and moderate psychopathy groups scored higher on risk for dangerousness and lower on treatment amenability than their low psychopathy group. These findings are similar to the current study in that both the high and moderate psychopathy groups reported high levels of acting out, while the high psychopathy, high anxiety groups reported greater psychological distress than both other groups.

Vaughn et al. (2009) also tested for subtypes of psychopathy in an adolescent sample (86% boys and 14% girls who scored high on the APSD measure of psychopathy). Although their method differed from that of the current study, there are important similarities in the findings. Using finite mixture modelling, they included psychiatric symptoms, trauma, suicide ideation, ADHD diagnosis, and use of antidepressants in a constrained two-class model. As in the current study, they found two psychopathy groups, one of which was characterised by high scores on several indicators of psychological distress including anxiety and somatisation, impulsivity (i.e., ADHD diagnosis), and social problems (i.e., interpersonal sensitivity). Unlike the current study, their groups contained a similar number of participants, and groups did not differ in levels of psychopathy.

Several important conclusions can be drawn from the findings of these adolescent studies. First, psychopathy is not a unitary construct and youth scoring high on psychopathy can be divided into meaningful groups. Second, it appears that there are developmental differences in the relationships between psychopathy and anxiety as well as in psychopathy and comorbid psychopathology. It is curious that in the current study and the Lee et al. (2010) study, very few participants fell into the high psychopathy high anxiety groups whereas in adult studies of primary and secondary psychopathy groups tend to have more equal group sizes. In addition, in the current study, maternal maltreatment was highly related to psychopathy for the entire sample and this relationship did not differ across groups. This is not what would be expected given

traditional conceptualizations of primary or secondary psychopathy which further suggests developmental differences.

Developmental Considerations

In the current study, the group that had the highest levels of psychopathy also had the highest levels of anxiety. These findings differ from what would be expected given traditional conceptualizations of psychopathy. In Cleckley's (1955) seminal description of psychopathy, he asserted that "it is highly typical for [a psychopath] ... to show a relative immunity from such anxiety and tension as might be judged normal or appropriate in disturbing situations" (p. 384). Subsequently, numerous researchers have shown that individuals with high levels of psychopathy tend to score low on measures of anxiety (Decuyper, De Pauw, De Fruyt, De Bolle, & De Clercq, 2009), do not learn from or experience anxiety related to punishment (Blair, Morton, Leonard, & Blair, 2006; Blair et al., 2004), and show decreased biological markers for fear and anxiety (Lewis, 1991). Although the literature examining subtypes of psychopathy in adults has shown that there are subgroups of individuals who have high levels of psychopathy and coexisting anxiety, the findings from the current study also vary from this research. The majority of studies examining adult subtypes have found that high anxiety (secondary) psychopathy subtypes tend to have equal (Poythress et al., 2010) or lower levels of psychopathy (Skeem, Johansson, Andershed, Kerr, & Loudon, 2007; Swogger & Kosson, 2007) than low anxiety (primary) subtypes whereas in the current study, the high anxiety subtype had significantly higher levels of psychopathy than the low anxiety subtype.

Taken together, the findings of Lee et al. (2010) and the current study suggest that there are developmental differences in the relationship between psychopathy and anxiety. Heterotypic continuity refers to an underlying trait, disorder, or temperament, manifesting in differing ways across developmental periods. It is likely that there is heterotypic continuity in psychopathy whereby anxiety is more prevalent in adolescence and decreases over time. Providing some support for this theory, a recent study examining adolescent anxiety and psychopathy (Kubak & Salekin, 2009) found that psychopathy was highly related to anxiety in male and female adolescents. Though this was not a longitudinal study, the authors compared the relationship between anxiety and

psychopathy across ages in their sample, and found that anxiety was less related to psychopathy in later adolescence than in earlier adolescence. It is possible that this decrease in anxiety occurs as a result of increased encounters with the criminal justice system, as well as increased exposure to dangerous situations leading to habituation to unpleasant experiences or numbing of negative emotions.

Consistent with Lee et al.'s (2010) findings, the high-psychopathy/high-anxiety group in the current study was very small. Given the current sample of adolescent girls, it was expected that a greater percentage of participants would fall in this group as secondary psychopathy is associated with higher rates of internalizing symptoms (including anxiety) and females tend to experience higher rates of these symptoms. In addition, studies with adult males and females have tended to find approximately equal primary and secondary psychopathy groups (Hicks et al., 2010). A possible explanation for these unequal group sizes is that primary and secondary psychopathy was not as distinctly differentiated in this sample as in adult samples, but rather, that some characteristics of primary and secondary psychopathy were present across groups, with the high-psychopathy/high-anxiety group experiencing the greatest amount of psychopathology. In the current study, measures of psychological distress (withdrawn/depressed and somatic complaints) were somewhat elevated for both the low and moderate psychopathy groups (> 70th percentile based on normative data for the measure) indicating that all groups reported some comorbidity of symptoms and negative affect which is consistent with secondary psychopathy. Several studies have shown that there is greater comorbidity in adolescent psychopathy than in adult psychopathy (Sevecke et al., 2009), so it is not surprising that distinct subtypes of psychopathy may be less present in adolescent samples. Similarly, the relationship between maltreatment and psychopathy did not vary across groups as expected. Rather, maternal maltreatment was highly related to psychopathy regardless of group membership. These differences from adult samples may be a result of heterotypic continuity whereby comorbidity of symptoms decreases over time, or may be related to gender differences in this particular sample whereby adolescent females experience higher rates of internalizing problems than males who are typically studied. Despite these differences, the groups found in this study do roughly resemble primary and secondary psychopathy.

Evidence for Primary and Secondary Psychopathy

While some differences were found between the findings of the current study and research looking at subtypes of psychopathy in adult samples, arguably, the groups found in the current study do provide some support for primary and secondary psychopathy in adolescent females. The high-psychopathy/high-anxiety group is consistent with conceptualizations of secondary psychopathy in that they scored high on psychopathy measures and had coexisting high levels of anxiety, psychological distress, impulsivity and social problems. In contrast, the moderate-psychopathy/low anxiety group had elevated levels of psychopathy and low levels of anxiety consistent with primary psychopathy. Also consistent with primary and secondary subtypes, both groups reported high levels of rule breaking and aggressive behaviour. However, unlike primary psychopathy, psychological distress was somewhat elevated in the moderate-psychopathy/low-anxiety group. In addition, as discussed above, both Karpman (1948a; 1948b) and Porter (1996) proposed that secondary psychopathy is caused by environmental circumstances, most notably, childhood maltreatment. In the current study, inconsistent with theories of primary psychopathy, maltreatment was highly related to psychopathy and did not vary across groups.

Implications for Theory and Practice

An important implication of the current study is that psychopathy is not homogeneous in adolescence and as such, it is important to use broader assessments both in research and in clinical practice to fully assess risk factors and needs for individual adolescents. As in previous studies (Poythress et al., 2010; Skeem et al., 2007; Vaughn et al., 2009), the current study found a high psychopathy, high anxiety group which demonstrated substantial levels of both internalizing and externalizing psychopathology. This suggests that this group is at much higher risk than both other groups. Comorbid internalizing and externalizing problems are associated with higher rates of substance abuse (Lansford et al., 2008), suicide attempts (Verona, Sachs-Ericsson, & Joiner, 2004) and arrests (Chen, Thrane, Whitbeck, & Johnson, 2006) than pure internalizing or externalizing presentations. Therefore, it will be important for

treatment with secondary subtypes to address this wide range of psychopathology rather than focusing solely on antisocial behaviours.

The results of the current study provide some support for the presence of primary and secondary psychopathy in female adolescents. However, researchers and clinicians should remain cautious when using these adult constructs with adolescents as some developmental differences were found. In the current study, there was substantial comorbidity between psychopathy and psychological distress and the group with the highest rates of psychopathy also had the highest levels of anxiety. Other studies examining psychopathy in adolescents have found similar results (Kubak & Salekin, 2009; Lee et al., 2010; Sevecke et al., 2009). These findings suggest psychopathy characteristics may manifest differently in adolescents than adults. Even studies examining subtypes of psychopathy with adults have shown that secondary (thus higher anxiety) psychopathy is associated with lower levels of psychopathy than primary (lower anxiety) psychopathy (Skeem et al., 2007; Swogger & Kosson, 2007). In contrast to traditional theories of psychopathy and adult findings, evidence is growing that adolescents who score high on psychopathy measures tend to experience high levels of anxiety and comorbidity. This creates questions regarding the etiology and developmental course of psychopathy. For example, it may not be the case that decreased anxiety is an initial feature of psychopathy, but instead, that this deficit develops over time. Longitudinal studies will be needed to assess if anxiety does decrease over time, and if so, where this occurs during development and mechanisms for this decrease.

Although very little is known about the relationship between maltreatment and psychopathy in adolescent girls, there is evidence that maltreatment plays an important role in the development and expression of psychopathy in adolescent girls. The current study found that maltreatment was highly related to psychopathy across psychopathy groups. Other researchers have found that maternal maltreatment fully accounts for the relationship between psychopathy and aggression in adolescent females (Odgers et al., 2005). These findings emphasize the need for a greater understanding of maltreatment's role in psychopathy. In addition, they suggest that adolescent girls presenting with psychopathy and aggression should be assessed for histories of maltreatment.

While psychopathy is often considered untreatable (Harris & Rice, 2006), there is some evidence that intensive treatments can lead to positive treatment outcomes (Caldwell, Skeem, Salekin, & Van Rybroek, 2006). Given the differences between primary and secondary subtypes of psychopathy, particularly in levels of psychological distress, it is likely that these groups would benefit from differing treatment approaches. For example, Skeem et al. (2003) and Vaughn et al. (2009) suggested that secondary subtypes may be more likely to benefit from traditional interventions that address psychological distress. Treatment outcomes of primary and secondary psychopathy subtypes have yet to be examined directly, however, there is some indication that secondary subtypes may be more motivated to engage in treatment than primary subtypes (Lee et al., 2010). In primary psychopathy, on the other hand, where psychological distress is relatively absent, traditional forms of treatment may be unhelpful at best. Instead, it is possible that primary psychopathy will respond better to more intensive treatments focusing on risk management.

Limitations and Directions for Future Research

The current study had several limitations that are important to consider. First, self-report measures were used to assess many of the variables. Self-report measures have been shown to underestimate externalizing problems (such as rule breaking and aggressive behaviour). Despite this, high rates of externalizing behaviours were reported in the current study. While self-report measures do tend to more accurately assess internalizing problems, there are some drawbacks to only using self-report measures of anxiety. Adolescents who score high on psychopathy tend to have decreased physiological arousal to threatening stimuli and decreased physiological signs of anxiety (Lewis, 1991), yet self-report measures of anxiety do not necessarily correspond with physiological measures (Anderson & Hope, 2009; Bacow, May, Choate-Summers, Pincus, & Mattis, 2010). As such, it will be important for future studies examining subtypes of psychopathy to include physiological measures of anxiety in addition to self-report measures.

A second limitation was that the internal consistencies of some of the psychopathy factor scores were low. The PCL: YV has been well validated and excellent

internal consistency has been shown with male adolescents (Forth et al., 2003). Much less research has examined the applicability of this measure with adolescent girls or ethnic minorities (which composed 62% of the current sample). While there has been some support for the use of Hare's (2003) four-factor model of psychopathy with female adolescents (Forth et al., 2003; Jones et al., 2006) and African American adolescent girls (Schrum & Salekin, 2006), further research is needed to ensure that this model is measuring the same construct in adolescents and ethnic minority as in adults. Despite these low internal consistencies, the four-factor model was retained in the current study to allow for comparisons with studies of psychopathy subtypes in adult and adolescent males.

Another limitation of the current study was the small number of participants in the high-psychopathy/high-anxiety group. As a result of the limited size of this group, power was reduced for all subsequent analyses. Because it is not possible to screen for participants who will fall into individual groups using person-centred (as opposed to variable-centred) approaches, much larger sample sizes are necessary in future studies to ensure sufficient power to test for differences between groups.

Similarly, a larger sample size would have allowed for further exploration of the effects of ethnicity in psychopathy subtypes. In the current study, there were significantly more participants who identified as Caucasian in the high-psychopathy/high-anxiety group than the moderate-psychopathy/low-anxiety group. A recent meta-analysis (McCoy & Edens, 2006) showed that there are negligible differences between overall levels of psychopathy in Caucasian versus African American adolescent males, but the authors cautioned that there may still be differences in regards to what the construct is tapping in each ethnicity. Indeed some differences have been shown; for example, psychopathy scores tend to be less predictive of recidivism in ethnically diverse adolescents than in Caucasian adolescents (Edens, Campbell, & Weir, 2007). Given the sample size of the current study, it was not possible to separately examine ethnic groups. To date, the reliability, validity, and predictive ability of psychopathy (as measured by the PCL: YV) has not been examined in ethnic minority female adolescents. Future research must further assess the utility of this construct with adolescent girls, particularly those who are ethnically diverse, as measures of psychopathy are increasingly being used in decision making with young offenders.

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