Psychosocial Precursors of Psychopathy in a Psychiatric Sample: A Structural Equation Model Analysis

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BOSTON COLLEGE
GRADUATE SCHOOL OF SOCIAL WORK

PSYCHOSOCIAL PRECURSORS OF PSYCHOPATHY IN A PSYCHIATRIC SAMPLE: A STRUCTURAL EQUATION MODEL ANALYSIS

A dissertation

by

JOEL T. ANDRADE, MSW

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Psychosocial Precursors of Psychopathy in a Psychiatric Sample: A Structural Equation Model Analysis

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Abstract:

The clinical construct of psychopathy has a long and contentious history. Psychopathy has been identified anecdotally for centuries, but the ability to accurately define this construct continues to challenge researchers and clinicians. Theoretical conceptualizations of psychopathy have changed over the past 65 years. Psychopathy as a clinical construct has received a marked increase in attention in the research literature over the past 2 decades due to the validation and standardization of assessment tools designed to measure this construct, particularly the Psychopathy measures (Hare, 1991/2003; Hart, Cox, & Hare, 1995; and Forth, Kosson, & Hare, 2003). The Psychopathy Checklist (PCL)-measures have provided the field of psychopathy research with consistent measurement tools resulting in an increase of research. The majority of this research focuses on the validation of this measurement tool and its psychometric properties. Over this period of time, the psychopathy construct has been identified as the best single predictor of violence among adult offenders (Hart, 1998). Such findings have led some to conclude that “psychopathy is the most important psychological construct for policy and practice in the criminal justice system” (Harris, Skilling, & Rice, 2001). Despite the overwhelming evidence of substantial societal and individual costs attributable to this disorder, little is known about psychosocial precursors of psychopathy.
There is considerable research examining the effects of early childhood abuse, and results indicate that such early life stress is a risk factor for later criminal offending, particularly violence and aggression (Widom, 1989). However, there remains little research studying early life stress as it relates to the development of psychopathy. This dissertation will examine risk factors that may be related to the development of psychopathy in a sample of psychiatric patients using structural equation modeling.

The literature review will discuss the evolution of the psychopathy construct, and the contribution this construct has made in the area of violence risk assessment. As there have been very few studies examining psychosocial risk factors for psychopathy since the validation of the PCL-measures, longitudinal research of risk factors found predictive of antisocial and criminal behavior will also be reviewed. This will lead into a discussion of etiological theories and research of risk factors in the development of psychopathy.

Based on this review, 21 variables found predictive of psychopathy or criminal behavior were chosen from the MacArthur Violence Risk Assessment dataset. Theoretically, these variables are associated with (1) Abuse; (2) Parental Antisocial Behavior; and (3) Cognitive Ability. As a method of data reduction, Exploratory Factor Analysis (EFA) was conducted using these predictor variables to form empirically derived factors.

Based on these results, the final SEM includes five predictor variables measuring these constructs. Two of these are latent variables measuring moderate physical abuse and severe physical abuse. Three predictor variables are observed variables and measure biological father’s alcohol abuse history, biological father’s arrest history, and the subject’s cognitive ability. The outcome variable is psychopathy as measured by the PCL:SV. Of the 5 predictor variables, 4 were found predictive of psychopathy in the
final SEM. Physical abuse was not found to be predictive of psychopathy, but severe abuse ($\beta = 0.17$, $p = .043$), biological father’s alcohol abuse history ($\beta = .16$, $p = .004$), biological father’s arrest history ($\beta = 0.13$, $p = .02$), and the subject’s cognitive ability ($\beta = -0.18$, $p < .001$) were all found predictive of psychopathy. Based on these results, intervention strategies and directions for future research are reviewed. Post hoc analyses comparing male and female subjects, and black and white subjects, indicate different causal pathways in the development of psychopathy among these groups. Areas of future research designed to measure these potentially different causal pathways are recommended.
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Study Purpose and Aims

The study of psychopathy has increased rapidly over the past 2 decades since the validation of reliable tools to measure this construct, especially the PCL-measures. The empirical literature on psychopathy and violence report distinct differences between criminals who score higher on the PCL-measures when compared with those who do not. Psychopathic individuals have been found to be vastly more dangerous (Cornell, Warren, Hawk, Stafford, Oram, & Pine, 1996), less amenable to treatment (Olgoff, Wong, & Greenwood, 1990) and more likely to recidivate (Hemphill, Hare, & Wong, 1998). Based on this research, the clinical construct of psychopathy is important to identify, as psychopathic individuals are responsible for an inordinate amount of crime and violence.

The majority of psychopathy research over the past 2 decades has focused on defining this construct, and examining biological predeterminants of this disorder. Very limited research has focused on examining psychosocial or environmental precursors of this disorder. The goal of this study is to conduct such an analysis.

Research on the psychosocial precursors of personality, particularly negative early life experiences such as abuse, is a difficult area of study for two reasons. First, this research cannot be conducted prospectively due to the ethical concerns related to abuse of individuals in such studies. In cases when abuse is discovered during a study interventive measures must be taken in order to protect subjects from harm. Second, as research on this topic must be conducted retrospectively, data is not as reliable as in prospective or controlled studies. Despite these inherent problems, the study of psychosocial precursors in the development of this disorder will significantly contribute to our understanding of
psychopathy, and lead to interventions that can be implemented to decrease the prevalence of this disorder.

Some longitudinal studies have measured less severe, but theoretically related stressful early life experiences. However, studies measuring adult personality traits using self-reported information are more informative for this particular area of research as they more closely measure the desired predictor variables, in this case abuse and other early life stress. Although the methodological and statistical rigor of prospective and controlled studies is superior to retrospective analysis, without conducting retrospective analyses of the effect abuse and other early life stress has on the development of psychopathy would leave the question unanswered as such prospective research is not possible (or ethical). Information learned from retrospective studies of traumatic early life experiences will inform intervention strategies and shed light onto how early environmental stressors contribute to the development of psychopathy.

**Key Terms**

*Psychopathy:* Various meanings have been attributed to the label ‘psychopathy’ over time. Psychopathy has been identified in religious, literary, political text throughout history and has been identified across cultures (Murphy, 1976). The term “psychopathy” has also gone through many transitions over time. Hervey Cleckley (1941) was the first to catalogue specific character traits he believed captured this diagnostic category, which included 16 specific criteria. Robert Hare (Harpur, Hakstian, & Hare, 1988; Hare, 1991) quantified Cleckley’s criteria and devised psychometric rating scales to assess the presence of this disorder, the Psychopathy Checklist-measures (PCL). Our current understanding of psychopathy is based on Hare’s work. For the purposes of this
dissertation, psychopathy is defined as a personality disorder measured by the PCL-measures. This is different from the Diagnostic and Statistical Manual of Mental Disorder’s (American Psychiatric Association, 2000) definition of Antisocial Personality Disorder. The PCL-measures provide researchers and clinicians with a more discriminating tool that accounts for both personality features and behavioral characteristics consistent with this construct (Hare, 1991/2003).

*Abuse:* The term abuse may have various meanings depending on the context in which it is used. In this study physical abuse is broken into two categories: (1) moderate physical abuse; and (2) severe physical abuse. Moderate physical abuse includes being hit by hand or with an object. Severe abuse includes any type of physical abuse that required medical intervention in the form of hospitalization. Although such a distinction is not ideal, for research purposes these distinctions are drawn based on statistical analysis to further our understanding of the relation between types of abuse and psychopathy.

*Antisocial:* Antisocial is a generic term that has been given various connotations since its inclusion in the DSM as a diagnostic label, namely Antisocial Personality Disorder. For the purposes of this study, antisocial is defined as attitudes or behaviors that are counter to the norm of a population (APA, 2000). This term will be used throughout this study to describe attitudes and behaviors that negatively impact others, such as criminal behavior and violence. Parental antisocial behavior is measured by two variables: (1) biological father’s arrest history; and (2) biological father’s history of alcohol abuse.

*Structural Equation Modeling:* “Structural equation modeling (SEM) uses various types of models to depict relationships among observed variables, with the same basic goal of providing a quantitative test of a theoretical model hypothesized by a researcher. More
specifically, various theoretical models can be tested in SEM to hypothesize how sets of variables define constructs and how these constructs are related to each other.” (p. 2, Schumacker & Lomax, 2004). SEM has become a very popular method of statistical analysis due to its ability to take measurement error into account and the increased availability of user-friendly software programs such as AMOS (Byrne, 2001).
Significance

Individuals who meet the criteria for psychopathy based on the PCL-measures are responsible for an inordinate amount of crime and violence. Research on psychopathy has found this construct to be the best single predictor of violence among adult offenders (Hart, 1998). Such findings have led some to conclude that “psychopathy is the most important psychological construct for policy and practice in the criminal justice system” (Harris, Skilling, & Rice, 2001). Despite the overwhelming evidence of substantial societal and individual costs attributable to this disorder, little is known about psychosocial precursors of psychopathy. The few available studies examining how early abuse and environmental factors increase the risk of the development of this disorder vary in their results. Through our understanding of early life risk factors for the development of psychopathy intervention strategies can be designed to address these risk factors. Despite the lack of research regarding the impact of treatment on adult psychopathy, there is research literature focusing early intervention with at risk children and youth. (Olds, Henderson, Cole, Eckenrode, Kitzman, Luckey, et al., 1998). These studies show good results in decreasing arrest rates and substance abuse rates of participants. However, there remains a lack of research aimed at identifying risk factors associated with the development of psychopathy, therefore resulting in an inability to design early intervention strategies targeting these specific risk factors.

This dissertation uses a psychiatric sample, and is the first study to use such a sample to examine the impact of psychosocial risk factors in the development of psychopathy. There are only a handful of research studies examining the relation between early psychosocial risk factors and psychopathy (based on the PCL or a PCL-
derived measure). These are discussed in the literature review. All of these studies used non-psychiatric samples. Research in the area of violence risk assessment finds that risk factors found predictive of violent recidivism in the general offender population are also predictive of violent recidivism in mentally disordered offenders (Bonta, Law, & Hanson, 1998). Psychopathy is the single best predictor of violence in these samples (Monahan et al., 2001). However, the relation between psychosocial risk factors in the development of this disorder has not been examined in a psychiatric sample. This study will provide insights into how psychosocial risk factors impact the development of psychopathy among psychiatric patients. These results are generalizable to psychiatric patients, but not to the general population or to criminal samples. However, results from this study will increase our understanding of psychosocial factors that increase an individual’s risk for developing psychopathy. Findings from this study will advance the knowledgebase of particular risk factors that increase an individual’s risk for developing this particularly concerning personality disorder. Constructs and risk factors found to increase the risk of psychopathy in this study will guide future research effort using other populations, particularly criminal offenders.

This study is the first to differentiate between types of physical abuse as they relate to the development of psychopathy. Therefore, conclusions based on these results will increase our understanding of how abuse, particularly how different types of abuse examined in this study relate to the risk for the development of psychopathy. Findings from this study will inform future research and treatment interventions.
History of the Psychopathy Construct

The construct of psychopathy has a long and contentious history. Psychopathy has been identified in religious, literary, political and historical texts. This disorder has been identified in different cultures, for example Murphy (1976) found evidence of psychopathy in the Yorubas (a rural tribe from Nigeria) and in the Alaskan Inuit Eskimos. The term psychopath has also gone through many transitions over time. In a historical overview, Walker and McCabe (1973) identified three separate meanings associated with psychopathy. The first meaning encompasses all individuals who exhibit some form of psychopathology. The second includes those who exhibit some form of pathology which cannot be attributed to a psychosis (i.e., schizophrenia or delusional disorder). Finally, the term has been used to describe all individuals who commit unethical or morally unjust acts (Walker et al., 1973).

Philippe Pinel (1801/1962) was the first to describe this construct, although at the time psychopathy did not fit into the psychiatric nomenclature. Pinel’s observations took place in post-revolutionary France. He found some patients who were free of psychotic illness that presented as impulsive, violent, and lacked remorse. Pinel used the term “manie sans délire” to describe this disorder, which translates literally to mean ‘insanity without delirium.’ Pinel wrote, “I was not a little surprised to find many maniacs who were under the dominion of instinctive and abstract fury, as if the faculties of affect alone had sustained injury.” (Pinel 1801/1962, p. 9). This synopsis focused on the shallow, or lack of, affect inherent among this group of patients.
American and British psychiatrists in the early to mid-1800’s were also reporting similar findings in their clinical work (Rush, 1812; Prichard, 1835). The etiology of this disorder was inferred to result from some type of birth defect or other disease. Therefore the notion that psychopathic individuals were not responsible for their criminal actions and behavior was promoted by Benjamin Rush, an American psychiatrist. Rush advocated that psychopathic individuals were best treated within medical facilities as opposed to prison (Toch, 1998). Prichard proposed the phrase *moral insanity* to describe this group, and concluded that although such individuals knew the difference between right and wrong they were compelled to act aggressively due to an underlying deficit (Toch, 1998).

Emil Kraepelin (1915) postulated his theory of psychopathy and offered two types. The first he described as obsessive, impulsive, and exhibiting sexual deviations. The second group comprised of those Kraepelin believed displayed other odd or peculiar personality attributes. This second group was broken into 7 subgroups as follows: (1) the excitable, (2) the unstable, (3) the impulsive, (4) the eccentric, (5) the liars and swindlers, (6) the antisocial, and (7) the quarrelsome. In retrospect, it is clear that these ‘types’ are descriptive of diverse character pathology, and are similar to modern-day personality disorders rather than one specific personality type.

Later descriptions of psychopathy also tended to comprise a heterogeneous group of criminal offenders who shared only an antisocial history (Karpman, 1948). Psychopaths were described in general terms to lack guilt, remorse, and lasting bonds with others, while possessing high levels of impulsivity (McCord & McCord, 1964). McCord and McCord’s (1964) description includes several personality and behavioral
traits, but summarize that the two most distinctive features of the psychopath are “guiltlessness and lovelessness” (p. 17). However, the idea that the psychopath behaves in an aggressive and violent manner is discussed at length in their description.

Despite these general descriptive accounts, it was not until Hervey Cleckley’s book ‘The Mask of Sanity’ was published in 1941 that specific traits of this disorder were catalogued (Cleckley, 1941/1976). Cleckley identified 16 personality traits that, through his work with such individuals, he believed captured the essence of the psychopathic personality. The following are Cleckley’s 16 traits:

1. Superficial charm and good “intelligence”.
2. Absence of delusions and other signs of irrational thinking.
3. Absence of “nervousness” or psychoneurotic manifestations.
4. Unreliability.
5. Untruthfulness and insincerity.
6. Lack of remorse or shame.
7. Inadequately motivated antisocial behavior.
8. Poor judgment and failure to learn by experience.
10. General poverty in major affective reactions.
11. Specific loss of insight.
12. Unresponsiveness in general interpersonal relations.
13. Fantastic and uninviting behavior with drink and sometimes without.
14. Suicide rarely carried out.
15. Sex life impersonal, trivial, and poorly integrated.
16. Failure to follow any life plan.

Cleckley stressed the personality dimensions of this disorder, and clearly believed that most psychopaths are not violent. While Cleckley acknowledged that a substantial proportion of incarcerated individuals exhibit psychopathic traits, he asserted that the majority of psychopaths are not incarcerated. According to Cleckley, the psychopath is not likely to commit major crimes that result in long prison terms. He is also distinguished by his ability to escape ordinary legal punishments and restraints. Though he regularly makes trouble for society, as well as for himself, and frequently is handled by the police, his characteristic behavior does not usually include committing felonies which would bring
about permanent or adequate restrictions of his activities. He is often arrested, perhaps one hundred times or more. But he nearly always regains his freedom and returns to his old patterns of maladjustment. (Cleckley, p. 19).

Cleckley’s construct is different than other historical descriptions of psychopathy which incorporate violent and antisocial behavior. Cleckley’s presentation of the psychopath is devoid of behavioral characteristics, and also in contrast to later interpretations of this disorder, especially over the past 15 years which incorporate numerous behavioral traits (e.g., Hare, 1991/2003).

Antisocial Personality Disorder

The Diagnostic and Statistical Manual of Mental Disorders (DSM) is published by the American Psychiatric Association (APA) and categorizes mental disorders. The DSM is currently in its 4th Edition and the clinical diagnosis most closely resembling psychopathy has undergone several revisions in this manual. The first edition of the DSM (APA, 1952) used the term Sociopathic Personality Disturbance to describe this group of individuals. The choice of this label illustrates the APA’s attempt to acknowledge the impact of social or societal forces on personality formation and mental abnormality. The DSM I’s description of sociopathy included many of Cleckley’s (1941) personality traits including: a lack of anxiety; lack of guilt; impulsivity; callousness; and a lack of accepting responsibility for actions. In addition, the inclusion of behavioral criteria was admonished by some (McCord & McCord, 1964) as over inclusive of general criminal behavior. The DSM-II (APA, 1968) retained the clinical descriptors of the psychopath, and continued too lack a uniform listing of character traits. This was in concordance with clinical tradition, but resulted in poor reliability between diagnostic raters. Clinicians using the DSM-II were guided by the above descriptors, but no
guidelines for diagnosis were included to ensure the construct was being reliably assessed between diagnosticians.

The DSM-III (1980) and its revision DSM-III-R (APA, 1987) dramatically shifted from its preceding text with the replacement of Sociopathic Personality Disturbance with the new diagnostic category: Antisocial Personality Disorder (ASPD). This clinical construct was no longer defined by personality traits, as in the clinical tradition of psychopathy, but rather by a set of behavioral criteria. The transition to behavioral traits from personality traits result in increased reliability at the expense of validity (Hare, 1996); meaning that the easy to assess behavioral traits result in an over-inclusive, but reliably measured construct. The core personality attributes of psychopathy were no longer included in the criteria. The updated set of criteria also increased the heterogeneity of this group as it was over inclusive of those who violated social norms. The DSM-III also added the criteria that for a diagnosis of ASPD a diagnosis of Conduct Disorder\(^1\) or a history of behaviors indicative of this disorder must be present before the age of 15.

The current nomenclature of the DSM-IV (APA, 1994) and it’s Text Revision (DSM-IV-TR; APA, 2000) continues to emphasize the behavioral characteristics of this disorder. The DSM-IV-TR defines ASPD as a pervasive pattern of disregard for and violation of the rights of others occurring since age 15 years, as indicated by three (or more) of the following:

1. failure to conform to social norms with respect to lawful behaviors as indicated by repeatedly performing acts that are grounds for arrest
2. deceitfulness, repeated lying, use of aliases, or conning others for personal profit or pleasure

\(^1\) Conduct disorder is listed under the Attention-Deficit and Disruptive Behavior Disorders in the “Disorders Usually First Diagnosed in Infancy, Childhood, or Adolescence” section of the DSM.
3. impulsivity or failure to plan ahead
4. irritability and aggressiveness, as indicated by repeated physical fights or assaults
5. reckless disregard for safety of self or others
6. consistent irresponsibility, as indicated by repeated failure to sustain consistent work behavior or honor financial obligations
7. lack of remorse, as indicated by being indifferent to or rationalizing having hurt, mistreated, or stolen from another

An individual must also be 18 years of age and have exhibited symptoms consistent with Conduct Disorder with an onset before the age of 15 to be diagnosed with ASPD.

An addition to the diagnosis of ASPD in the DSM-IV and the DSM-IV-TR complicates our understanding of this disorder. Although the term psychopath was not present in the DSM-III-R, the DSM-IV and the DSM-IV-TR include the following statement: “This pattern has also been referred to as psychopathy, sociopathy, or dissocial personality disorder” (p. 645 and p. 702 respectively). This increases diagnostic confusion as the research literature discriminates between psychopathy and ASPD (Hare, 1991); while the DSM-IV and DSM-IV-TR indicate that these terms are synonymous.

The clinical diagnosis of ASPD based on the DSM-IV-TR criteria has limited clinical utility due to the heterogeneous population this diagnosis captures. There are over 500,000 criterion combinations that could result in an individual being diagnosed with ASPD (Rogers, Duncan, Lynett, & Sewell, 1994). However, individuals who commit crime and break societal rules do so for a variety of reasons that are not captured by the diagnosis. Also, a diagnosis of ASPD could consist of individuals who only exhibit behavioral dysregulation. A diagnosis of psychopathy, as defined by the Psychopathy Checklist-Revised (PCL-R; Hare, 1991/2003) in criminal populations, or the Psychopathy Checklist: Screening Version (PCL:SV; Hart, Cox, & Hare, 1995) in
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Civil psychiatric and community populations, can add a great deal of clinical information beyond a diagnosis of ASPD.

Based on research on the PCL-R the prevalence of psychopathy among incarcerated populations is consistently found to be between 15% and 25% (Hare, 1991/2003). Comparatively, the base rate of APSD has consistently been found to be between 60% (Cote & Hodgins, 1990) and 80% (Hare, 1991/2003) in this population. In the general population the base rate of ASPD is 3% in males and 1% in females (APA, 1994). Due to inherent difficulties in examining the rate of psychopathy in the general population there is very little data, but the estimated prevalence is approximately 1% (Hare, 1996).

Approximately 88% of those who meet the criteria for psychopathy also meet the criteria for ASPD (Hare & McPherson, 1984), while only 33% of those diagnosed with ASPD meet the criteria for psychopathy based on the PCL (Cunningham & Reidy, 1998). Based on these data, and data to be discussed in the following sections, psychopathy as measured by the PCL provide a more discriminating construct than the DSM diagnosis of ASPD to identify those at highest risk of violence and criminal offending. This construct also more narrowly defines those at most risk for violence, therefore providing researchers, clinicians, and policy makers with information as to the needs of this population. The following section will discuss the psychopathy construct as measured by the PCL-measures.

The Hare Psychopath

Robert Hare (1980) attempted to quantify Cleckley’s (1941) descriptive account of psychopathy and devised the Psychopathy Checklist (PCL). However, the 16 criteria
put forth by Cleckley were difficult to quantify due the inherent subjectivity (Hare, 1980). Hare (1980) compiled over 100 personality traits found in the research literature related to the psychopathy construct. After analysis, many were excluded due to redundancy and high correlations between items indicating that two or more items were measuring the same underlying trait. The result was a list of 22 items that comprised the original PCL (Harpur et al., 1988). After further analysis two more items were excluded, “previous diagnosis as psychopath (or similar)” and “drug or alcohol abuse not direct cause of antisocial behavior.” The first was deleted due to ambiguity and subjectivity, and the second was deleted due to scoring difficulty. Ten other item names were modified slightly without changing the descriptive criteria of the trait or behavior being measured. The following are the 20 items of the PCL-R (Hare, 1991/2003):

1. Glibness/Superficial Charm
2. Grandiose Sense of Self Worth
3. Need for Stimulation/ Proneness to Boredom
4. Pathological Lying
5. Conning/ Manipulative
6. Lack of Remorse of Guilt
7. Shallow Affect
8. Callous/ Lack of Empathy
9. Parasitic Lifestyle
10. Poor Behavioral Controls
11. Promiscuous Sexual Behavior
12. Early Behavioral Problems
13. Lack of Realistic, Long-term Goals
14. Impulsivity
15. Irresponsibility
16. Failure to Accept Responsibility for Own Actions
17. Many Short-term Marital Relationships
18. Juvenile Delinquent
19. Revocation of Conditional Release
20. Criminal Versatility

This psychometric tool has been found to be valid and reliable when measuring the construct of psychopathy (Hare, 1991/2003). Early research on the PCL found good construct validity as well as very good inter-rater reliability (Harpur et al., 1988). This was supported by later research on the PCL-R (Hare, 1991/2003). Since the advent of this tool, research has found a distinct difference between criminals who score higher on the PCL-R than those who do not. These individuals have been found to be vastly more dangerous (Cornell, Warren, Hawk, Stafford, Oram, & Pine, 1996), less amenable to
treatment (Olgoff, Wong, & Greenwood, 1990) and more likely to recidivate (Hemphill, Hare, & Wong, 1998). Based on this research, the clinical construct of psychopathy is important to identify, as these individuals are responsible for an inordinate amount of violence and crime. Therefore the PCL-R has been used widely among forensic populations, and has been shown to have predictive power by identifying which individuals are more likely to be violent in the future (Sreenivasan, Kirkish, Eth, & Mintz, 1997; and Serin, & Amos, 1995).

Since the validation of the PCL and the PCL-R (Hare, 1991/2003) the concept of psychopathy has been reborn into the research literature. Prior to the standardization of this tool, the ability to measure this concept was an enigma. The original factor analysis of the PCL-R resulted in a two-factor solution. The first is most consistent with the core of the theoretical psychopathic personality, including such traits as lacking remorse, guilt and empathy; while factor 2 measures behavioral characteristics.

The psychopathy construct captured by the PCL-R places as much importance on the behavior exhibited by psychopaths as on personality traits. The PCL-R was normed on criminal offenders and inpatient forensic patients. However, as Cooke and Michie’s (2001) study indicates many ‘successful psychopaths’ are not incarcerated, and by dropping the antisocial behavior factor we have a better measure of the clinical construct (e.g., Cleckley, 1941). Another assessment tool based on the PCL-R, the Psychopathy Checklist: Screening Version (Hart, Cox, & Hare, 1995) was normed and validated with civil psychiatric subjects. The PCL:SV was devised to assess psychopathy in civil psychiatric patients as part of the MacArthur Violence Risk Assessment study. Several changes were made to the PCL-R to account for the lack of criminal history variables in
such a sample, with the goal of maintaining good construct validity in measuring psychopathy in non-criminal samples (Hart, Cox, & Hare, 1995). The PCL:SV is a 12-item version of the PCL-R with very similar psychometric properties (Hill, Neumann, & Rogers, 2004). The contribution of behavioral items to the construct of psychopathy is similar. However, when using the PCL:SV as part of a violence risk assessment, not including this factor results in much weaker predictive power for violent behavior (Skeem, Mulvey, & Grisso, 2003). Therefore, the rationale for the evolution from the two-factor model (Hare, 1991), which included an antisocial behavioral factor, to the three-factor model (Cooke & Michie, 2001), which dropped this behavioral factor and focused solely on personality characteristics, to a four-factor model (Hare, 2003) that includes the three personality-based factors and one behavioral factor is that the antisocial/behavioral factor adds a great deal of predictive validity to the scale related to aggression and violence.

**Psychopathy and Antisocial Behavior**

The connection between psychopathy and antisocial behavior is long-standing. However, prior to the establishment of a standardized assessment tool (PCL-R) such research was plagued by poor construct validity when investigating this association. Since the PCL-R was originally established among correctional samples, criminal history variables were used as the criterion for antisocial behavior. Findings indicate that psychopaths are more likely to be convicted for violent offenses than their non-psychopathic counterparts (Kosson, Smith, & Newman, 1990). A retrospective study of male, federal Canadian inmates (n=317) found that psychopaths had an average history of convictions for non-sexual violent crimes of 7.32 compared with 4.52 for non-
psychopathic inmates (Porter, Birt, & Boer, 2001). In another retrospective examination of the criminal histories of a large sample of male, federal Canadian inmates (n=521), those who were diagnosed as psychopathic had significantly more convictions for assault, robbery, fraud, possession of weapons, and escapes from custody (Hare, McPherson, & Forth, 1988).

As the literature progressed, prospective studies examined the role of psychopathy in predicting future criminal behavior using recidivism as an outcome measure. For example, a prospective study of 231 inmates found that those who scored high on the PCL were four times as likely to recidivate violently (Hart, Cropp, & Hare, 1988). Sixty-five percent of those above the cut-off recidivated violently compared with 25% of those who scored low on psychopathy.

Among forensic patients psychopathy was also found to be an important predictor of violence and general recidivism. In a sample of 169 forensic patients, 77% of those who scored above the cut-off for psychopathy on the PCL-R violently recidivated compared with only 21% for those scoring below the cut-off (Harris, Rice, & Cormier, 1991).

Psychopaths’ rates of recidivism are much higher than non-psychopaths, and psychopaths re-offend at faster rates than non-psychopaths. The research literature on psychopathy and recidivism has consistently found that psychopaths are between two and five times more likely to be re-incarcerated for a violent offense when compared to non-psychopathic offenders (Serin & Amos, 1995). In this study, the overall base rate\(^2\) of

\(^2\) A base rate indicates the likelihood of a given variable. For example the base rate of violent aggression among the general population may be very low, but among incarcerated individuals it is much higher. Base rates are regularly used in violence risk assessments to determine the likelihood that a certain
violent recidivism was 17% for the entire sample. The rate of violent recidivism among psychopathic offenders was 25%, while for non-psychopathic offenders it was 5%. This disparity indicates that one in four psychopathic individuals will engage in some form of violence when released from prison, compared to 1 in 20 non-psychopathic offenders (Serin & Amos, 1995). Also, institutional violence has been shown to positively correlate with psychopathy in both incarcerated (Hill, Rogers, & Bickford, 1996) and civil psychiatric sample (Heilbrun, Hart, Hare, Gustafson, Nunez & White, 1998). In a meta-analytic review of the predictive validity of the PCL-measures for violent and general recidivism found moderate to strong effect sizes, and concluded that the PCL-R is a good predictor of both violent and general recidivism (Salekin, Rogers, & Sewell, 1996). These findings are consistent among various international samples, such as Canadian (Porter, Birt, & Boer, 2001), and Swedish offenders (Grann, Langstrom, Tengstrom, & Kullgren, 1999).

Based on this literature, psychopathy as a risk factor for violence is well-established. However, the contribution of each of the PCL-R factors is less clear and studies report inconsistent findings. This differentiation has important clinical implications as to the group most at risk for future violence. Most studies that have examined the contribution of each of the factors have reported that the behavioral factor (Factor 2 of the Hare model) is more indicative of an individual who acts violently. Among psychiatric inpatients, those with high factor 2 scores were at increased risk to engage in violent behavior. Factor 1 scores were not predictive of violent behavior (Heilbrun, et al., 1998). A recent meta-analysis was conducted examining institutional
misconduct among psychopaths and non-psychopaths (Walters, 2003). The correlation between aggressive acts was stronger for PCL Factor 2 ($r = .21$) than for PCL Factor 1 ($r = .14$).

Such findings present a tautological argument that antisocial behavior indicates the presence of psychopathy and therefore predicts future antisocial behavior. This circular understanding of psychopathy stems from methodological flaws in research that did not control for past antisocial behavior and correlates. Studies attempting to address this methodological issue report reduced ability of the construct in predicting violence. Skeem and Mulvey (2001) statistically controlled for 15 covariates of antisocial behavior in order to provide a better understanding of psychopathy’s relation to violent behavior. The result is a reduction of psychopathy’s ability to inform us about risk for future violence. The correlation remained significant, but was reduced from .26 to .12 (Skeem et al., 2001).

Although such research remains in its infancy theoretical discussions can be divided into two camps. One attributes antisocial behavior to the “core” personality construct of psychopathy and calls for its inclusion in the assessment of psychopathy (Hare, 2003). The other excludes antisocial behavior from the assessment of psychopathy and focuses more on the “clinical” manifestations of this disorder (Cooke & Michie, 2001). This argument views antisocial behavior and violence as a consequence of psychopathy rather than a diagnostic indicator.

*Psychosocial Risk Factors for Antisocial and Criminal Behavior*

Numerous retrospective and longitudinal studies have explored early childhood risk factors in the development of antisocial and criminal behavior in adulthood. The
following section will review findings from such studies with a focus on psychosocial risk factors. The inclusion criteria for studies reviewed in the following section is that they measured aggressive and criminal behavior in adulthood as well as early childhood environmental risk factors.

In a study by Robbins (1966) records of children treated at a child guidance clinic in St. Louis were reviewed 20 years after treatment. At the time of their referral to the clinic children were between the ages of 6 and 10. The goal of the study was to determine possible risk factors in the development of antisocial and criminal behavior. This sample included many children diagnosed with ‘sociopathy,’ ‘delinquency,’ and ‘conduct problems’ as subjects were referred to the clinic for behavioral difficulties. The diagnosis of psychopathy (or sociopathy as this disorder was referred to at the time) was not based on a standardized measure as data collection was conducted prior to the validation of the PCL-measures. The label of sociopathy was given when subjects showed a “gross, repetitive failure to conform to societal norms in many areas of life, in the absence of thought disturbance suggesting psychosis” (p. 79, Robbins, 1966). At follow-up the following variables were found to be statistically predictive of antisocial and criminal behavior: paternal antisocial behavior; paternal alcohol abuse; and delinquent peer relationships. Children with histories of physical abuse were also at increased risk for engaging in antisocial and criminal activity as adults, but this relation was not statistically significant (Robbins, 1966).

In a retrospective follow-up study 908 subjects with a history of court referral for substantiated cases of abuse and neglect prior to the age of 11 were evaluated retrospectively after 20 years (Widom, 1989). This study improved on earlier
methodological flaws in the research by matching abuse and neglect cases with a control group on variables such as gender, age, race, and socioeconomic status. Criminal records were reviewed for both abused/neglected subjects and matched controls. Subjects in the abuse/neglect group had statistically significantly more criminal offenses, were younger at the age of first offense, and showed more chronic patterns of criminality as evidenced by having five or more offenses on their criminal record (Widom, 1989). Later analysis found that sexual victimization in childhood, and physical abuse and neglect were also predictive of adult arrests for sex offenses (Widom & Ames, 1994).

The Cambridge-Somerville Study was a longitudinal study conducted in the Boston area (McCord, 1999). The sample consisted of 253 matched groups of boys. Subjects were matched on personality characteristics, parental occupation, religion, ethnicity, and parental criminality and alcohol abuse. Subjects were broken into two groups, an experimental group which was provided with home based treatment, and a control group which received no treatment. Although the goal of this study was to assess the results of intervention on later criminality, it provides useful longitudinal data of risk factors in the development of antisocial and criminal behavior. In the total sample, boys that were abused or neglected were more likely to be convicted of violent crimes, abuse substances, and die prior to the age of 35. Subjects who experienced early family discord, such as parental divorce or domestic violence, were at increased risk for adult offending (McCord, 1982). The best predictor of adult antisocial behavior at age 45 was poor parental supervision (McCord, 1979).

The Cambridge Study of Delinquent Development was a prospective longitudinal study investigating risk factors for adult aggression and criminality (Farrington, 1995).
The sample included 411 boys from working-class families in London. Data collection began in 1961 when the boys were either 8 or 9 years of age. Subjects and family members were interviewed when the subjects reached the ages of 10, 14, 16, 18, 21, 25, and 32. The goal of this study was to assess a wide range of possible risk factors in the development of antisocial and criminal behavior. No particular theoretical model was assessed, but rather as much data as possible was collected to determine risk and protective factors in the development of antisocial and criminal behavior. Childhood risk factors for later aggression included: antisocial child behavior, impulsivity, low intelligence, family criminality, poverty, and inconsistent parenting techniques (Farmington, 1995). Inconsistent parenting techniques included harsh punishment, poor parental supervision, parental conflict, and separation from parents. All risk factors independently contributed to the development of later aggression as measured by regression analysis (Farrington, 1995).

The Rochester Youth Development Study was a large prospective study designed to assess maltreatment in childhood and adolescence and resultant negative outcomes, such as aggressive and criminal behavior later in life (Thornberry, Ireland, & Smith, 2001). The final sample was composed of 1000 adolescents and their primary caretakers, both of which were interviewed every 6 months. Subjects were broken into the following groups: (1) early childhood-only maltreatment (n=35); (2) late childhood-only maltreatment (n=72); (3) adolescent-only maltreatment (n=78); and (4) persistent maltreatment (n=28); and (5) no substantiated maltreatment (n=787). Several outcome variables were measured such as, delinquency, drug use, alcohol use, school dropout, depressive symptoms, internalized symptoms, and externalized symptoms. Subjects in
the early childhood maltreatment-only group were no more likely to engage in delinquent behavior than those with no history of abuse. Subjects in the late childhood-only maltreatment group showed increased risk for delinquency. However, those in the adolescent maltreatment-only and persistent maltreatment groups were at highest risk for nearly all of the outcome variables measured (Thornberry, Ireland, & Smith, 2001). These findings remained after controlling for socioeconomic status, family structure, race, gender, community poverty, and parental education.

A large prospective study followed a sample of 15,117 subjects in Stockholm, Sweden (Hodgins & Janson, 2002). The goal of the study was to investigate predictive factors of mental illness and violence in a large sample. Subjects included 7,719 males and 7,398 females born in 1953 and living in Stockholm in 1963. Data collection began when subjects were 10 years of age, and continued for 20 years when subjects reached the age of 30. Thus, data collection was retrospective from 10 years old back to birth, and prospective from 10 to 30 years of age. This study found that the best predictor of aggressive and criminal behavior in adulthood was behavior problems in early childhood. The study reports that ‘family problems’ were not predictive of adult violence or criminal activity; however abuse was not used as a variable. Further, family problems were defined by the following definition, “If the parents had received social welfare payments for one year or more during a period and/or if the Child Welfare Committee had intervened in the family (therapy, supervision, placement of the child) because of the parents’ behaviour, the subjects’ family was rated as problematic.” (p. 145, Hodgins & Janson, 2002). Such a definition is very broad and does not clearly differentiate between families where abuse/neglect was present and those in which it was not. Also, by
including financial assistance to define the variable of “family problems” confounds this variable with socioeconomic status.

This review supports the proposal that early life psychosocial risk factors, such as abuse and family discord, are predictive of criminal and aggressive behavior in adulthood. As discussed in previous sections, such behavior is related, but not synonymous with the construct of psychopathy. The next section will review the few studies that examine risk factors found statistically predictive of psychopathy as measured by the PCL.

Risk factors found statistically predictive of psychopathy

There are numerous theoretical proposals in the literature that attempt to show the ‘causes’ of psychopathy. These theories have evolved over time, based on the accumulation of research, particularly since the standardization of the PCL-measures. This literature is vast and complex for several reasons. Prior to the standardization of the PCL there was not a common heuristic researchers could use to quantify psychopathy. A great deal of the literature written at that time focused on theoretical causal mechanisms in the development of psychopathy, but lacked a common measure of psychopathy. This literature evolved to ask ‘what is psychopathy?’ as opposed to ‘what causes psychopathy?’ Hundreds of articles support the validation of the PCL through the 1980s and 1990s therefore providing this common heuristic that was lacking in prior research. We are now at a better place to study the causal mechanisms that lead to the development of this disorder. The goal of this section is to provide an overview of these theories which will lead to the research questions and hypotheses of this dissertation. This section
will be broken into three parts as follows: (1) biological theories; (2) cognitive theories; and (3) environmental theories.

**Biological Theories**

As brain imaging capabilities advance so does our understanding of brain function in relation to various disorders. Studies of brain imaging have evolved and become more specific so as to locate specific brain regions and view their activity, both during resting and active phases. In the area of psychopathy research great strides have been made recently. Initial studies found the frontal region of the brain to be associated with aggression and impulsivity, both traits associated with psychopathy (Barratt, 1994; Moffitt, 1993; and Raine, 2002). Despite such advancements, the study of neurological or brain imaging differences between psychopaths and non-psychopaths in adulthood is a complicated area of research. The main reason for this complication is that as individuals grow and experience life, brain changes occur based on environmental factors. For example, initial neuroimaging research showed that men who met the criteria for antisocial personality disorder also had significantly less prefrontal gray matter when compared with control subjects (Raine, Lencz, Bihrlle et al., 2000). However, a later study that controlled for duration of alcohol abuse and level of education found no difference in prefrontal gray volume (Laakso, Guning-Dixon, Vaurio et al., 2002).

Due to findings associating amygdala dysfunction with aggressive behavior (e.g., Raine, Bushsbaum, & LaCasse, 1997) and the association between psychopathy and aggression, recent research has begun to explore the connection between amygdala dysfunction and psychopathy. The amygdala is an almond-shaped structure located within the temporal lobe and adjacent to the hippocampus. Although the full function of
the amygdala remains unknown, studies show its use in aversive conditioning and instrumental learning (Ledoux, 1998) as well as processing emotions (Blair, Morris, Frith, et al., 1999). Therefore, many of the deficits unique to the construct of psychopathy indicate amygdala dysfunction in individuals who possess psychopathic traits. Neuroimaging studies examining amygdala function comparatively between psychopathic and non-psychopathic individuals reveal structural differences (Tiihonen, Hodgins, Vaurio., et al., 2000; Kiehl, Smith, Hare, Mendrek, Forster, Brink, & Liddle, 2001). One study compared criminal psychopaths with criminal non-psychopaths based on their scores on the PCL-R (Tiihonen et al., 2000). Using magnetic resonance imaging (MRI) psychopathic criminals showed significantly less amygdaloid volume (Tiihonen et al., 2000). Another study employed functional magnetic resonance imaging (fMRI) to measure brain activity comparing three groups while undergoing an affective memory task (Kiehl et al., 2001). The first group was comprised of 8 criminal psychopaths, the second group was comprised of 8 criminal non-psychopaths, and the third group was 8 healthy matched controls. The results indicate that criminal psychopaths showed greater activation in brain regions outside of the limbic system when exposed to affective stimuli compared with the other two groups (Kiehl et al., 2001). Criminal psychopaths and criminal non-psychopaths showed less affect related activity in the right amygdala compared to healthy controls (Kiehl et al., 2001). Such findings point out that while amygdala and other brain abnormalities are found in psychopathic individuals, they are also found in other offenders who do not score highly on the PCL-R. Another study employed a paradigm designed to examine the neural substrates of emotional learning by showing subjects a non-emotional picture and associating some of these pictures with an
odor (negative unconditioned stimulus) and others with non-odorous air (positive unconditioned stimulus). Subjects went through three phases: habituation, acquisition, and extinction. This study found that those who met the criteria for Antisocial Personality Disorder (APA, 2000) showed *increased* activation in the amygdala during the aversive conditioning paradigm (Schneider, Habel, Kessler, Posse, Grodd, & Müller-Gätner, 2000). However, this finding is inconsistent with other data that suggests *decreased* activation in the amygdala when comparing psychopathic and non-psychopathic individuals (Rilling, Glenn, Jairam, Pagnoni, Goldsmith, Elfenbein, & Lilienfeld, 2007).

Despite the complexities in developmental/biological research, the research on brain differences between psychopathic and non-psychopathic individuals has proliferated to the point that psychosocial precursors to the development of this disorder have been wholeheartedly dismissed by some. For example, in a recent book titled, “The Psychopath: Emotion and the Brain” the authors stated, “There are no reasons why antisocial parents, parental alcoholism, inconsistent discipline, or a lack of supervisions should give rise to the emotional difficulties seen in individuals with psychopathy” (p. 41, Blair, Mitchell, & Blair, 2005.) Although the authors concede that such family environments may increase the likelihood for antisocial and aggressive behavior for individuals raised in such environments, their view that the specific pathology associated with psychopathy is not a direct result. Such findings should caution researchers not to oversimplify their findings until longitudinal studies can track subjects over long periods of time so as to determine the effects of co-occurring environmental variables, such as abuse and family discord.
A separate area of research focusing on biological outcomes of early traumatic experiences, particularly physical and sexual abuse, has found the incidence of amygdala, hippocampus, and anterior cingulate abnormalities to be significantly higher in adults with histories of abuse (Bremner, Vermetten, Schmahl, Vaccarino, Vythilingam, Afzal et al., 2004; Cohen, Grieve, Hoth, Paul, Sweet, Tate et al., 2006; and Kitayama, Quinn, & Bremner, 2006). There is little consensus regarding the experience of abuse and its relation to the development of psychopathy in adulthood.

*Neuro-Cognitive Theories*

Psychopaths have been said to “know the words but not the music” (Johns & Quay, 1962). This illustration is supported by recent research findings that psychopaths’ brain functioning is different from non-psychopaths when processing emotional words (Intrator, Hare, Strizke, Brichtswein et al., 1997; Kiehl, Smith, Hare, Mendrek, Foster, Brink, & Liddle, 2001). A significant area of research has explored the cognitive patterns of psychopaths, and how psychopaths process information differently when compared with non-psychopaths.

In a now famous study, Lykken (1957) found that psychopaths were less avoidant of punishment in the form of electrical shock than non-psychopaths. Subjects in this study were broken into three groups: (1) “primary sociopaths”—measured by Cleckley’s criteria; (2) “neurotic sociopaths”—incarcerated individuals that did not fit Cleckley’s criteria; and (3) control group—made up of students. Each subject was attached to a device that produced and electrical shock, and informed that they would receive an uncomfortable electrical shock after hearing a particular ring tone. There were two different types of ring tones of different timbers. This study found psychopaths to
exhibit less anxiety and less galvanic skin response associated with receiving a shock. Lykken (1957) concluded that psychopath’s ability to avoid punishment is impaired, and is associated with their lack of anxiety.

This finding was replicated by Hare (1965) who compared three groups: (1) incarcerated psychopaths; (2) incarcerated non-psychopaths; and (3) a control group made up of non-criminal students. In this study subjects watched a screen that displayed numbers in ascending order. They were informed that when they saw the number eight they would receive a shock. There were statistically significant differences in skin conductance response, both during the shock and in the time leading up to the shock. Psychopaths showed a lower level of conductance overall, and also in the pattern of change as the shock approached (Hare, 1965). These findings suggest that psychopaths’ level of fear and anxiety is impaired.

Hare (1968; 1978) later found a contrast between psychopath’s skin conductance and their cardiovascular response to upcoming shock. Psychopaths showed poor electrodermal response, but good cardiovascular response (Hare, 1968; 1978). Based on these results, Hare proposed that “anomalies in the autonomic responses of psychopaths are more likely a reflection of the particular motivational and cognitive demands placed on them, than of an autonomic nervous system that does not function properly.” (Hare, 1986, p. 13) This proposal contests that psychopaths are able to ‘tune out’ emotions, such as fear, when focused on another goal.

To further this line of research, Newman and colleagues have shown that psychopaths exhibit poor passive avoidance learning, meaning that they fail to inhibit behavior that previously led to punishment (Newman & Schmitt, 1998). This research
builds upon Fowles (1980) theory of poor passive avoidance learning in psychopaths, which is an extension of Gray’s (1975) learning theory. In this model, learning is mediated by three interactive arousal systems: (1) the behavioral activation system (BAS); the behavioral inhibition system (BIS); and (3) a nonspecific arousal system (NAS). The BAS is a motivational system which seeks reward. The BIS is an anxiety system that inhibits behavior secondary to punishment cues (passive avoidance), and the NAS is an intermediary system that receives input from both. As heart rate is associated with facing a threat, the literature suggests that heart rate is closely related to the BAS, whereas electrodermal activity is associated with the BIS (Fowles, 1980). Research in this area shows psychopaths to have an overactive BAS (Gorenstein & Newman, 1980) and an underactive BIS (Fowles, 1980; Patterson & Newman, 1993). The result is an individual who is absorbed with possible rewards in his environment, with sole attention paid to this area, at the expense of processing potential punishment cues. Studies in this area find that individuals who score as psychopathic on the PCL-R fail to learn from the experience of punishment (Arnett, Smith, & Newman, 1997; Newman, 1998; Patterson & Newman, 1993).

Environmental Theories

There is limited research regarding environmental precursors, individual risk or protective factors in the development of psychopathy. The reason for this paucity of research is the recent validation and standardization of the psychopathy checklist and progeny (Hare, 1991/2003). Research not using the PCL, or other validated measures of psychopathy, tend to be over inclusive and include generally antisocial individuals, as opposed to those who meet the clinical criteria for psychopathy. Therefore the following
review will include only those studies which used the PCL or PCL-derived measures of psychopathy.

A descriptive study of the prevalence of abuse in a sample of 95 incarcerated male youth found higher rates of abuse among those who scored above the cut-off for psychopathy (Forth & Tobins, 1995). The Psychopathy Checklist: Youth Version (PCL:YV; Forth, Kosson, & Hare, 2003) was used to determine psychopathy diagnosis, and a cutoff score of 30 was employed. The overall rate of abuse (which included sexual abuse, physical abuse, neglect, and emotional abuse) was 71.4% for those diagnosed with psychopathy, and 63.3% for non-psychopaths.

Another study examined the relation between early childhood victimization and psychopathy retrospectively in a sample of adults (Weiler & Widom, 1996). The sample included 629 (309 males and 320 females) subjects with a documented history of abuse and a matched control group of 440 subjects (228 males and 212 females). Subjects were matched on all variables other than abuse/neglect. All subjects were interviewed using a diagnostic interview schedule, the PCL-R, and measures of IQ and reading ability. Results indicate that victims of childhood abuse and/or neglect had significantly higher PCL-R scores than subjects in the matched control group after controlling for demographic characteristics and potential confounding variables, such as criminal history variables. Also, while childhood victimization was predictive of psychopathy, it was not predictive of violence when psychopathy was controlled for. These findings suggest that the relationship between childhood victimization and adult violence is mediated by psychopathy (Weiler, & Widom, 1996).
The next study surveyed 105 incarcerated males, 50 psychopathic individuals and 55 non-psychopathic individuals based on their scores on the PCL-R (Marshall & Cooke, 1999). An analysis of a childhood environment scale indicated two distinct childhood factors that influenced later aggression. The first was labeled “family dynamics,” and was comprised primarily of parental behaviors directed towards the child. The second factor was labeled “societal influences.” This factor was comprised of three items: school performance, school experience, and institutional stay. After statistically testing each individual psychometric tool, stepwise multiple regression was conducted to measure the relation between childhood experiences and PCL-R scores. The results indicated that, “different childhood experiences were associated with the personality and behavioral features of psychopathy. These results suggest a specificity of effect with familial experiences being more closely linked with the personality features of the disorder and the societal influences being more closely associated with the behavioral features of the disorder” (Marshall, et al., 1999, p. 220). An interesting finding of the study is the apparent linear relationship between adult psychopathy and “societal influence,” meaning that as “societal” risk factors increase, psychopathic personality traits increase. “Familial” factors exhibited a negative curvilinear relationship with PCL-R scores, indicating that low to moderate psychopathic traits are strongly related to early family experiences, while high psychopathic traits are less influenced by this factor.

A longitudinal study compared a group of adult males found guilty of a property or violent offense during adolescence (n=192) with a control group (n=95) matched for age, SES, and neighborhood (Lang, af Klinteberg, & Alm, 2002). Victimization in childhood data was collected during adolescence, and history of violence and PCL-R
interviews were conducted during follow-up approximately 30 years later. Results found that both a history of abuse and psychopathic traits were predictive of violence in adulthood. However, in contrast to Wieler & Widom (1996), childhood victimization was not predictive of adult psychopathy (Lang, af Klinteberg, & Alm, 2002). Instead, these results indicated that violence played a mediating role between childhood victimization and adult psychopathy. The authors concluded, “children with psychopathy-related traits and behaviors living in abusive families, with parental impulsivity and impulse control disorders, hyperactivity, alcohol abuse, poor socialization and low tolerance to frustration, are at high risk for eye-witnessing of violence and for developing violent behavior themselves.” (p. 98, Lang et al., 2002)

The next study conducted retrospective analysis of psychosocial correlates of psychopathy in a sample of 188 male and 38 female incarcerated adolescents between the ages of 12 and 19 (Campbell, Porter, & Santor, 2004). The PCL:YV was used as the measure of psychopathy. Several scales were administered to subjects to measure clinical variables, and psychosocial variables were collected throughout file review. Stepwise multiple regression analysis was employed to predict PCL:YV score based on clinical and psychosocial variables. The results indicate that higher psychopathy scores were associated with a history of physical abuse (Campbell et al., 2004). However, the only psychosocial variable to predict a higher score on the PCL:YV was a history of non-parental living arrangements (e.g., foster care).

In a sample of 615 adult male offenders a structural equation model was applied to test the relation between early abuse and psychopathy, and the possible mediating role of dissociation (Poythress, Skeem, & Lilienfeld, 2006). While there was an overall
association between being abused as a child and psychopathy in adulthood, abuse exerted no direct or indirect effect on the core interpersonal and affective features of psychopathy (factor 1 of the PCL). However, abuse was directly related to the behavioral traits of psychopathy such as impulsive and irresponsible lifestyle (factor 2 of the PCL).

The six studies that have examined the relation between early psychosocial factors and psychopathy using the PCL-measures have all used non-psychiatric samples. The violence risk assessment literature finds that risk factors that are predictive of violent recidivism in the general offender population are also predictive of violent recidivism in mentally disordered offenders (Bonta, Law, & Hanson, 1998). In both psychiatric sample and criminal offenders psychopathy has been found to be one of the most predictive factors for future violence (Monahan et al., 2001). The relation between psychosocial risk factors in the development of this disorder has not been examined in a psychiatric sample. Based on this review, this dissertation will be the first study to examine the relation between psychosocial risk factors in the development of psychopathy in a psychiatric sample. This study will provide insights into how psychosocial risk factors impact the development of psychopathy among psychiatric patients.

Conclusions

Based on this review of the current research literature several conclusions can be drawn. The following will highlight the findings of this review and lead to the specific research questions and hypotheses of this dissertation:

- Prior to the validation of the PCL-measures there was not a common heuristic for measuring psychopathy. Prior to the validation of the PCL-measures, studies evaluating causal mechanisms in the development of this disorder were
methodologically flawed as psychopathy was inconsistently measured across samples.

- Prior to the standardization of the PCL-measures longitudinal research consistently reported that early life stressors, such as abuse and antisocial parental behavior, statistically predict aggressive and criminal behavior in adulthood.

- Throughout the 1980s, 1990s, and early 2000s, the vast majority of research in this area asked the question ‘what is psychopathy?’ as opposed to ‘what causes psychopathy?’

- Since the validation of the PCL-measures the majority of research examining causal mechanisms has focused on biological and neurological differences between psychopaths and non-psychopaths.

- Research examining psychosocial risk factors in the development of psychopathy is an understudied area.

- The little research that is available in this area does not report consistent findings; particularly regarding the role abuse in childhood has on the development of psychopathy.

- The goal of this dissertation is to address this lack of research in the current literature by examining psychosocial risk factors in the development of psychopathy (as measured by the PCL:SV) in a sample of adult psychiatric patients.
Chapter II
Methodology and Procedure

Research Questions

The goal of this dissertation is to determine whether particular risk factors are statistically predictive of psychopathy in a sample of psychiatric patients. The following are the general research questions:

- What are early life psychosocial risk factors that statistically predict psychopathy in a sample of psychiatric patients?
- Are there particular risk factors that increase an individual’s risk for developing psychopathy in a sample of psychiatric patients?
- Does abuse and parental antisocial behavior statistically predict psychopathy as they predict aggressive and criminal behavior?
- If abuse and parental antisocial behavior are predictive of psychopathy are they also predictive of individual factors of the PCL:SV?

To answer these research questions a three-step approach will be employed:

1. Exploratory factor analysis (EFA) will be conducted using psychosocial variables found to be predictive of psychopathy. As there is limited research in this area, psychosocial variables found predictive of adult criminal and aggressive behavior will be included in the EFA. This analysis will establish empirically derived factors that can be tested using structural equation modeling.

2. Confirmatory Factor Analysis (CFA) will be used to measure the fit of the factor structure found using EFA.
3. Based on the results of EFA and CFA, structural equation modeling will assess the fit of the model.

This dissertation will use a mixed measurement and path model. EFA will be conducted using variables that are theoretically related to the latent variables to be tested in the SEM.

Subjects

The MacArthur Violence Risk Assessment Study was a multi-site study designed to assess risk factors for violent behavior in a sample of psychiatric patients (Monahan et al., 2001). The goal of the original study was to improve on methodological flaws of earlier research in the area of violence risk assessment, particularly by defining violence more broadly. In contrast to previous studies that used only reconviction for a violence offense as the outcome measure the MacArthur study used arrest data, hospital data, interviews with the patient, and interviews with collaterals to measure actual violence. The overall sample was made up of psychiatric patients admitted to acute civil inpatient facilities in Pittsburgh, PA, Kansas City, MO, and Worcester, MA.

Inclusion criteria for the sample included the following: (1) subjects were civilly committed to a psychiatric hospital; (2) subjects are between the ages of 18 and 40; (3) subjects are English speaking; (4) subjects race is Caucasian or African-American (other than the Worcester site at the University of Massachusetts Medical School at Worcester State Hospital, which included Latino participants); (5) subjects have a medical record diagnosis of schizophrenia, schizophreniform disorder, schizoaffective disorder, depression, dysthymia, mania, brief reactive psychosis, delusional disorder, alcohol or other drug abuse or dependence, or a personality disorder. To ensure a consistent
distribution of demographic variables, such as age, gender, and race, this study used a stratified random sampling design.

Over the course of the study a total of 12,873 patients were hospitalized across the three study sites. Of these admissions, 7,740 met the inclusion criteria. A total of 1,695 patients were asked to participate in the study. Patients were asked to participate within approximately 5 days of their hospital admission. Those who were not asked to participate within 20 days of admission were excluded from the study. The refusal rate was 20%, resulting in a sample size of 1,136 total subjects.

The median length of hospitalization was 9 days. After providing informed consent to participate in the research, the patient was interviewed in the hospital by both a research interviewer and a research clinician in order to assess him or her on each of the risk factors. Three sources of information were used to ascertain the occurrence and details of a violent incident in the community. Interviews with patients, interviews with collateral individuals (i.e., persons named by the patient as someone who would know what was going on in his or her life), and official sources of information (arrest and hospital records) were all coded and compared. The patients and collaterals were interviewed every 10 weeks over a 1 year period to follow up on any incidents of aggression or violence. There were two types of interviews conducted with subjects; research interviews and clinical interviews. The research interviews collected historical data, while clinical interviews assessed the subject’s clinical presentation, particularly the presence of psychiatric symptoms. Included in these interviews was the PCL:SV (Hart, Cox, & Hare, 1995). Of the 1,136 individuals in this study, 871 were scored on the
PCL:SV. The final sample used in this dissertation is comprised of 446 subjects for whom complete data was available for all variables to be used in the analysis.

Using a psychiatric sample presents with some advantages in our understanding of the impact of psychosocial risk factors in the development of psychopathy. The six studies described in the literature review examining the relation between early psychosocial risk factors and psychopathy (based on the PCL or a PCL-derived measure) all used non-psychiatric samples. Research in the area of violence risk assessment finds that risk factors that are predictive of violent recidivism in the general offender population are also predictive of violent recidivism in mentally disordered offenders (Bonta, Law, & Hanson, 1998). Psychopathy is the single best predictor of violence in psychiatric samples (Monahan et al., 2001). However, the relation between psychosocial risk factors in the development of this disorder has not been examined in a psychiatric sample. Based on this review, this dissertation would be the first study to examine the relation between psychosocial risk factors in the development of psychopathy in a psychiatric sample.

Measures

Psychopathy

In order to quantify the psychopathy construct, Hare (1980) explored the use of the 16 criteria set forth by Cleckley (1941) and rated each on a 3 point scale. However, Cleckley’s goal was not to provide a tool for the assessment of psychopathy, but rather a synopsis of what he believed were the most relevant personality traits comprising the construct of psychopathy. Cleckley’s 16 criteria were difficult to score due the inherent subjectivity (Hare, 1980). Based on this study, Hare compiled A list of over 100
personality traits found in the research literature that were related to psychopathy. After further analysis, many were excluded due to redundancy and high correlations between items indicating that two or more items were measuring the same underlying trait. This list resulted in the 22 items of the original Psychopathy Checklist (Harpur et al., 1988).

The PCL was normed on 10 different samples comprising of 1,626 Canadian inmates. The majority of subjects (1,316) were white, while 94 Native Canadian inmates and 216 Black inmates were included.

After further analysis two more items were excluded, “previous diagnosis as psychopath (or similar)” and “drug or alcohol abuse not direct cause of antisocial behavior.” The first was deleted due to ambiguity of the construct of psychopathy and difficult in scoring this item, and the second was withdrawn for difficulty in scoring this item. Ten other item names were modified slightly without changing the descriptive criteria of the trait or behavior being measured. The following are the 20 items of the PCL-R (Hare, 1991):

1. Glibness/Superficial Charm
2. Grandiose Sense of Self Worth
3. Need for Stimulation/ Proneness to Boredom
4. Pathological Lying
5. Conning/Manipulative
6. Lack of Remorse of Guilt
7. Shallow Affect
8. Callous/Lack of Empathy
9. Parasitic Lifestyle
10. Poor Behavioral Controls
11. Promiscuous Sexual Behavior
12. Early Behavioral Problems
13. Lack of Realistic, Long-term Goals
14. Impulsivity
15. Irresponsibility
16. Failure to Accept Responsibility for Own Actions
17. Many Short-term Marital Relationships
18. Juvenile Delinquent
19. Revocation of Conditional Release
20. Criminal Versatility

This psychometric tool has been found to be valid and reliable when measuring the construct of psychopathy (Hare, 1991/2003). Early research on the PCL found good construct validity as well as very good inter-rater reliability (Harpur et al., 1988). This was supported by later research on the PCL-R (Hare, 1991/2003). The PCL-R has been
used widely among forensic populations, and has been shown to have predictive power by identifying which individuals are more likely to be violent in the future (Sreenivasan, Kirkish, Eth, & Mintz, 1997; and Serin, & Amos, 1995).

The original factor analysis of the PCL-R resulted in a two-factor solution. The first is most consistent with the core of the theoretical psychopathic personality, including such traits as lacking remorse, guilt and empathy; while factor 2 measures behavioral characteristics. The psychopathy construct captured by the PCL-R places as much importance on the behavior exhibited by psychopaths as on personality traits.

More recently there has been some question as to the validity of this two-factor model. A study by Cooke and Michie (2001) concludes that “although the two-factor model has served as a useful heuristic device to guide research on psychopathy, it does not provide an adequate structural model for psychopathy” (p. 173). To replace this model, the authors found evidence of a three-factor model that better accounts for the personality traits of this disorder. These factors are “Arrogant and Deceitful Interpersonal Style, Deficient Affective Experience, and Impulsive and Irresponsible Behavioral Style” (Cooke et al., 2001, p. 171). After analyzing the goodness of fit of this three-factor model it was concluded, “that the three-factor hierarchical model provides the best description of these data” (Cooke et al., 2001, p. 176). The three-factor model places much less emphasis on criminal behavior.

As discussed above, the PCL-R is normed on criminal offenders and inpatient forensic patients. However, as Cooke and Michie’s (2001) study indicates many ‘successful psychopaths’ are not incarcerated, and by dropping the antisocial behavior factor we have a better measure of the clinical construct (e.g., Cleckley, 1941). Another
assessment tool based on the PCL-R, the Psychopathy Checklist: Screening Version (Hart, Cox, & Hare, 1995) was normed and validated with civil psychiatric subjects. The PCL:SV was devised to assess psychopathy in civil psychiatric patients as part of the MacArthur Violence Risk Assessment study. Several changes were made to the PCL-R to account for the lack of criminal history variables in such a sample, with the goal of maintaining good construct validity in measuring psychopathy in non-criminal samples (Hart, Cox, & Hare, 1995). The PCL:SV is a 12-item version of the PCL-R with very similar psychometric properties (Hill, Neumann, & Rogers, 2004). The contribution of behavioral items between these two measures is very similar. When using the PCL:SV as part of a violence risk assessment evaluation, not including the behavioral factor results in much weaker predictive power for violent behavior (Skeem, Mulvey, & Grisso, 2003). Therefore, the rationale for the evolution from the 2 factor model, which included an antisocial behavioral factor, to the 3 factor model, which dropped this behavioral factor and focused solely on personality characteristics, back to a model that includes both the 3 personality-based factors and one behavioral factor is that the antisocial/behavioral factor adds a great deal of predictive validity to the scale related to aggression and violence.

Based on the 3-factor model, additional research has been conducted by Hare and colleagues (Hare & Neumann, 2006) resulting in a new 4-factor model that includes the behavioral factor. The theoretical underpinning of this model is that behavioral characteristics, particularly antisocial and violent behavior, are necessary requirements. The authors conclude that “deceitful interpersonal behavior, deficient affect, and behavioral dysregulation in the context of violating critical social contracts, be they moral or legal, represent the manifestation of psychopathy proper.” (p. 84, Hare et al., 2006).
As the research on the PCL has struggled to find a conclusive factor structure, recent studies support a “superordinate” 1-factor structure. Based on the available data, Hare concludes that, “the presence of a superordinate factor structure is demonstrated in several studies using multiple measures, including Cronbach’s alpha, inter-item correlations, and item-total correlations…Additionally, General Factor Saturation estimates from different investigations strongly support a Total psychopathy score.” (p. 85; Hare, 2003). More recent research supports the use of a 1-factor or ‘super-factor’ model which uses the total PCL score (Hare, 2003; Neumann, Hare, & Newman, 2007).

*The Psychopathy Checklist: Screening Version (PCL:SV; Hart, Cox, & Hare, 1995)*

The PCL:SV is a 12-item scale derived from the PCL-R (Hare, 1991/2003). This measure was devised to assess psychopathy in a non-forensic sample as part of the MacArthur Violence Risk Assessment Study (Steadman, Silver, Monahan, Appelbaum, Robbins, Mulvey, et al., 2000). Like the PCL-R items are scored on a 3-point scale—0 = does not apply; 1 = item applies to a certain extent; and 2 = item applies. Scores range from 0 to 24, and a cut-off score of 18 is used for the diagnosis of psychopathy and in most research. The PCL:SV shows a similar factor structure to the PCL-R (Hill, Neumann, & Rogers, 2004; Vitacco, Neumann, & Jackson, 2005). The first factor measures “Emotional Detachment” and is made up of six items, and the second factor measures “Antisocial Behavior”, and is also measured by six items. Internal consistency, interrater reliability, test-retest reliability, concurrent validity, and convergent and discriminant validity have all been found to be satisfactory in research on the PCL:SV (Hart et al., 1995).
Previous research has evaluated the factor structure of the PCL:SV in this sample and shown the factor structure to be similar to research on the PCL-R (Monahan et al., 2001). Skeem and Mulvey (2001) conducted confirmatory maximum-likelihood factor analysis to test the two-factor structure. The findings suggest a similar 2 factor structure to that found in the PCL:SV reliability study (Hart, et al., 1995). The authors report that as the comparative fit index (CFI) fell just short of the 0.90 standard for adequate fit (CFI=0.89) they concluded, “The ‘borderline’ estimates of fit described above may be based on the low base rate of psychopathy in this sample but could reflect PCL:SV structure differences in civil psychiatric samples.” (Skeem & Mulvey, 2001, p. 364). The following table illustrates the two-factor model found in validation studies on the PCL:SV (Hart et al., 1995). This factor structure was also confirmed in the sample used in this dissertation (Skeem & Mulvey, 2001):

Table 1: PCL:SV Factor Structure

<table>
<thead>
<tr>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Superficial</td>
<td>7. Impulsive</td>
</tr>
<tr>
<td>2. Grandiose</td>
<td>8. Poor Behavioral Controls</td>
</tr>
<tr>
<td>3. Deceitful</td>
<td>9. Lacks Goals</td>
</tr>
<tr>
<td>4. Lacks Remorse</td>
<td>10. Irresponsible</td>
</tr>
<tr>
<td>5. Lacks Empathy</td>
<td>11. Adolescent Antisocial Behavior</td>
</tr>
</tbody>
</table>

In a study that included 586 participants from 11 different Canadian and U.S. samples, Cooke & Michie (2001) identified a three factor model for the PCL:SV. The sample included samples including the following types of subjects: (1) non-mentally ill convicted prisoners; (2) forensic psychiatric; (3) civil psychiatric; and (4) community controls. The first factor, “Arrogant and Deceitful Interpersonal Style”, is composed of three PCL:SV items (Superficial, Grandiose, Deceitful). The second factor, “Deficient
Affective Experience” is composed of three items (Lacks Remorse, Lacks Empathy, Doesn’t Accept Responsibility). The third factor, “Impulsive and Irresponsible Behavioral Style” is also composed of three PCL:SV items (Impulsive, Lacks Goals, Irresponsible). Three items did not load onto any of these three factors: Poor Behavioral Controls, Adolescent Antisocial Behavior, and Adult Antisocial Behavior.

**Predictor Variables**

The following paragraphs will describe the three groups of variables that will be used as predictor variables in this study: (1) Abuse; (2) Parental Antisocial Behavior; and (3) Cognitive Ability.

**Abuse Variables**

As discussed in the literature review, the relation between abuse and psychopathy is an understudied area. Since the validation of the PCL-measures there are only a handful of studies that explore the role early childhood abuse plays in the development of psychopathy. The MacArthur Violence Risk Assessment Database includes several variables that assess abuse. There are 12 individual items measuring physical abuse in childhood and adolescence. The following table lists the 12 observed variables in the database used to measure abuse.

**Table 2: Physical abuse variables in childhood and adolescence**

<table>
<thead>
<tr>
<th>Physical Abuse in Childhood Variables:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thinking about when you were a child (up to age 12), did your parents ever:</td>
</tr>
<tr>
<td>• Beat or really hurt you with bare hand/fist?</td>
</tr>
<tr>
<td>• Beat or hit you with something hard?</td>
</tr>
<tr>
<td>• Beat or hit you with a whip, strap, or belt?</td>
</tr>
<tr>
<td>• Injure you with a knife, gun, or other weapon?</td>
</tr>
<tr>
<td>• Physically injure you so that you were admitted to a hospital?</td>
</tr>
<tr>
<td>• Physically injure you to the point that you needed to see a doctor?</td>
</tr>
</tbody>
</table>

| Physical Abuse in Adolescence Variables: |
Thinking about when you were a teenager (after age 12), did your parents ever:
- Beat or really hurt you with bare hand/fist?
- Beat or hit you with something hard?
- Beat or hit you with a whip, strap, or belt?
- Injure you with a knife, gun, or other weapon?
- Physically injure you so that you were admitted to a hospital?
- Physically injure you to the point that you needed to see a doctor?

These variables were measured on a 6 point Likert-scale as follows: 0= never; 1= once; 2= twice; 3= sometimes; 4= frequently; 5= most of the time.

**Parental Antisocial Behavior**

There were 8 variables in the dataset that measure parental antisocial behavior.

Table 3 below lists these variables:

**Table 3: Parental Antisocial Variables:**

- Now, thinking about the whole time when you were a teenager, how often did your parents hit or throw something at each other?
- Did your parents have physical fights with people outside the family?

These variables were measured on a 6 point Likert-scale as follows: 0= never; 1= once; 2= twice; 3= sometimes; 4= frequently; 5= most of the time.

- Did your real (biological) mother/ (woman who raised you) ever use alcohol excessively (drink a lot)?
- Did your real (biological) mother/ (woman who raised you) ever use street drugs?
- Did your real (biological) father/ (man who raised you) ever use alcohol excessively (drink a lot)
- Did your real (biological) father/ (man who raised you) ever use street drugs?

These variables were measured on a 7 point Likert-scale as follows: 0 = never; 1 = very infrequently; 2 = less than once a month; 3 = once a month; 4 = once a week; 5 = twice a week; 6 = daily.

- Did your mother (woman who raised you) ever get arrested?
- Did your father (man who raised you) ever get arrested?
These variables were measured on a 7 point Likert-scale as follows: 0 = never; 1 = 1 time; 2 = 2 times; 3 = 3 times; 4 = 4 times; 5 = 5 to 10 times; 6 = more than 10 times.

*Cognitive Ability*

The total score on the Wechsler Adult Intelligence Scale—Verbal Scale will measure cognitive ability. The Vocabulary subtest of the WAIS-R is a test of word knowledge and semantic memory, and is highly correlated with Full Scale IQ (Kaufman, 1990). The WAIS-R Vocabulary subscale has been found comparable to other measures of adult intelligence (Uttl, 2002).

*Procedure*

*Initial Hospital Interview*

Subjects were interviewed on two occasions during their initial hospitalization. On one occasion the interview was conducted by a research interviewer to obtain demographic and historical data; and the other interview was conducted by a research clinician (Ph.D., M.A., or M.S.W). The purpose of the clinical research interview was to obtain clinical data and administer clinical scales. Clinical interviews and record reviews were conducted to confirm the medical record diagnosis with the DSM-III-R Checklist (Janca & Helzer, 1990). The scales administered included the Novaco Anger Scale (Novaco, 1994) and the Barratt’s Impulsiveness Scale (Barratt, 1994). In cases that the subject did not qualify for an Axis I diagnosis the clinician administered the Structured Interview for DSM-III-Personality (SID-P; Pfohl, Blum, Zimmerman, & Stagl, 1989).

*Follow-Up Interviews*

As the initial goal of the overall MacArthur study was to research risk variables for violence in a psychiatric sample, subjects and collaterals were interviewed every 10
weeks over the course of 50 weeks. During the follow-up interviews additional clinical scales and measures were administered, including the PCL:SV. The PCL:SV was scored during follow-up 1 or 2. Of the 1,136 original hospitalized subjects 83.7% participated in the first follow-up interview. Seventy-seven percent were seen for 3 or more follow-up interviews, and 49.6% participated in all 5 interviews.

**Internal Review Board Approval**

This study was approved by the Office for Research Protections (ORP) at Boston College in accordance with 45 CFR 46.101 (b) (4), which provides exemption for research with pre-existing data sources in which the information will not be recorded in such a manner that subjects can be identified, directly or through identifiers linked to the subjects. The approval was granted on February 13, 2008.

**Statistical Analysis**

**Exploratory Factor Analysis (EFA)**

The goal of EFA is to determine empirically based factors as a means of data reduction (Tabachnick & Fidell, 2001). A total of 21 variables will be used in this dissertation.

Of these variables, 12 are related to physical abuse, 8 are related to parental antisocial behavior, and 1 is related to cognitive ability. Separate EFA will be run on the 12 variables measuring physical abuse and the 8 variables measuring parental antisocial behavior. EFA will be conducted to consolidate observed variables and determine their underlying latent constructs. Based on the results of the EFA individual items will be cut from the analysis to increase parsimony. The observed variables selected for EFA were chosen based on the literature review and meet one or both of the following criteria: (1)
variables have been found statistically predictive of psychopathy; and/or (2) variables have been found statistically predictive of antisocial and criminal behavior. As the literature review reveals, there are limited studies of psychosocial precursors of psychopathy—therefore variables found predictive of antisocial and criminal behavior were selected as well.

The following steps will be taken in the EFA using SPSS:

1. Compute the correlation matrix for all observed variables described above. The correlation matrix will indicate whether variables are correlated with each other. This allows for the appropriateness of the factor model to be evaluated (Norusis, 1990). At this point, Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) is analyzed. A KMO over 0.6 is recommended for acceptable factor analysis (Tabachnick & Fidell, 2001). Bartlett’s Test of Sphericity is also analyzed. This analysis is very sensitive, therefore with large samples it is likely to show significance even if correlations are low (Tabachnick & Fidell, 2001).

2. The second step is factor extraction. At this step the fit of the data is evaluated (Norusis, 1990). The maximum likelihood method will be used in this analysis. The maximum likelihood method estimates population values for the factor loadings through an estimation process that are most likely to have generated the observed data (Polit, 1996).

3. The third step in EFA is factor rotation. The goal of factor rotation is to provide more interpretable results (Norusis, 1990). Factor rotation does not mathematically improve the factor solution, but rather provides a more useful way of interpreting the results as the factor matrix is difficult to interpret (Polit, 1996).
In this analysis varimax rotation will be used. Varimax rotation is “a method of orthogonal rotation which simplifies the factor structure by maximizing the variance of a column of the pattern matrix” (p. 79, Kim & Mueller, 1978).

**Confirmatory Factor Analysis (CFA)**

Based on the results of the EFA, CFA will be conducted. CFA “is a much more sophisticated technique used in the advanced stages of the research process to test a theory about latent process. Variables are carefully and specifically chosen to reveal underlying processes.” (p. 584, Tabachnick & Fidell, 2001). CFA will be used to confirm the findings of the EFA for the variables to be used in the final structural equation model. Based on the results of the EFA and CFA the final structural equation model will be tested.

**Structural Equation Model**

Structural equation modeling is a statistical technique designed to test a priori hypotheses (Kline, 2005), and is therefore not an exploratory technique. Using SEM compels the researcher to have a comprehensive knowledge of previous research findings and a solid theoretical framework from which hypotheses are based. Advantages of SEM over other multivariate statistical techniques include the following: (1) SEM is a confirmatory technique as opposed to other statistical analysis that is exploratory in nature (i.e., regression analysis); (2) SEM provides estimates for measurement error and accounts for such error; (3) SEM has the ability to incorporate both observed and latent variables as opposed to other statistical techniques that use only observed variables; and (4) SEM is able to compare alternative models (Byrne, 2001).
The following steps will be taken in the SEM process: (1) model specification; (2) evaluation of assumptions; (3) model estimation and preliminary evaluation; (4) model testing; and (5) model modification.

**Model Hypotheses**

There are numerous theoretical proposals in the literature that attempt to show the ‘causes’ of psychopathy. These theories have evolved over time, based on the accumulation of research, particularly since the standardization of the PCL-measures. The research literature to date is inconsistent in its findings regarding the association between early abuse and the development of psychopathy. Some studies show that psychopathic individuals have a higher rate of abuse than non-psychopathic individuals (Forth & Tobins, 1995; Weiler & Widom, 1996; Poythress, Skeem, & Lilienfeld, 2006), while other studies do not report this finding (Lang, af Klinteberg, & Alm, 2002). Although there are very few studies examining family dynamic factors, there is some evidence that family discord is statistically predictive of psychopathy (Marshall & Cooke, 1999). The review of this research literature supports the investigation of psychosocial risk factors in the development of psychopathy, and SEM provides the best tools for such analysis.

**Hypothesis #1**

- Abuse in childhood and adolescence will be statistically predictive of psychopathy in adulthood, meaning that subjects with histories of abuse will be more likely to score as psychopathic based on PCL:SV score.

**Hypothesis #2**
• Parental antisocial behavior will be statistically predictive of psychopathy in adulthood, meaning that subjects with histories of parental antisocial behavior will be more likely to score as psychopathic based on PCL:SV score.

**Hypothesis #3**

• The majority of previous research indicates that there is no relation between cognitive ability and psychopathy; therefore it is hypothesized that cognitive ability will not be predictive of psychopathy. However, cognitive ability will be entered into the structural equation model to determine whether cognitive ability influences psychopathy in this sample.

**Hypothesis #4**

• There is inconsistent evidence in the research literature regarding the relation between abuse and the two factors of the PCL:SV. Some studies find no statistically predictive relation between abuse and the development of psychopathy (Campbell et al., 2004; and Lang et al., 2002), while others find that early life abuse is predictive of developing psychopathy (Marshall & Cooke, 1999; and Wieler & Widom, 1996). When examining the relation between abuse and the factor structure of psychopathy, abuse was found predictive of the behavioral traits, but not personality traits (Poythress et al., 2006). The review of the developmental literature on criminal and aggressive behavior indicates that individuals with histories of abuse are more likely to engage in criminal and aggressive behavior as adults. Therefore, it is hypothesized that abuse will be statistically predictive of Factor 2 of the PCL:SV.

**Hypothesis #5**
• There is very little research examining the relation between parental antisocial behavior and psychopathy. The available research indicates that parental antisocial behavior is a risk factor for criminal and violent behavior later in life. Therefore, it is hypothesized that parental antisocial behavior will be statistically predictive of Factor 2 of the PCL:SV.

**Hypothesis #6**

• Although there remains significant debate as to the underlying factor structure of the PCL—measures the one-factor, two-factor, and three-factor models (Cooke & Michie, 2001) will be used in a separate analysis in order to determine the predictive value of abuse and parental antisocial behavior in the development of the personality traits of psychopathy. The one-factor model provides an overall psychopathy value, while the two-factor model separates personality traits from antisocial behavior. The three-factor model does not include behavioral items, but includes three separate factors or character traits. The results from this analysis will enhance our understanding of any causal relationship between abuse and parental antisocial behavior in the development of the personality traits associated with psychopathy. No a priori hypotheses will be made regarding this analysis.

In SEM, hypotheses are written in the form of diagrams with observed variables taking the form of rectangles and latent variables taking the form of circles (Schumacker & Lomax, 2004). Below is the general hypothesized model:

*Figure 1: Hypothesized Model*
Five fit indices will be used to assess the model fit including the following:

1. Chi-Square: The Chi-Square ($\chi^2$) value evaluates whether the observed and implied (estimated) variance-covariance matrices differ. The $\chi^2$ statistic tests model fit. In samples over 200 the $\chi^2$ statistic is likely to be significant and therefore not a good measure of model fit for large samples (Schumacker & Lomax, 2004).

2. Goodness of Fit Index: The Goodness of Fit Index (GFI) also tests model fit, and is “based on the ratio of the sum of the squared differences between the observed
and reproduced matrices to the observed variance” (p. 101, Schumacker & Lomax, 2004). A GFI over .90 is recommended.

3. **Comparative Fit Index:** The Comparative Fit Index (CFI) compares the fit of the independent model with the proposed model (Schumacker & Lomax, 2004). A CFI over .90 indicated good fit.

4. **Incremental Index of Fit:** The Incremental Index of Fit (IFI) takes into account issues of parsimony and sample size, and incorporates the degrees of freedom into the statistic. An IFI over .90 is indicative of good fit of the model taking into account changes in degrees of freedom from comparison models (Byrne, 2001).

5. **Root Mean Square Error of Approximation:** The Root Mean Square Error of Approximation (RMSEA) accounts for the error of approximation in the population and compares the model with the fit of the population covariance matrix if it were available (Byrne, 2001). A RMSEA of .08 or below indicates acceptable fit, and under .05 indicates good fit (Byrne, 2001).
Chapter III

Results

Sample

Of the original 1,136 subjects in the sample, the PCL:SV was completed for 871 subjects. Of the variables used in this dissertation there was missing data for 425 subjects. The final dataset includes 446 subject for which all data was available. Of the 446 subjects in the final sample, 273 were male (61.2%) and 173 were female (38.8%). Regarding race, 335 (75.1%) were Caucasian and 111 (24.9%) were African-American. The majority of subjects were not married (57.2%). The average age of subjects was 30.27 (SD=6.26). The mean PCL:SV score in this sample was 7.84 (SD=5.46). The average Factor 1 score was 2.81 (SD=2.96) and the average Factor 2 score was 5.03 (SD=3.23). The average WAIS-R score was 37.49 (SD=16.35).

Test for Non-Response Bias

Analyses were conducted to determine whether there were significant differences between those included in the final sample (n=446) and those in the original sample (n=1,136) regarding age, gender, race, socioeconomic status and marital status.

To determine whether there were significant differences in gender, race and marital status $\chi^2$ statistics were computed. Results are presented in the following tables:

Table 4: Gender

<table>
<thead>
<tr>
<th></th>
<th>Final dataset</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>296</td>
<td>174</td>
<td>469</td>
</tr>
<tr>
<td>% within final dataset</td>
<td>42.9%</td>
<td>39.0%</td>
<td>41.3%</td>
</tr>
<tr>
<td>Male</td>
<td>394</td>
<td>272</td>
<td>668</td>
</tr>
</tbody>
</table>
% within final dataset & 57.1% & 61.0% & 58.7% \\
\hline
| Total | n     & 690 & 446 & 1136 \\
| % within final dataset & 100% & 100% & 100% \\

Note: \( X^2 (1) = 1.887, p = .170 \)

**Table 5: Race**

|                 | Final dataset | Total | \\
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Caucasian</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>450</td>
<td>335</td>
</tr>
<tr>
<td>% within final dataset &amp; 62.2% &amp; 75.1% &amp; 69.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>African-American</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>240</td>
<td>111</td>
</tr>
<tr>
<td>% within final dataset &amp; 34.8% &amp; 24.9% &amp; 30.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>690</td>
<td>446</td>
</tr>
<tr>
<td>% within final dataset &amp; 100% &amp; 100% &amp; 100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: \( X^2 (1) = 12.42, p < .001 \)

**Table 6: Marital Status**

|                 | Final dataset | Total | \\
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Never Married</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>396</td>
<td>255</td>
</tr>
<tr>
<td>% within final dataset &amp; 57.5% &amp; 57.2% &amp; 57.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Married</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>293</td>
<td>191</td>
</tr>
<tr>
<td>% within final dataset &amp; 42.5% &amp; 42.8% &amp; 42.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>689</td>
<td>446</td>
</tr>
<tr>
<td>% within final dataset &amp; 100% &amp; 100% &amp; 100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: \( X^2 (1) = 0.01, p = .921 \)
These results indicate that there were no differences between subjects included in the final sample when compared with subjects that were excluded in terms of gender and marital status. Significant differences were found for race. However, the difference seems to be small as 75.1% of subjects that were included in the final sample were white compared with 65.2% of subjects in the original sample.

To determine whether there were differences between subjects in the final sample and those in the original sample in terms of socioeconomic status (SES) and age $t$-tests were conducted.

Results are presented in the following table:

Table 7: Socioeconomic Status and Age

<table>
<thead>
<tr>
<th></th>
<th>Final Dataset</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>S.E. of Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socioeconomic Status</td>
<td>No</td>
<td>442</td>
<td>65.50</td>
<td>12.16</td>
<td>.58</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>397</td>
<td>63.26</td>
<td>13.10</td>
<td>.66</td>
</tr>
<tr>
<td>Age</td>
<td>No</td>
<td>690</td>
<td>29.39</td>
<td>6.20</td>
<td>.24</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>446</td>
<td>30.27</td>
<td>6.26</td>
<td>.30</td>
</tr>
</tbody>
</table>

Socioeconomic Status: $t(837) = 2.57, p = .01$
Age: $t(1134) = 2.34, p = .02$

The differences in socioeconomic status and age were significant at the .05 level. However, as can be seen from the descriptive statistics for both groups, the differences seems to be small enough that they can be considered not significant for practical purposes.

**Variables**

In the dataset there were 12 variables measuring physical abuse, 8 variables measuring parental antisocial behavior, and 1 variable measuring cognitive ability. The following section will review the univariate statistics for these variables and any
necessary transformations required to ensure normal distributions of these variables. The following sections also provide results of the EFA, CFA, and SEM. EFA was performed separately on two groups of variables: (1) Abuse and (2) Parental Antisocial Behavior in order to reduce the number of variables to be used in the Structural Equation Model (SEM).

Abuse Variables

Univariate Statistics

The following table lists the univariate data for the 12 observed variables measuring abuse:

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beat as a child</td>
<td>1.65</td>
<td>1.82</td>
<td>0.46</td>
<td>-1.37</td>
</tr>
<tr>
<td>Beat with hard object as a child</td>
<td>0.93</td>
<td>1.55</td>
<td>1.32</td>
<td>0.23</td>
</tr>
<tr>
<td>Beat with a belt as a child</td>
<td>2.05</td>
<td>1.72</td>
<td>-0.26</td>
<td>-1.45</td>
</tr>
<tr>
<td>Injured with a weapon as a child</td>
<td>0.08</td>
<td>0.51</td>
<td>7.95</td>
<td>67.6</td>
</tr>
<tr>
<td>Beat and required to see a doctor as a child</td>
<td>0.33</td>
<td>0.95</td>
<td>3.15</td>
<td>9.43</td>
</tr>
<tr>
<td>Beat and required hospitalization as a child</td>
<td>0.09</td>
<td>0.48</td>
<td>7.04</td>
<td>55.0</td>
</tr>
<tr>
<td>Beat as a teen</td>
<td>1.06</td>
<td>1.54</td>
<td>1.12</td>
<td>-0.20</td>
</tr>
<tr>
<td>Beat with hard object as a teen</td>
<td>0.44</td>
<td>1.29</td>
<td>2.28</td>
<td>3.92</td>
</tr>
<tr>
<td>Beat with a belt as a teen</td>
<td>0.94</td>
<td>1.52</td>
<td>1.26</td>
<td>0.09</td>
</tr>
</tbody>
</table>
Injured with a weapon as a teen  
Beat and required to see a doctor as a teen  
Beat and required hospitalization as a teen  
Note: n=446

Due to the non-normal skew and kurtosis of some of the variables statistical transformations were conducted. Attempts were made to use the square root of the variables in order to get a more normal distribution. This was successful for one of the variables, but six variables remained non-normal after attempts to use the square root, cube root, and log of these variables. Exploratory factor analysis was conducted using the 6 variables that were normally distributed. Table 9 includes the item that was successfully transformed using the square root. Items that were not successfully transformed through these methods were dropped from further analysis. Two of these variables were transformed into dichotomous variables and entered into the final SEM. The rationale for the inclusion of these two variables will be discussed below.

Table 9: Univariate Statistics with Data Transformations

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sqrt Beat with hard object as a teen</td>
<td>0.31</td>
<td>.067</td>
<td>1.89</td>
<td>1.88</td>
</tr>
</tbody>
</table>

Note: n=446

Measurement Model

Abuse Variables

Exploratory Factor Analysis

A principal-components analysis with Varimax rotation was used to extract underlying factors. No criterion was set to determine the number of factors to be
extracted. Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was analyzed. A KMO over 0.6 is recommended for acceptable factor analysis (Tabachnick & Fidell, 2001). Bartlett’s Test of Sphericity was used to test the significance of the factor structure (Tabachnick & Fidell, 2001). The second step is factor extraction. At this step the fit of the data is evaluated (Norusis, 1990). The principal component method was used to extract factors in the EFA. The principal component method “assumes that all measurement error is random and that error of variance in one item is not shared with error variance in other items in the analysis” (p. 350; Polit, 1996). The third step in EFA is factor rotation. The goal of factor rotation is to provide more interpretable results (Norusis, 1990). Factor rotation does not mathematically improve the factor solution, but rather provides a more useful way of interpreting the results as the factor matrix is difficult to interpret (Polit, 1996). In this analysis varimax rotation was used. Varimax rotation maximizes the variance of the loadings within factors, and “minimizes the number of variables that have high loadings on a factor, which facilitates interpretation of the factors” (p. 357; Polit, 1996). If individual items do not load onto theoretically based factors they will be dropped from the model.

Of the 12 variables measuring physical abuse in the dataset 6 met criteria for normality. These variables were measured on a 6 point Likert-scale as follows: 0= never; 1= once; 2= twice; 3= sometimes; 4= frequently; 5= most of the time. Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was 0.772. Bartlett’s Test of Sphericity was significant (\(X^2\) (15) = 1230.94, \(p < .001\)). All items loaded onto one factor which accounted for 58.14% of the total variance among these variables. All factor loadings
were between 0.651 and 0.836. Cronbach’s alpha was 0.84 for these 6 items indicating good internal reliability. Table 10 illustrates the factor loadings.

Table 10: Component Matrix

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beat as a child</td>
<td>.770</td>
</tr>
<tr>
<td>Beat with hard object as a child</td>
<td>.779</td>
</tr>
<tr>
<td>Beat with a belt as a child</td>
<td>.651</td>
</tr>
<tr>
<td>Beat as a teen</td>
<td>.836</td>
</tr>
<tr>
<td>Beat with hard object as a teen</td>
<td>.782</td>
</tr>
<tr>
<td>Beat with a belt as a teen</td>
<td>.771</td>
</tr>
</tbody>
</table>

Note: Extraction Method: Principal Component Analysis
No rotation was necessary as there was a 1 factor solution

Confirmatory Factor Analysis

Based on the results from the EFA, the following factor structure was tested using Confirmatory Factor Analysis (CFA):

Figure 2: Confirmatory Factor Analysis of Abuse Variables (n=446)
Five fit indices were used to assess model fit including: (1) Chi-Square; (2) Goodness of Fit Index; (3) Comparative Fit Index; (4) Incremental Index of Fit; and (5) Root Mean Square Error of Approximation.

The Chi-Square value evaluates whether the observed and implied (estimated) variance-covariance matrices differ. The Chi-Square ($\chi^2$) statistic tests model fit. In samples over 200 the $\chi^2$ statistic is likely to be significant and therefore not a good measure of model fit for large samples (Schumacker & Lomax, 2004). The Goodness of Fit Index (GFI) also tests model fit, and is “based on the ratio of the sum of the squared differences between the observed and reproduced matrices to the observed variance” (p. 101, Schumacker & Lomax, 2004). A GFI over .90 is recommended. The Comparative Fit Index (CFI) compares the fit of the independent model with the proposed model (Schumacker & Lomax, 2004). A CFI over .90 indicated good fit. The Incremental Index of Fit (IFI) is not dependent on sample size and incorporates the degrees of freedom into the statistic. An IFI over .90 is indicative of good fit of the model (Byrne, 2001). The Root Mean Square Error of Approximation (RMSEA) accounts for the error of approximation in the population and compares the model with the fit of the population covariance matrix if it were available (Byrne, 2001). A RMSEA of .08 or below indicates acceptable fit, and under .05 indicates good fit (Byrne, 2001).

The following fit indices were obtained:

**Model 1**

$\chi^2 (9) = 191.01, p < .001$

Goodness of Fit Index (GFI) = .89

Comparative Fit Index (CFI) = .85
Incremental Index of Fit (IFI) = .85

Root Mean Square Error of Approximation (RMSEA) = .21

In this case, the model fit was not acceptable as indicated by the fit indices (in particular, the GFI, CFI, and IFI were below the recommended cutoff of .90 and the RMSEA was well above its standard cut-off value of .08). An inspection of the modification indices suggested that the fit of the model would improve by allowing several of the error terms to have a covariance different from zero. These covariances have an obvious rationale behind them as all variables measure types of abuse at varying levels during childhood and adolescence. For example, e1 is the error term for having been hit as a child. This error term covaries with several other error terms of childhood and adolescent physical abuse. Also, other types of physical abuse in childhood covary with later physical abuse in adolescence. The covariances of the error terms are as follows:

- e1 and e3 (hit as a child and hit with a belt as a child)
- e2 and e5 (hit with something hard as a child and hit with something hard as a teen)
- e3 and e6 (hit with a belt as a child and hit a belt as a teen)
- e1 and e5 (hit as a child and hit with something hard as a teen)
- e1 and e6 (hit as a child and hit with a belt as a teen)

By allowing these covariances to be different from zero, the fit indices become acceptable. Moreover, the fit of this model is significantly better than the previous one as indicated by the improvement in the fit indices and the difference in the $X^2$ statistic.

*Model 2 (allowing covariances)*

$X^2 (4) = 14.231, p = .007$
GFI = .99
CFI = .99
IFI = .99
RMSEA = .076

\[ \text{Diff}(\chi^2)(5) = 176.779, \ p < .001 \]

Table 11 illustrates the final version of the measurement model for Abuse including standardized regression weights ($\beta$):

Table 11: Confirmatory Factor Analysis for Abuse Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Estimate</th>
<th>$\beta$</th>
<th>S.E.</th>
<th>C.R.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beat as a child</td>
<td>1.43</td>
<td>.79</td>
<td>.084</td>
<td>17.05</td>
</tr>
<tr>
<td>Beat with hard object as a child</td>
<td>1.00</td>
<td>.65</td>
<td>.069</td>
<td>14.40</td>
</tr>
<tr>
<td>Beat with a belt as a child</td>
<td>0.81</td>
<td>.47</td>
<td>.087</td>
<td>9.30</td>
</tr>
<tr>
<td>Beat as a teen</td>
<td>1.28</td>
<td>.83</td>
<td>.065</td>
<td>19.86</td>
</tr>
<tr>
<td>Beat with hard object as a teen</td>
<td>0.49</td>
<td>.72</td>
<td>.030</td>
<td>16.15</td>
</tr>
<tr>
<td>Beat with a belt as a teen</td>
<td>1.11</td>
<td>.74</td>
<td>.068</td>
<td>16.53</td>
</tr>
</tbody>
</table>

Note: n=446
p<.0001 for all items

All items had significant loadings on their corresponding factors as expected in the proposed model, and the factor loadings were moderate to high (standardized regression weights ranged from .47 to .83).

This one factor solution provides a measure of physical abuse during childhood and adolescence. The following figure illustrates the standardized regression weights in the confirmatory factor analysis:

*Figure 3: Confirmatory Factor Analysis of Abuse Variables with Standardized Regression Weights (n=446)*
As four variables were not included in this analysis due to the non-normal distribution it was decided to transform two of these variables into dichotomous variables to be used in the final SEM. The main purpose of this dissertation is to determine if particular early life experiences, such as abuse, are predictive of psychopathy in adulthood. Therefore, these two variables, which measure severe abuse resulting in the need for hospitalization, will be included in the SEM. Correlations between variables that were dropped from the initial analysis range from low to high, although all were significant at the .001 level. Due to the significant correlations between these variables, the low frequency of this group of variables in this sample, and difficulty in transforming these variables to achieve normal distributions, two variables that were not used in the EFA and CFA were chosen to measure the construct of severe physical abuse in childhood and adolescence. The two items that were selected to measure severe abuse in
the final model were chosen are they are indicative of the most severe type of physical abuse measured in this study, physical abuse that required admission to a hospital. By dropping the other variables the model is more parsimonious while maintaining a measure of severe physical abuse. Table 12 lists the correlations between the severe abuse variables. Table 13 lists the prevalence of the 12 abuse variables in this sample.

**Table 12 Correlation Coefficients Among Severe Abuse Variables**

| Injure with weapon as child | 1.00 |
| Beat and needed to see a doctor as a child | 0.36* 1.00 |
| Beat admitted to hosp as child | 0.29* 0.51* 1.00 |
| Injure with weapon as a teen | 0.73* 0.22* 0.28* 1.00 |
| Beat and needed to see a doctor as a teen | 0.29* 0.62* 0.42* 0.21* 1.00 |
| Beat and admitted to a hospital as a teen | 0.32* 0.35* 0.66* 0.40* 0.51* |

Note: n = 446
* indicates $p < 0.001$

**Table 13 Percentages of abuse variables**

| Beat as a child | 49.6% | 50.4% |
| Beat with hard object as a child | 70.2% | 29.8% |
| Beat with a belt as a child | 35.7% | 64.3% |
| Injure with weapon as child | 96.2% | 3.8% |
| Beat and needed to see a doctor as a child | 86.3% | 13.7% |
| Beat admitted to hosp as child | 95.5% | 4.5% |
| Beat as a teen | 61.9% | 38.1% |
| Beat with hard object as a teen | 81.8% | 18.2% |
| Beat with a belt as a teen | 68.8% | 31.2% |
| Injure with weapon as a teen | 97.5% | 2.5% |
| Beat and needed to see a doctor as a teen | 90.8% | 9.2% |
| Beat and admitted to a hospital as a teen | 98% | 2% |

Note: n = 446

*Parental Antisocial Variables*

*Exploratory Factor Analysis*
There were 8 variables measuring parental antisocial behavior in the database.

The following table lists the univariate statistics for these variables:

Table 14: Univariate Statistics

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents Hit Each Other</td>
<td>1.07</td>
<td>1.63</td>
<td>1.12</td>
<td>-0.27</td>
</tr>
<tr>
<td>Parents Have Physical Fights Outside the Home</td>
<td>0.54</td>
<td>1.16</td>
<td>2.11</td>
<td>3.39</td>
</tr>
<tr>
<td>Biological Mother’s Arrest History</td>
<td>0.18</td>
<td>0.73</td>
<td>5.48</td>
<td>33.83</td>
</tr>
<tr>
<td>Biological Father’s Arrest History</td>
<td>0.72</td>
<td>1.57</td>
<td>2.38</td>
<td>4.55</td>
</tr>
<tr>
<td>Biological Mother’s Alcohol Abuse History</td>
<td>1.11</td>
<td>2.14</td>
<td>1.58</td>
<td>0.681</td>
</tr>
<tr>
<td>Biological Father’s Alcohol Abuse History</td>
<td>2.57</td>
<td>2.80</td>
<td>0.282</td>
<td>-1.84</td>
</tr>
<tr>
<td>Biological Mother’s Drug Abuse History</td>
<td>0.32</td>
<td>1.20</td>
<td>3.98</td>
<td>14.79</td>
</tr>
<tr>
<td>Biological Father’s Drug Abuse History</td>
<td>0.46</td>
<td>1.37</td>
<td>3.27</td>
<td>9.63</td>
</tr>
</tbody>
</table>

Note: n=446

Due to the non-normal skew and kurtosis of some of the variables transformations were conducted. Attempts were made to use the square root of the variables in order to get a more normal distribution. This was successful for some of the variables, but three variables remained non-normal after attempts to use the square root, cube root, and log of these variables. Table 15 lists the univariate data of the two items that were successfully transformed using the square root. Items that were not successfully transformed through these methods were dropped from further analysis.

Table 15: Univariate Statistics with Data Transformations
As described above with the Abuse Variables, principal-components analysis with varimax rotation was used to extract underlying factors. No criterion was set to determine the number of factors to be extracted. Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was 0.663. Bartlett’s Test of Sphericity was significant ($\chi^2_{(10)} = 245.234, p < .001$). One factor was extracted accounting for 39.5% of total variance.

Table 16: Component Matrix

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents Hit Each Other</td>
<td>.588</td>
</tr>
<tr>
<td>Parents Had Fights Outside the Home</td>
<td>.626</td>
</tr>
<tr>
<td>Biological Mother’s Alcohol Abuse History</td>
<td>.516</td>
</tr>
<tr>
<td>Biological Father’s Alcohol Abuse History</td>
<td>.706</td>
</tr>
<tr>
<td>Biological Father’s Arrest History</td>
<td>.698</td>
</tr>
</tbody>
</table>

Note: Extraction Method: Principal Component Analysis
No rotation was necessary as there was a 1 factor solution

Factor loadings were between .516 and .706. Cronbach’s Alpha for these 5 variables was 0.51.

Due to the very low reliability coefficient of these items it was decided to use two observed variables to measure father’s antisocial behavior as opposed to the construct of parental antisocial behavior. These items measure the subject’s biological father’s arrest history and history of alcohol abuse. These variables were measured on a 7-point Likert Scale. The variable measuring biological father’s arrest history was positively skewed so
this variable was transformed using the square root. The following are the univariate
statistics for these two variables:

Table 17: Biological Father’s Antisocial Behavior Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Father’s Alcohol History</td>
<td>2.57</td>
<td>2.80</td>
<td>0.28</td>
<td>-1.84</td>
</tr>
<tr>
<td>Sqrt Biological Father’s Arrest History</td>
<td>.41</td>
<td>.75</td>
<td>1.61</td>
<td>1.24</td>
</tr>
</tbody>
</table>

Note: n=446

Cognitive Ability

Intelligence was measured by the Vocabulary subset of the Wechsler Adult
Intelligence Scale—Revised (WAIS-R; Wechsler, 1981). The Vocabulary subtest of the
WAIS-R is a test of word knowledge and semantic memory, and is highly correlated with
Full Scale IQ (Kaufman, 1990). This scale consists of 35 words that are read to the
subject and the subject is asked to define the word correctly. Each word is scored as 0, 1,
or 2. A score of 0 indicates no understanding of the word, 1 indicates some
understanding, and 2 indicates good understanding. The maximum score for this scale is
70. Scores on the Vocabulary subscale are reported as scaled scores in the WAIS-R
manual (Wechsler, 1981). Based on the normative data, conversions of these scaled
scores the average score on the vocabulary subscale is 49 with a standard deviation of
approximately 20. Compared with this normative data, the mean WAIS-R vocabulary
score for this sample was in the 25th percentile (0.67 standard deviations below the
normative mean).

The WAIS-R Vocabulary subscale has been found comparable to other measures
of adult intelligence (Uttl, 2002). The vocabulary subscale is highly correlated with the
full scale score on the WAIS-R, \( r = 0.81 \). The following are the univariate statistics for the WAIS-R Vocabulary Subscale in this sample:

Table 18: Univariate statistics WAIS-R Vocabulary Subscale

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAIS-R Vocabulary</td>
<td>37.49</td>
<td>16.35</td>
<td>-0.21</td>
<td>-0.088</td>
</tr>
<tr>
<td>Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: \( n=446 \)

*Structural Model*

Structural Equation Modeling was used to examine whether the constructs of Abuse, Severe Abuse, Biological Father’s Arrest History, Biological Father’s Alcohol Abuse History, and Cognitive Ability were predictive of psychopathy in this sample of psychiatric patients. This mixed measurement and path model is recursive and identified with one latent variable and three observed variables. This model includes two latent exogenous variables and 3 observed exogenous variables. The two latent exogenous variables include: (1) moderate physical abuse and (2) severe abuse. Six observed variables make up the latent variable moderate physical abuse which were discussed in the exploratory and confirmatory factor analysis above. The two observed variables measuring the construct of severe abuse are dichotomous items that assess whether the individual was physically abused in childhood or adolescence to the point they were hospitalized for injury. The three observed exogenous variables were also described earlier and include: (1) biological father’s alcohol abuse history; (2) biological father’s arrest history; and (3) cognitive ability.

A one-factor version of the PCL:SV was used in which all 12 items of the PCL:SV loaded onto one construct. A maximum likelihood estimation procedure was
employed. When using the maximum likelihood estimation with non-normal or
dichotomous data the literature indicates that this method will underestimate the fit of a
model (Jöreskog & Sörbom, 1996; Skrondal & Rabe-Hesketh, 2005; Song & Lee, 2006).
This method was chosen to analyze the current structural equation model over other
estimation procedures due to the size of the sample and the number of variables used, as
other methods would not be appropriate (Jöreskog & Sörbom, 1996; Skrondal & Rabe-
Hesketh, 2005; Song & Lee, 2006). Generalized least squares and weighted least squares
are recommended for very large samples of 2000 or more (Olsson, Foss, Troye, &
Howell, 2000). When comparing various methods based on sample size, specification
error, and multivariate normality, Olsson and colleagues concluded that maximum
likelihood estimation, “tends in general not only to be more stable, but also demonstrates
higher accuracy in terms of empirical and theoretical fit compared to the other
estimators.” (p. 578, Olsson, Foss, Troye, & Howell, 2000). Figure 4 illustrates the
hypothesized Structural Equation Model.

Figure 4: Hypothesized Structural Equation Model
The following model was evaluated using AMOS 8 statistical software:

*Figure 5: Structural Equation Model: Mixed Measurement and Path Model Demonstrating Selected Factors Predicting Psychopathy (n=446)*
Five fit indices were used to assess the fit of the model, and were explained above in the CFA section.

The following fit indices were obtained:

(Note: arrows for the covariances among factors are not shown for illustrative clarity)
Model 1

$X^2 (213) = 909.616, p < .001$

GFI = .84

CFI = .84

IFI = .84

RMSEA = .08

The model fit was not acceptable given the relatively low values of GFI, CFI, and IFI. An inspection of the modification indices suggested that the fit of the model would improve by allowing several of the error terms related to the PCL:SV instrument to have a covariance different from zero. Research on the PCL:SV finds that the items below are correlated (Hart, Cox, & Hare, 1995). The following error terms were found to have covariance different from zero:

- e9 and e10 (Items 1 and 2 of the PCL:SV; superficial and grandiose)
- e9 and e11 (Items 1 and 3 of the PCL:SV; superficial and deceitful)
- e12 and e13 (Items 4 and 5 of the PCL:SV; lacks remorse and lacks empathy)
- e17 and e18 (Items 9 and 10 of the PCL:SV; lacks goals and irresponsible)
- e19 and e20 (Items 11 and 12 of the PCL:SV; adolescent antisocial behavior and adult antisocial behavior)

These covariances are theoretically sound based on prior research on the PCL:SV (Hart, Cox, & Hare, 1995). Specifically, a study of the factor structure of the PCL:SV found items 1, 2, and 3 are highly correlated as well as items 4 and 5, and items 9 and 10 (Skeem, Mulvey, & Grisso, 2003). Items 11 and 12 (antisocial behavior in adolescence and adult antisocial behavior) have been shown to correlate in several studies (e.g., Hart,
Cox, & Hare, 1995; Hare, 2003). By allowing these covariances to be different from zero, as found in previous research, the fit indices become acceptable with a GFI, CFI, and IFI over .90 and a significantly improved $X^2$ statistic.

*Model 2 (allowing covariances)*

$X^2 (208) = 500.230, p < .001$

GFI = .90

CFI = .92

IFI = .92

RMSEA = .05

Diff ($X^2$) (5) = 409.386, p < .001

The following figure and table illustrates the final version of the structural model:

*Figure 6: Structural Equation Model: Mixed Measurement and Path Model Demonstrating Selected Factors Predicting Psychopathy with Covariance of Error Terms (n=446)*
(Note: arrows for the covariances among factors are not shown for illustrative clarity)

Table 19: Structural Equation Model

<table>
<thead>
<tr>
<th>Item</th>
<th>Estimate</th>
<th>β</th>
<th>S.E.</th>
<th>C.R.</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Abuse</td>
<td>-0.02</td>
<td>-0.02</td>
<td>.064</td>
<td>-0.34</td>
<td>.734</td>
</tr>
</tbody>
</table>
All of the item loadings on their respective factors were positive and significantly different from zero. Four of the five predictor variables were statistically significant at the 0.05 level. These were Severe Abuse ($\beta = 0.17, p = .043$), Cognitive Ability ($\beta = -0.18, p < .001$), Biological Father’s Arrest History ($\beta = 0.13, p = .02$), and Biological Father’s Alcohol Abuse History ($\beta = .16, p = .004$). Higher levels of severe abuse, biological father’s arrest history, and biological father’s alcohol abuse history were associated with higher levels of psychopathy. Higher levels of cognitive ability were associated with lower levels of psychopathy. It should be noted that the effects of these factors were relatively small. An inspection of the squared multiple correlations suggest that the predictor variables used in this model explain 16.3% of the variability in psychopathy (PCL:SV).

*Figure 7: Final Structural Equation Model with Standardized Regression Weights*

*(n=446)*
Psychosocial Precursors of Psychopathy in a Psychiatric Sample

Physical Abuse → Cognitive Ability

Severe Abuse → Psychopathy

Biological Father’s Alcohol Abuse History → Psychopathy

Biological Father’s Arrest History → Psychopathy

Cognitive Ability → Psychopathy

Physical Abuse

Severe Abuse

Biological Father’s Alcohol Abuse History

Biological Father’s Arrest History

Cognitive Ability

Psychopathy

Correlation Coefficients:

Physical Abuse: -0.02
Severe Abuse: 0.17
Biological Father’s Alcohol Abuse History: 0.13
Biological Father’s Arrest History: -0.18
Cognitive Ability: 0.16
2-factor and 3-factor Models of Psychopathy

The analysis was re-run using the 2-factor (Hart, Cox, & Hare, 1995) and 3-factor (Cooke & Michie, 2001) models found in previous research on the PCL:SV. However, the results were unsatisfactory. The fit indices were found to be well below acceptable cutoffs. The path estimates had extremely high standard errors, which caused all of the relationships between the moderate physical abuse, severe abuse, biological bather’s arrest history, biological father’s alcohol abuse history, cognitive ability and the PCL:SV to be nonsignificant. Therefore, the model with a 1-factor structure for psychopathy was the most adequate.

Research on the PCL-measures has struggled to find a conclusive factor structure. Recent studies support a “superordinate” 1-factor structure (Hare, 2003). Hare concluded, “the presence of a superordinate factor structure is demonstrated in several studies using multiple measures, including Cronbach’s alpha, inter-item correlations, and item-total correlations…Additionally, General Factor Saturation estimates from different investigations strongly support a Total psychopathy score.” (p. 85; Hare, 2003). These results are consistent with the 1-factor structure used in this dissertation.

Post Hoc Analyses

To determine whether psychosocial precursors affect the development of psychopathy differently across gender and race post hoc analysis were conducted separately by gender and race. The model found in the previous section was run separately for the following four groups: (1) female subjects (black and white); (2) male subjects (black and white); (3) black subjects (male and female); and (4) male subjects
(black and white). Results of each analysis will be discussed separately below.

Conclusions based on these results will be presented in the discussion chapter.

**Female Subjects**

For the female subjects the model fit was not fully acceptable. While 3 of the 5 fit indices were acceptable (CFI, IFI, and RMSEA) 2 were not ($\chi^2$ and GFI). As discussed earlier, the chi-square statistic is sensitive to large sample size (Tabachnick & Fidell, 2001); however this analysis used a smaller sample of 174 subjects. Also, the GFI was slightly below the acceptable level of 0.90. In examining the significance levels of the 5 predictor constructs only 1 was significant at the 0.05 level; cognitive ability ($\beta = -0.17$; $p = .044$). As found in analysis of the total sample, cognitive ability was negatively predictive of psychopathy among female subjects. Moderate physical abuse, severe physical abuse, biological father’s arrest history, and biological father’s alcohol abuse history were not predictive of psychopathy among female subjects. This model accounted for 10.5% of total variance.

The following are the fit indices for the female subjects, followed by a table illustrating the relation of each of the predictor variables to psychopathy.

$\chi^2 (208) = 299.614; p < .001$

GFI = .87

CFI = .93

IFI = .94

RMSEA = .05

Table 20: Structural Equation Model Female Subjects

<table>
<thead>
<tr>
<th>Item</th>
<th>Estimate</th>
<th>$\beta$</th>
<th>S.E.</th>
<th>C.R.</th>
<th>$p$</th>
</tr>
</thead>
</table>

Male Subjects

For the male subjects the model fit was similar to that found for female subjects. Three of the 5 fit indices were acceptable (CFI, IFI, and RMSEA), while 2 were not ($X^2$ and GFI). The sample size for male subjects was larger (n=272) than for female subjects (n= 174) which may have affected the chi-square statistic which is sensitive to larger samples (Tabachnick & Fidell, 2001). Again, the GFI was slightly below the acceptable level of 0.90. In examining the significance levels of the 5 predictor variables 3 were significant at the 0.05 level. These include cognitive ability ($\beta = -0.21; p < .001$), biological father’s arrest history ($\beta = 0.19; p = .009$), and biological father’s alcohol abuse history ($\beta = 0.21; p = .002$). As found in analysis of the total sample and the analysis of female subjects, cognitive ability was negatively predictive of psychopathy among male subjects. Moderate physical abuse and severe physical abuse were not predictive of psychopathy among male subjects. This model accounted for 22.7 % of total variance, which is significantly larger than that found for the total sample and for female subjects.

The following are the fit indices for the male subjects, followed by a table illustrating the relation of each of the predictor variables to psychopathy.

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>CFI</th>
<th>IFI</th>
<th>RMSEA</th>
<th>X^2</th>
<th>GFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Abuse</td>
<td>0.01</td>
<td>0.01</td>
<td>0.10</td>
<td>0.07</td>
<td>.941</td>
</tr>
<tr>
<td>Severe Abuse</td>
<td>2.37</td>
<td>0.23</td>
<td>1.65</td>
<td>1.43</td>
<td>.151</td>
</tr>
<tr>
<td>Cognitive Ability</td>
<td>-0.01</td>
<td>-0.17</td>
<td>0.01</td>
<td>-2.01</td>
<td>.044</td>
</tr>
<tr>
<td>Biological Father’s Arrest History</td>
<td>0.08</td>
<td>0.05</td>
<td>0.13</td>
<td>0.60</td>
<td>.552</td>
</tr>
<tr>
<td>Biological Father’s Alcohol History</td>
<td>0.01</td>
<td>0.01</td>
<td>0.04</td>
<td>0.14</td>
<td>.892</td>
</tr>
</tbody>
</table>

Note: $n = 174$
$\chi^2 (208) = 431.696; p < .001$

GFI = .87

CFI = .91

IFI = .91

RMSEA = .05

Table 21: Structural Equation Model Male Subjects

<table>
<thead>
<tr>
<th>Item</th>
<th>Estimate</th>
<th>$\beta$</th>
<th>S.E.</th>
<th>C.R.</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Abuse</td>
<td>0.06</td>
<td>0.06</td>
<td>0.09</td>
<td>0.61</td>
<td>.543</td>
</tr>
<tr>
<td>Severe Abuse</td>
<td>0.40</td>
<td>0.06</td>
<td>0.78</td>
<td>0.51</td>
<td>.616</td>
</tr>
<tr>
<td>Cognitive Ability</td>
<td>-0.02</td>
<td>-0.21</td>
<td>0.00</td>
<td>-3.36</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Biological Father’s Arrest History</td>
<td>0.26</td>
<td>0.19</td>
<td>0.11</td>
<td>2.62</td>
<td>.009</td>
</tr>
<tr>
<td>Biological Father’s Alcohol Abuse History</td>
<td>0.09</td>
<td>0.21</td>
<td>0.03</td>
<td>3.09</td>
<td>.002</td>
</tr>
</tbody>
</table>

Note: $n = 272$

Black Subjects

For the black subjects (male and female) the model fit was poorer than for male and female subjects. Only 2 of the 5 fit indices were acceptable (IFI, and RMSEA), while 3 were not ($\chi^2$, CFI, and GFI). The sample size for black subjects was smaller ($n=111$) than for male or female subjects. In examining the significance levels of the 5 predictor constructs only 1 was significant at the 0.05 level; biological father’s alcohol abuse history ($\beta = 0.29; p = .014$). Based on the poor model fit it is concluded that this model is not applicable to black and white subjects equally. Conclusions regarding this finding will be reviewed in the discussion chapter.
The following are the fit indices for the male subjects, followed by a table illustrating the relation of each of the predictor variables to psychopathy.

\[ \chi^2 (208) = 312.1; p < .001 \]

GFI = .81
CFI = .89
IFI = .90
RMSEA = .07

Table 22: Structural Equation Model Black Subjects

<table>
<thead>
<tr>
<th>Item</th>
<th>Estimate</th>
<th>(\beta)</th>
<th>S.E.</th>
<th>C.R.</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Abuse</td>
<td>0.04</td>
<td>0.05</td>
<td>0.15</td>
<td>0.27</td>
<td>.784</td>
</tr>
<tr>
<td>Severe Abuse</td>
<td>0.43</td>
<td>0.09</td>
<td>0.96</td>
<td>0.44</td>
<td>.659</td>
</tr>
<tr>
<td>Cognitive Ability</td>
<td>-0.01</td>
<td>-0.06</td>
<td>0.01</td>
<td>-0.63</td>
<td>.531</td>
</tr>
<tr>
<td>Biological Father’s Arrest History</td>
<td>-0.02</td>
<td>-0.01</td>
<td>0.14</td>
<td>-0.01</td>
<td>.917</td>
</tr>
<tr>
<td>Biological Father’s Alcohol Abuse History</td>
<td>0.11</td>
<td>0.29</td>
<td>0.05</td>
<td>2.46</td>
<td>.014</td>
</tr>
</tbody>
</table>

Note: \( n = 111 \)

White Subjects

For the white subjects (male and female) the model fit was better than for the other post hoc analyses. Three the 5 fit indices were acceptable (CFI, IFI, and RMSEA), while 2 were not (\(\chi^2\), and GFI). The sample size for white subjects was larger than for other post hoc analyses (\( n = 335 \)), which may have contributed to the significant chi-square which is sensitive to larger samples (Tabachnick & Fidell, 2001). The GFI of .89 was slightly below the recommended cutoff of .90. In examining the significance levels of the 5 predictor constructs 3 were significant at the 0.05 level and similar to the model
found for the total sample. The three constructs that were statistically predictive of psychopathy were severe abuse ($\beta = 0.18; p = .046$), cognitive ability ($\beta = -0.16; p = .007$), and biological father’s arrest history ($\beta = 0.18; p = .006$). The significance level of biological father’s alcohol abuse history was slightly higher than .05. Moderate physical abuse was not statistically predictive of psychopathy for white subjects, as was found in all other analyses in this study. This model accounted for 16.3% of the total variance.

The following are the fit indices for the male subjects, followed by a table illustrating the relation of each of the predictor variables to psychopathy.

$$X^2 (208) = 440.279; p < .001$$

GFI = .89

CFI = .92

IFI = .92

RMSEA = .06

Table 23: Structural Equation Model White Subjects

<table>
<thead>
<tr>
<th>Item</th>
<th>Estimate</th>
<th>$\beta$</th>
<th>S.E.</th>
<th>C.R.</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Abuse</td>
<td>-0.02</td>
<td>-0.02</td>
<td>.07</td>
<td>-0.26</td>
<td>.797</td>
</tr>
<tr>
<td>Severe Abuse</td>
<td>1.71</td>
<td>0.18</td>
<td>0.86</td>
<td>2.00</td>
<td>.046</td>
</tr>
<tr>
<td>Cognitive Ability</td>
<td>-0.01</td>
<td>-0.16</td>
<td>0.01</td>
<td>-2.70</td>
<td>.007</td>
</tr>
<tr>
<td>Biological Father’s Arrest History</td>
<td>0.28</td>
<td>0.18</td>
<td>0.10</td>
<td>2.76</td>
<td>.006</td>
</tr>
<tr>
<td>Biological Father’s Alcohol Abuse History</td>
<td>0.04</td>
<td>0.11</td>
<td>0.03</td>
<td>1.75</td>
<td>.079</td>
</tr>
</tbody>
</table>

Note: $n = 335$
Chapter IV
Discussion

The current study builds on the small amount of previous research examining psychosocial predictors and risk factors in the development of psychopathy. The goal of this study was to determine whether certain early life stressors were statistically predictive of psychopathy in adulthood by using structural equation modeling. This goal was achieved, and findings provide insight into some inconsistencies found in previous research. This chapter will review the findings of this dissertation and incorporate findings from previous research into this overall discussion. This discussion will focus on the predictive value of each of the variables used in this dissertation. This chapter will then discuss treatment and intervention strategies for psychopathy and propose interventive strategies based on the findings from this study and available data from this research literature. Finally, the chapter will conclude with a discussion of the strengths and potential limitations of this study, and recommend areas of needed future research.

Since the standardization of tools designed to measure psychopathy, particularly the PCL-measures, there has been an increase in research aimed at uncovering the underlying causes of this particularly concerning personality disorder. The majority of this research has examined biological or brain differences in adults with psychopathic personality traits. Due to differences found in brain functioning between psychopathic and non-psychopathic individuals conclusions have been drawn indicating that this personality disorder is biologically predetermined, but little research has explored the early life experiences of these individuals. Due to the lack of research in this area, and inconsistent findings found in the available research, this dissertation was designed to
measure the impact of physical abuse and other early life stressors in childhood and adolescence to determine whether these factors contribute to the development of psychopathy. To gain a comprehensive understanding of precursors of psychopathy, a biopsychosocial model provides a sound framework. A biopsychosocial model of personality development allows for understanding the contribution of biological, psychological, and environmental variables. Psychopathy has been examined using this model, and findings indicate significant biological, psychological, and environmental or social influences (Paris, 1998). The literature review described the research conducted in these areas. The majority of research to date has focused on biological precursors of psychopathy, but few studies have considered psychosocial risk factors. Due to this gap in the research literature, the selection of psychosocial risk factors used in this study used the biopsychosocial framework with an ecological lens incorporating biological, early life, and environmental issues. This dissertation examined the predictive ability of 5 constructs in the development of psychopathy. Two can be classified as solely environmental in nature; moderate physical abuse and severe physical abuse. The other three share environmental and biological characteristics including biological father’s arrest history, biological father’s alcohol abuse, and cognitive ability. These three constructs can be passed on through genetic predisposition and/or early life environments.

This dissertation used data from the MacArthur Violence Risk Assessment Study. The goal of the original MacArthur study was to examine which factors increase the risk for future violence in psychiatric patients. Large amounts of data were collected to achieve this goal. The PCL:SV was used to measure psychopathy for 871 subjects. After
exploring the data three sets of variables were selected to measure the following constructs: (1) physical abuse; (2) parental antisocial behavior; and (3) cognitive ability. Cases with missing data were excluded from analysis, resulting in a total sample of 446 subjects.

The physical abuse construct initially consisted of 12 items. After examining the normality of these items and conducting exploratory and confirmatory factor analysis, 6 items loading onto one factor were used to measure the latent variable moderate physical abuse in childhood and adolescence. Two other items from the original 12 items were transformed into dichotomous variables and used in the final SEM to measure severe abuse in childhood and adolescence.

The parental antisocial behavior construct initially consisted of 8 variables. After conducting EFA a 1-factor solution was determined which included 5 of these items. Despite the moderate to high factor loadings, the reliability of this measure was found to be poor with a Cronbach’s Alpha of 0.51. Therefore, two items consistent with paternal antisocial behavior, and found predictive of violence and general antisocial behavior in the research literature, were chosen to measure this construct in the final SEM. These two variables were: (1) biological father’s alcohol abuse history; and (2) biological father’s arrest history.

The third construct used in the SEM measures cognitive ability as measured by the Wechsler Adult Intelligence Scale-Revised Vocabulary scale.

*Main Findings*

In this sample 4 of the 5 predictor variables were statistically predictive of psychopathy. Moderate physical abuse was the only predictor variable that was not
found predictive of psychopathy. Severe physical abuse, biological father’s arrest history, biological father’s alcohol abuse history, and cognitive ability were all found predictive of psychopathy. The following sections details the findings of each of the 5 predictor variables used in this study, and reviews these results in the context of findings from previous research.

**Abuse**

Since the validation of the PCL-measures there are only six studies that examine the relation between abuse and the development of psychopathy. Results from these limited studies are inconsistent. The majority are descriptive reports that do not examine the potential causal nature of abuse and later psychopathy. In a sample of juvenile offenders, those who scored higher on a PCL-measure had significantly higher rates of abuse in childhood (Forth & Tobins, 1995). In a community based sample, subjects with histories of childhood abuse and/or neglect had significantly higher PCL scores than subjects in the matched control group. This remained the case after controlling for demographic characteristics and potential confounding variables (Weiler & Widom, 1996). A study comparing 50 male psychopathic offenders and 55 non-psychopathic male offenders found subjects with histories of physical abuse in childhood were more likely to be psychopathic adults (Marshall & Cooke, 1999). Another study using a sample of male and female juvenile offenders found that higher psychopathy scores were associated with a history of physical abuse (Campbell, Porter, & Santor, 2004). Another study using a sample of adult male offenders found that being abused as a child was predictive of psychopathy in adulthood, but abuse exerted no direct or indirect effect on the core interpersonal and affective features of psychopathy (factor 1 of the PCL).
However, abuse was directly related to the behavioral traits of psychopathy such as impulsive and irresponsible lifestyle (factor 2 of the PCL). (Poythress, Skeem, & Lilienfeld, 2006). Despite findings from these limited studies that support a relation between early life abuse and the development of psychopathy some studies do not find any relationship between the two. For example, a longitudinal study found that childhood victimization was not predictive of adult psychopathy (Lang, af Klinteberg, & Alm, 2002) but it was predictive of violence in adulthood.

Unlike previous research, this dissertation differentiated between types of physical abuse and broke this variable into two latent variables: (1) moderate physical abuse and (2) severe physical abuse. This differentiation was based on results of EFA and CFA. Six observed variables made up the construct of physical abuse, and included physical abuse in childhood and adolescence. The latent variable physical abuse was not predictive of psychopathy in adulthood ($\beta = -0.02; p = .734$). However, the latent variable severe physical abuse, as indicated by two dichotomous observed variables, was found predictive of psychopathy ($\beta = 0.17; p = .043$). This study is the first to differentiate between the forms of physical abuse in this way in the study of potential causes of adult psychopathy. Although these results should be interpreted with caution due to the very small group of subjects who experienced this severe form of abuse, this finding indicates that individuals who are severely physically abused are more likely to become psychopathic adults. This finding has significant implications in our understanding of the development of this personality disorder. The disparity in the few studies conducted on this topic may be a function of the way abuse is defined.
Based on this finding, it can be argued that although physical abuse as measured in other research may not be related to the development of psychopathy, severe physical abuse that requires medical intervention increases the risk that the individual will develop psychopathy in adulthood. Previous research has not differentiated between moderate and severe physical abuse, and based on statistical insignificance in some previous studies between physical abuse and psychopathy it has been concluded that abuse in childhood is not related to adult psychopathy. However, the current study calls into question such findings as well as the way physical abuse is measured in these studies.

A related area of research explores the long-term effect of negative parenting on personality formation. Children who are exposed to negative parenting are at increased risk to develop personality traits similar to psychopathy. In particular, physical punishment has been shown to interfere with the development of a conscience (i.e., understanding how aggressive or antisocial behavior impact others) and resultant antisocial behavior later in life (Gershoff, 2002; Kochanska, 1997). Longitudinal research in children show that those who are harshly disciplined exhibit lower levels of guilt following aggressive behavior, and children who exhibited less guilt were more likely to engage in aggressive behavior at 56 month follow-up (Kochanska, Gross, Lin, & Nichols, 2002). Children who were raised in harsh and punitive environments were less concerned about the feelings of others (empathy) in early childhood (Hastings, Zahn-Waxler, Robinson, Usher, & Bridges 2000). Higher levels of physical punishment have also been shown to increase psychopathic personality features in children (Pardini et al., 2007), but the impact of this early life stress has not been studied into adulthood.
Findings from this dissertation suggest that severe abuse in childhood and adolescence increases the risk for the development of psychopathy in adulthood. In light of other research findings that do not suggest that abuse in childhood and adolescence is related to the development of psychopathy further research is needed. Based on findings from this dissertation, and findings from previous research, it can be hypothesized that moderate physical abuse in childhood increases an individual’s risk for developing externalizing and antisocial behavior, while severe abuse increases an individual’s risk for developing both antisocial behavior and personality traits consistent with psychopathy. Additional research differentiating between these two forms of psychical abuse is required to more fully understand this issue.

**Biological father’s arrest history**

Biological father’s arrest history was predictive of psychopathy in this sample ($\beta = 0.13; p = .02$). This finding is consistent with previous research. A history of parental incarceration was the single best predictor of antisocial personality in a longitudinal study that followed 411 boys through adulthood. For those who had an incarcerated parent, 48% met the diagnostic criteria for antisocial personality disorder as adults, compared with 14% of those without an incarcerated parent (Farrington, 2000). Harris, Rice, & Lalumiere (2001) found that parental antisociality, as defined by parental criminality and alcohol abuse, was related to higher psychopathy levels in a criminal offender sample.

Although there are limited research studies that measure psychopathy using a standardized measure, there is a related area of research that focuses on the relation between antisocial parenting and lack of parental supervision on later antisocial behavior (Lipsey & Derzon, 1998). For example, in a study of early life stressors and later
criminal activity, poor parental supervision in childhood was the best predictor of violent and non-violent criminal behavior (McCord, 1979). Poor parental supervision in childhood has also predicted high psychopathy scores in adulthood (Farrington, 1995). For example, children whose father did not join in their childhood activities had significantly higher psychopathy scores when compared with children whose fathers did join in their childhood activities. In a sample of adolescents, lack of parental involvement in their children’s activities was a strong predictor of behavioral problems during adolescence (Frick, Christian, & Wooten, 1999). A meta-analysis that included data from 300 studies found the strongest and most consistent early childhood predictors of adolescent antisocial behavior were a lack of parental monitoring and a lack of parental supervision of during childhood (Loeber and Stouthamer-Loeber, 1986).

Although these findings indicate an increased risk for adult psychopathy most of these studies did not measure psychopathy using a standardized measurement tool such as the PCL-measures.

A problem with the study of the long-term effects of antisocial parenting on the development of psychopathy in adulthood is that most of the research to date has been collected using juvenile subjects. Despite the lack of research with adult samples examining the impact of being raised by antisocial parents, there is research examining the temporal stability of psychopathy and antisocial behavior from adolescence to adulthood. The most preeminent study of the temporal stability of antisocial behavior was conducted by Robins (1966). This study used records from a child guidance clinic in St. Louis that were discovered 20 years after the clinical was closed. The records were of children diagnosed with ‘sociopathy,’ ‘delinquency,’ and ‘conduct problems’ 20 years
earlier. This sample was then followed-up 20 years later, and results indicated that over 50% of children diagnosed with such disorders in childhood exhibited an antisocial lifestyle as adults (Robins, 1966).

In adult samples temporal stability has been shown to a moderate degree with follow up periods between 10 months and 2 years (Schroeder, Schoreder, & Hare, 1983; Rutherford, Caciola, Alterman, McKay, & Cook, 1999). Despite the stability of the psychopathy construct in adults, the correlated antisocial behavior committed by these individuals is shown to decrease with age (Harpur & Hare, 1994.) Therefore, even in adult samples the behavioral manifestations of psychopathy remains somewhat fluid, while personality traits remain more constant.

A meta-analytic review of personality trait consistency over the lifespan concluded that personality does not fully solidify at the end of adolescence, but continues to form into adulthood (Roberts & DelVecchio, 2000). This meta-analysis included 152 longitudinal studies examining the stability of personality traits from childhood to between the ages of 50 and 70. Findings revealed test-retest correlation coefficients, showing trait consistency, increased from .31 in childhood to .54 in late adolescence, and steadily increased to .74 between the ages of 50 and 70. Such findings indicate a slow progression for personality traits to solidify throughout life, especially during childhood and adolescence.

The most rigorous study to date measuring temporal stability of psychopathy from childhood to adolescence was conducted by Frick and Colleagues (Frick, Kimonis, Dandreaux, & Farell, 2003). This study employed a parent and teacher rating scale of psychopathic traits, and conducted 5 administrations over a 4 year period. The first was
at the initial assessment, and the remaining 4 were conducted at the end of each year.

Children in this sample were 98 non-referred children in the third, fourth, sixth, and seventh grades at the time of the initial assessment. For parent ratings, ICCs ranged from .80 to .88 from the 2 to 4 years, with as stability estimate of .93 over the 5 assessments. Statistically, this suggests stability of the construct over time. In addition, the three subscales (callous-unemotional, narcissism, and impulsivity) ICCs ranged from .71 to .92. Such findings indicate moderate stability of psychopathy-like traits from childhood to adolescence (Frick et al., 2003).

Findings from the temporal stability literature and psychopathy indicate that psychopathy is moderately stable over time. These findings, in combination with findings from this dissertation, indicate that children of fathers with a history of arrests are at increased risk for developing psychopathy as adults, but more research in this area is required. This evidence also suggests that although risk factors for the development of psychopathy may be present, interventions may be successful at decreasing psychopathic personality traits as personality continues to form into adulthood. This suggests that providing interventions earlier in the developmental process (i.e., in childhood or adolescence) will increase the chances for success.

**Biological father’s alcohol abuse history**

Biological father’s alcohol abuse history was predictive of psychopathy in this sample ($\beta = 0.16; p = .004$). Although no study to date has specifically measured the results of biological father’s alcohol abuse and the development of psychopathy, this finding is consistent with the research literature regarding behavioral outcomes of children of fathers who abuse alcohol.
In children, father’s alcohol abuse when the child was between 12 and 18 months of age has been found predictive of aggressive and externalizing behaviors later in childhood (Eiden, Edwards, & Leonard, 2007). This finding is based on a longitudinal study comparing children of alcoholic fathers and non-alcoholic fathers. It used structural equation modeling to determine differences in aggressive behaviors in kindergarten between these two groups. This study concluded that father’s alcohol abuse at an early age resulted in lower levels of maternal and paternal warmth and later aggressive behavior.

Research on personality development has shown difference in temperament between children of fathers who abuse substances and children of fathers who do not abuse substances (Blackson, 1994). A study comparing boys with fathers who abuse substances with boys without substance abusing fathers found the former group to be at higher risk of behavioral problems (Blackson, 1994). Research comparing temperament differences finds that children with normal temperament are at decreased risk of engaging in antisocial behavior throughout life (Moffitt, 1993).

Another study examining behavioral differences between children of parents who abuse alcohol found that children of parents who did not abuse alcohol were at much lower risk to engage in aggressive behavior (Edwards, Eiden, Colder, & Leonard, 2006). Also, children of parents who abused alcohol did not show normative decreases in aggressive behavior when compared with children of parents who did not abuse alcohol.

Findings from previous research on the effect of parental substance abuse, particularly paternal alcohol abuse, are in line with findings from the current study. Taken as a whole, paternal alcohol abuse can be viewed as a risk factor for the
development of psychopathy. This finding requires much more research, particularly longitudinal studies from childhood to adulthood, of children with fathers who abuse alcohol. Studies that use validated psychopathy measures, such as PCL-measures, will provide valuable insights into the strength of this relationship.

Cognitive Ability

An inconsistent finding in the research literature relates to the intelligence or cognitive ability of psychopathic individuals. Early theoretical conceptualizations of psychopathy, such as Cleckley’s (1941), proposed that psychopathic individuals exhibit “superior intelligence” (p. 338). Later research did not support this speculation. For example, in a sample of criminal offenders, Harpur, Hare, and Hakstian (1989) found a near zero correlation between intelligence and psychopathy (-0.05). Hart, Forth, and Hare (1990) found no significant relation between psychopathic individuals and non-psychopathic individuals on a variety of neuropsychological tests, including intelligence tests. When examining the relation between intelligence, psychopathy, and violence psychopathic individuals with higher intelligence are more likely to begin their criminal career at an earlier age (Johansson & Kerr, 2005). A limitation of these studies is how psychopathy is measured, in these studies psychopathy was made into a dichotomous variable (psychopath or non-psychopath). When psychopathy is measured as a continuous variable, using the PCL-measures, more rigorous statistical analysis is possible.

Findings from this dissertation indicate a negative relation between psychopathy and intelligence, meaning that psychopathic individuals are more likely to exhibit lower intellectual ability ($\beta = -0.18; p < .000$). This finding may be a function of the type of
the sample that was used, a psychiatric sample. Due to the long term cognitive effects of chronic mental illness, this sample may over represent individuals with lower cognitive abilities. Additional research with different types of samples (i.e., criminal offenders and community samples) will add to our understanding of psychopathy and intelligence.

1-Factor Model of Psychopathy

Research on the PCL-measures has struggled to establish a conclusive factor structure. Early research found a 2-factor solution (Hare, 1991). Later research concluded that a 3-factor solution containing only the personality criteria, and leaving out behavioral items, provides a better understanding of this disorder (Cooke & Michie, 2001). Critics of this model commented that this model lost a great deal of value as many items were deleted (Hare, 2003). More recent research supports the use of a 1-factor or ‘super-factor’ model which includes all items on the PCL-measure (Hare, 2003; Neumann, Hare, & Newman, 2007).

This study attempted to analyze data using the 1-factor, 2-factor, and 3-factor models found in previous research in order to determine the best fit. The results of the analysis using the 2-factor and 3-factor models were unsatisfactory. The fit indices were found to be well below acceptable cutoffs. The path estimates had extremely high standard errors, which caused all of the relationships between the Abuse, Severe Abuse, Biological Father’s Arrest History, Biological Father’s Alcohol Abuse History, Cognitive Ability and the PCL:SV to be nonsignificant. Therefore, the model with a 1-factor structure of psychopathy was the most adequate.

Neumann, Hare, & Newman (2007) conducted an analysis which included over 6,000 subjects to establish whether a 1 factor solution or ‘super-factor’ could be used to
explain psychopathy. This study included a very large dataset including male \(N = 4865\) and female \(N = 1099\) offenders, and forensic psychiatric patients \(N = 965\), who were assessed with the PCL-R (Hare, 2003). Structural equation modeling results indicated that a single ‘super-factor’ can be used to explain psychopathy.

Based on the available data, Hare concluded, “the presence of a superordinate factor structure is demonstrated in several studies using multiple measures, including Cronbach’s alpha, inter-item correlations, and item-total correlations…Additionally, General Factor Saturation estimates from different investigations strongly support a Total psychopathy score.” (p. 85; Hare, 2003). These results are consistent with the 1-factor solution used in this dissertation.

These results are generalizable to psychiatric patients, but not to the general population or to criminal samples. The findings from this study indicate that early life stressors, particularly severe abuse, paternal arrest history, and paternal alcohol abuse increases the risk for developing psychopathy among psychiatric patients. The relation between these risk factors and the development of psychopathy in non-psychiatric samples requires further study, particularly in criminal offender populations. The rate of psychopathy is much higher among criminal offenders than in psychiatric samples allowing for more advanced statistical analysis (Hare, 1991/2003). Findings from this dissertation call for replication of these results in criminal offender populations.

**Post Hoc Analyses: Gender and Race**

The model found for the total group of subjects \(n=446\) was not fully replicated among the four groups (female subjects, male subjects, black subjects, and white subjects). However, as the fit indices of several models were very close to recommended
cutoffs these findings warrant discussion. The following section will briefly review relevant research findings on psychopathy and gender, and psychopathy and race. Findings from the current study will be incorporated into this discussion.

*Psychopathy and Gender*

Research examining gender differences and psychopathy in non-criminal samples find lower rates of psychopathic traits in women than in men (Lilienfeld & Andrews, 1996). Problems with such research include the low base rate of psychopathy in the general population and the lack of a standardized measure of psychopathy for non-criminal samples. Studies using the PCL-measures to define psychopathy using criminal samples also find a lower rate of psychopathy among female offenders than found in male offender samples. Based on research on the PCL-R the prevalence of psychopathy among male offenders is consistently found to be between 15% and 25% (Hare, 1991/2003). In a study of 528 incarcerated women the rate of psychopathy based on the PCL was 9% (Vitale, Smith, Brinkley, and Newman, 2002). Another study found the rate of psychopathy based on the PCL to be 16% in a sample of 103 incarcerated women (Salekin, Rogers, & Sewell, 1997). Such findings have been attributed to either an actual lower rate of psychopathy among women, or measurement issues related to items on the PCL-measures that may not adequately capture this personality construct among women. Although lower rates of psychopathy have been found among female subjects, the two-factor structure found in male offenders has been replicated with female offenders (Kennealy, Hicks, & Patrick, 2007). This suggests that although the base rate of psychopathy is lower among women, the expression of this disorder is similar across gender.
There have been no studies specifically examining psychosocial precursors of psychopathy among women. Also, no studies to date compare psychosocial precursors of psychopathy between female and male subjects.

This dissertation indicates different causal pathways in the development of psychopathy for female and male subjects. The model fit was comparable between female (GFI = .87; CFI = .93; IFI = .94; RMSEA = .05) and male subjects (GFI = .87; CFI = .91; IFI = .91; RMSEA = .05). However, when comparing the influence of the psychosocial risk factors used in this study across gender significant differences were found. For female subjects only 1 of the 5 predictor constructs was significantly predictive of psychopathy at the 0.05 level; cognitive ability ($\beta = -0.17; p = .044$). For male subjects 3 of the 5 predictor constructs were significant at the 0.05 level. These include cognitive ability ($\beta = -0.21; p < .001$), biological father’s arrest history ($\beta = 0.19; p = .009$), and biological father’s alcohol abuse history ($\beta = 0.21; p = .002$). These results indicate different causal mechanisms in the development of psychopathy between women and men. Cognitive ability was negatively predictive of psychopathy for both male and female subjects.

These results, although preliminary due to the less than ideal fit of the model for both female and male subjects, call for future research examining different causal pathways in the development of psychopathy among women and men. Although it is unclear why these models differ, a few possibilities are worth exploring in future research. For example, women’s greater support networks may moderate the effects of early life psychosocial stressors in the development of psychopathy for women. It is also possible that risk factors not measured in this dissertation are predictive of psychopathy.
for women. Some alternative risk factors not considered in this study such as sexual
abuse, maternal antisocial behavior, and domestic violence require further study as they
relate to the development of psychopathy among women.

*Psychopathy and Race*

Research on psychopathy and race has increased over the past 20 years. Initial
studies raised concerns about the applicability of the PCL-measures with black subjects.
The first study to examine psychopathy and racial differences used a sample of 356
inmates in the United States (Kosson, Smith, & Newman, 1990). The sample included
124 black subjects and 232 white subjects. Subjects were divided into the following 3
groups based on their PCL score: (1) psychopaths; (2) “middle” subjects; and (3) non-
psychopaths. There were significant differences between the psychopath and non-
psychopath groups with respect to race. For white subjects, 23% scored as psychopathic
while 36.3% of black subjects scored as psychopathic. Twenty two percent of white
subjects scored as non-psychopaths while 8.9% of black subjects were in the non-
psychopath group. Membership in the ‘middle’ group was comparable between black
and white subjects (54.8% vs. 54.7% respectively). Chi-square analysis confirmed a
significant correlation between psychopathy score and race, with black subjects being
more likely to score as psychopathic (Kosson et al., 1990).

Later research, using a larger sample, found comparable rates of psychopathy
between white and black subjects (Cooke, Kosson, & Michie, 2001). The sample
included 356 black and 359 white subjects. The researchers attributed the contradictory
findings between these two studies to the use of more advanced statistical analysis in the
second study, particularly the use of CFA. The authors conclude, “the more powerful

and more appropriate methods of CFA indicate that the results of Kosson et al. (1990) do not generalized to these samples.” (p. 539; Cooke, Kosson, & Michie, 2001). This finding has been replicated using numerous U.S. and international samples (Hare, 2001).

Despite such findings, some authors continued to suggest that African-Americans are “more” psychopathic than whites (Lynn, 2002). In response to this assertion, a meta-analysis of 21 studies was conducted (Skeem, Edens, Camp, & Colwell, 2004). Studies used in this meta-analysis all used the PCL to measure psychopathy among black and white samples. Findings from this meta-analysis do not support the claim that black subjects are “more” psychopathic than white subjects (Skeem, et al., 2004).

A related area of research examined differential effects of anxiety and information processing related to psychopathy in black and white subjects (Doninger & Kosson, 2001; Lorenz & Newman, 2002; and Schmitt, Brinkley, & Newman, 1999). Findings indicate a positive association between anxiety and risk aversion for white subjects, but a negative association between anxiety and risk aversion among black subjects independent of psychopathy score. Other research has attempted to replicate findings of information processing deficits found in white psychopathic samples, in a sample of African-American psychopathic subjects (Lorenz & Newman, 2002) without success. The authors concluded that, “findings indicate that the emotion deficits, as measured by the lexical decision task and associated with psychopathy in Caucasian offenders, do not generalize to African-American offenders.” (p. 1084). These researchers also concluded that “although the criminal behavior exhibited by African-American psychopaths appear comparable in prevalence and severity to that of Caucasian psychopaths, [psychopathy] may be associated with different, and yet unidentified, distal causes” (p. 1084). Studies
examining the relation between psychopathy, impulsivity, and substance abuse also find difficulty in generalizing findings from white to black subjects (Walsh, Allen, & Kosson, 2007). These findings suggest that although the expression of psychopathy may be similar between black and white offenders (Cooke, Kosson, & Michie, 2001; Hare, 2001; Skeem, et al., 2004), when examining related issues such as information process (Lorenz et al., 2002), impulsivity, and substance abuse (Walsh et al., 2007) between black and white psychopathic subjects differences are found.

No study to date has compared psychosocial precursors of psychopathy between black and white subjects. Findings from this dissertation indicate different causal mechanisms in the development of psychopathy between black and white subjects. The model used indicated poor fit for black subjects (GFI = .81; CFI = .89; IFI = .90; RMSEA = .07), while the fit was much better for white subjects (GFI = .89; CFI = .92; IFI = .92; RMSEA = .06).

Analysis of the strength of predictor constructs for white subjects indicates that three constructs were statistically predictive of psychopathy. These were severe abuse ($\beta = 0.18; p = .046$), cognitive ability ($\beta = -0.16; p = .007$), and biological father’s arrest history ($\beta = 0.18; p = .006$). These findings were not replicated among black subjects due to poor model fit.

Although it is not clear why this model showed such poor fit for African-American subjects, a few possibilities require investigation in future research. Risk factors not measured in this dissertation may be predictive of psychopathy among African-American subjects. Some alternative risk factors not considered in this study, such as the effects of community violence, domestic violence, and the absence of a
positive male role model require further study among African-American samples. Also, protective factors such as extended family support networks that may moderate the effects of early life psychosocial stressors in the development of psychopathy among African-American subjects should be included in future studies.

Treatment & Intervention

The study of treatment and interventions with psychopathic individuals is a complicated area of research for two reasons. First, prior to the standardization of the PCL-measures, there was not a common method of quantifying this disorder. Therefore, studies used various assessment strategies resulting in poor construct validity between studies. Second, since the standardization of the PCL-measures, which provides a valid and reliable measure of psychopathy, few studies have examined clearly defined and consistent treatment interventions across samples. Due to these methodological issues, the available research literature reports inconsistent findings and disparate conclusions between studies.

One of the most often cited psychopathy/treatment studies was conducted retrospectively using a sample of 176 mentally disordered offenders. Participants in this study were treated for at least 2 years during a 10-year period from 1968 to 1978 in the social therapy unit (STU) at Penetanguishene maximum-security institution in Canada (Rice, Harris, & Cormier, 1992). Subjects in this study were matched with a control group of offenders who did not undergo treatment in the STU. The PCL-R was completed retrospectively, based on file information. Findings indicate that psychopathic offenders who were treated at the STU were more likely to recidivate violently when compared with psychopathic offenders who were not treated in the STU (77% vs. 55%,
respectively). Based on findings from this study, it has been concluded by some that treating psychopathic individuals may *increase* their risk for future violence (Rice et al., 1992). However, the treatment interventions that were used in the STU raise significant questions about the validity of the results. The treatment groups were peer led as opposed to being led by mental health professionals. Treatment interventions included nontraditional therapies, such as nude encounter sessions and the use of drugs such as methedrine, LSD, and alcohol. This study continues to be cited as evidence that treatment increases psychopaths’ risk for violence despite the obvious issues with the treatment interventions that were used.

Despite the belief that psychopathic individuals do not respond to treatment, or become more dangerous as a result of treatment, a meta-analysis found certain treatments to be effective (Salekin, 2002). This analysis included 42 treatment studies in which psychopathic individuals received some form of treatment. The findings indicate that psychopathic individuals responded well to intensive treatment interventions, such as long term individual psychotherapy (Salekin, 2002). Residential treatment programs that did not include regular contact with mental health professionals were found to be the least effective. The most effective form of treatment combined cognitive-behavioral and insight-oriented techniques (Salekin, 2002).

D’Silva and colleagues reviewed 24 research studies on the treatment of psychopathy that used the PCL-R to measure psychopathy (D’Silva, Duggan, & McCarthy, 2004). The authors found that only 3 of the 24 studies had an appropriate research design to answer the question of whether psychopaths respond to treatment. They concluded that “the commonly held belief of an inverse relationship between high-
scores on the PCL-R and treatment response has not been established” (D’Silva et al., 2004, p. 163).

The research on the treatment of psychopathy in adulthood is too sparse to draw any solid conclusions of treatment effectiveness. Much future research is needed in order to guide evidence-based practices. Although findings from this dissertation, and from previous research, support using cognitive-behavioral and insight-oriented therapy focusing on trauma-related issues this recommendation is made with caution due to findings from the general psychopathy and treatment literature. For example, there is a body of literature suggesting that psychopathic individuals are not able to process affectively charged material appropriately (Williamson, Harpur, & Hare, 1991). Also, research on empathy training for psychopathic individuals has shown to increase the risk for future violence (Seto & Barbaree, 1999). Much more research is needed in this area in order to inform recommendations for psychotherapeutic interventions.

Due to the lack of data on treatment effectiveness with psychopathic adults this dissertation does not add to the current literature in this area. However, as early life stressors were found predictive of psychopathy in adulthood, early intervention strategies are recommended. Although there are no studies measuring the effectiveness of early intervention on psychopathy rates there is research on the effectiveness of early intervention on antisocial behavior.

A 15 year follow-up study of 315 adolescents whose mothers participated in an early intervention program when they were young showed that youth who participated in this program had significantly less antisocial behavior in childhood when compared with a control group that did not receive this intervention (Olds, Henderson, Cole, Eckenrode,
Kitzman, Luckey, et al., 1998). The experimental group received intensive services including 9 prenatal home visits and 23 home visits over the first 2 years of the child’s life. The control group received standard interventions that were much less intensive than the experimental group. The result was a 48% fewer reports of child abuse in the experimental group than the control group. When the children were 15 years of age the experimental group had 59% fewer arrests than the control group, and 90% fewer interventions for incorrigible behavior under New York law, and were less likely to run away. Findings from such research, coupled with findings from this dissertation, emphasize the need for early interventions strategies for at-risk youth, particularly those with a history of severe physical abuse raised by antisocial parents. These interventions should be aimed at providing parenting skills to parents of at risk children and youth.

**Conclusions**

This study adds to the limited literature in the area of early childhood experiences of individuals who exhibit psychopathic personality traits as adults. Moderate physical abuse during childhood and adolescence was not predictive of psychopathy in this sample; however severe physical abuse during childhood and adolescence, biological father’s alcohol abuse history, biological father’s arrest history, and cognitive ability were all found statistically predictive of psychopathy.

**Strengths of the study**

Strengths of this study include: (1) an adequate sample size to allow for the use of SEM techniques; (2) the differentiation between moderate and severe physical abuse; (3) the use of a standardized measure of psychopathy; and (4) the ability to conduct post hoc
analysis of different causal pathways in the development of psychopath across gender and race.

The sample size was adequate (n=446) and able to be analyzed using Structural Equation Modeling. The findings indicate that severe physical abuse and other early life stressors, such as paternal criminal involvement and paternal alcohol abuse, contribute to the development of psychopathy. These findings call for further research, with improved assessment measures of abuse and environmental factors, to determine the relation between these variables and the development of this disorder. It is recommended that scales measuring abuse, including corroboration with collateral sources and/or official records, be used in order to overcome methodological issues in the current study.

This is the first study to differentiate between moderate and severe physical abuse. Findings from this dissertation call for further research that differentiates between these two forms of physical abuse as it relates to the development of psychopathy.

This study used the PCL:SV to measure psychopathy. As discussed earlier, there are very few studies that examine early psychosocial variables related to the development of psychopathy that use a standardized measure such as the PCL-measures. Therefore, additional research using PCL-measures combined with reliable measures of early life stressors will greatly add to our understanding of how such abuse may lead to the development of this disorder.

This study is also the first to attempt to differentiate causal pathways in the development of psychopathy based on gender and race. These findings call for future research to consider potentially different causal mechanisms for the development of psychopathy in women and men, and in African-American and white subjects.
Potential Limitations of the study

This original MacArthur Violence Risk Assessment Study was not designed to measure the relation between psychosocial risk factors and psychopathy; therefore the measurement of abuse and parental antisocial variables were not ideal. These variables were based on self-report.

Due to these measurement issues some modifications were made to the original plan for this dissertation in order improve statistical analysis. The original goal of this dissertation was to measure 3 latent variables including: (1) physical abuse; (2) parental antisocial behavior; and (3) cognitive ability.

Due to difficulties in transforming data of the abuse variables, the low frequency of this group of variables in this sample, and the significant correlations between these variables, two individual items were chosen to measure the construct of severe physical abuse in childhood and adolescence. The two items that were selected were chosen because they are indicative of the most severe type of physical abuse measured in this study, physical abuse that required admission to a hospital. By dropping the other variables the model is more parsimonious while maintaining this measure of severe physical abuse. However, this measure of severe abuse was less than ideal due to the low frequencies of these variables in this sample. Future research attempting to replicate finding from this study should use a standardized measure of severe abuse. Similarly, due to difficulties in the analysis of the parental antisocial behavior construct, two observed variables were used to measure paternal antisocial behavior and paternal alcohol abuse. These measures were based on self-report and required adult subjects to recall information from childhood and adolescence.
Another limitation of this study was the lack of standardized assessment tools used to measure abuse, biological father’s alcohol abuse history, and biological father’s antisocial behavior. Future research will benefit from using standardized assessments of these variables that will allow for more thorough statistical analysis.

Despite these limitations, this study does provide new and useful insights into the psychosocial precursors of psychopathy. The main study finding that when severe abuse is differentiated from moderate physical abuse the former type of abuse is statistically predictive of psychopathy will provide future research with an alternative way of measuring abuse that will increase our understanding of the psychosocial precursors of adult psychopathy.

**Future Research Implications**

Despite the limitations of the measures used, severe abuse, biological father’s alcohol abuse history, and biological father’s history of arrests, were all positively statistically predictive of psychopathy in this sample. Cognitive ability was negatively statistically predictive of psychopathy in this sample. Although the very low rate of severe abuse in this sample raises questions as to the validity of this result, future research is warranted. Further study regarding the relation between types of early abuse and the development of psychopathy is needed. As discussed in the intervention section, increased understanding of how different risk factors, such as early abuse, increase the risk for developing psychopathy in adulthood will inform early-intervention strategies.

Research on the psychosocial precursors of psychopathy, particularly negative early life experiences, is a difficult area of study. The majority of this research must be done retrospectively as longitudinal studies can not monitor abuse due to the harmful
impact on the subjects. In cases when abuse is reported during such a study interventions would result in order to protect subjects from ongoing abuse.

Some longitudinal studies have measured less severe, but theoretically related stressful early life experiences. However, studies measuring adult psychopathy using self-reported historical information are more informative as they more closely measure the desired predictor, in this case abuse. Although the methodological and statistical rigor of prospective, control studies is far superior to retrospective analysis, those like this dissertation can not be done prospectively. Information learned from retrospective studies of traumatic early life experiences inform intervention strategies and shed light onto how early environmental stressors shape personality.

The following recommendations are made for future research:

- In order to provide greater understanding of the impact of early life abuse on the development of psychopathy it is recommended that structured measurement tools designed to measure abuse retrospectively be used. The use of such tools will increase statistical rigor of this research and as a result provide more informative findings.

- Future research should differentiate between severe and moderate physical abuse using standardized measures in order to attempt replication of the findings from this study and advance this research literature.

- Although this study was not able to analyze the effect of these different types of abuse on the various factors of the PCL:SV it is recommended that future research attempt to analyze this relation. This research will inform our understanding of how the psychopathic personality develops more specifically.
• Post hoc analysis of gender differences indicates that there are different causal pathways in the development of psychopathy for women and men. Although the model fit was similar between female and male subjects the predictor variables were different for these groups. Additional research is required examining the potentially moderating effect of social support networks and early life psychosocial stressors in the development of psychopathy for females. Also, risk factors not considered in this study such as sexual abuse, maternal antisocial behavior, and domestic violence require further study in the development of psychopathy among women.

• Post hoc analysis of racial differences indicate that there are different causal pathways in the development of psychopathy for and for African-American and white subjects. Due to the poor fit of the model for African-American subjects no definitive conclusions can be drawn as to specific precursors for the development of psychopathy. Additional research should explore alternative risk factors not considered in this study, such as the effects of community violence, domestic violence, and the absence of a positive male role model as they relate to the development of psychopathy among African-American subjects. Also, protective factors such as extended family support networks that may moderate the effects of early life psychosocial stressors in the development of psychopathy among African-American subjects should be included in future studies.
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