

FAMILY FUNCTION, AGGRESSION, AND PSYCHOPATHIC  
PERSONALITY TRAITS IN  
COLLEGE STUDENTS

by

Anna L. Kobee, A.A.S., B.A.A.S., B.S.C.J.

A thesis submitted to the Graduate Council of  
Texas State University in partial fulfillment  
of the requirements for the degree of  
Master of Arts  
with a Major in Psychological Research  
December 2015

Committee Members:

Reiko Graham, Chair

Jean Hu

Ollie Seay

**COPYRIGHT**

by

Anna L. Kobbé

2015

## **FAIR USE AND AUTHOR'S PERMISSION STATEMENT**

### **Fair Use**

This work is protected by the Copyright Laws of the United States (Public Law 94-553, section 107). Consistent with fair use as defined in the Copyright Laws, brief quotations from this material are allowed with proper acknowledgment. Use of this material for financial gain without the author's express written permission is not allowed.

### **Duplication Permission**

As the copyright holder I, Anna L. Kobee, authorize duplication of this work, in the whole or in part, for educational or scholarly purposes only.

## **DEDICATION**

To my three amazing parents Carola “NaNa”, Jack “Scruffy”, and Linda “Mimi”, without you, I wouldn’t have made it this far in life. You have stressed the importance of education since I could talk, saying that it was the one thing no one could take away from me. Thank you, mom, for showing me unconditional love and support, even when I did not deserve it. You have always been there for me, as you still are, and now I am lucky enough to have you show the same love and support to my own two children. You amaze me with how hard you work, and still manage to always be there for us. You are my best friend, and I am honored to be your daughter. Dad, thank you for giving me my stubbornness, my drive, my unwillingness to back down from a fight or when things get difficult, and especially for being my ladder to climb down from the ledge when I feel as though my world is crashing around me. Your respect and approval means everything to me, whether you realize it does or not. You have always been (and still are) my rock. My other mom, you have shown me what a strong woman looks like; the type of woman I want and hope to be. You may not have always agreed with the direction I was headed, but that did not stop you from always supporting me. You have a passion to better yourself, and better the lives of everyone around you, which inspires me to do the same. Thank you for helping me become the woman that I am, and for loving me, no matter what.

To my amazing husband for 13+ years, I don’t even know if it’s possible to convey what your support and unconditional love means to me. I am not an easy person

to live with, but you do it and you've held up well. You have supported me through any endeavor I chose, whether it was the military, educational, or otherwise. You have been there when I didn't feel like I could go any further, seen me at my absolute worst, and still stuck around. You have made dinners, shuttled our boys around, and taken care of them at home when I was locked away in our room for countless hours working on this thesis. All I could ever ask for in a husband, a partner for life, is that you be there for me to lean on. You are that and so much more. Thank you for making me feel worth all the effort.

Finally, to my two sons, Taylob and Kayden, this thesis is dedicated to you. You have shown me what true, selfless love is. You are still so very young, and cannot comprehend what you mean to me, or the love I have for you. On days where I wanted to cry, I didn't feel as though anything was going right, and I couldn't do this anymore; I looked at you, you made me laugh, and life was better again. I keep going because I want a better life for you. At this small moment in time, I am your whole world, and although that quickly changes as you both get older; you will always be my entire world.

## ACKNOWLEDGMENTS

To Dr. Reiko Graham, I cannot thank you enough for your help and guidance in this project. I would have undoubtedly given up long ago had I not had you in my corner telling me that I could actually do this. You knew when to push harder and knew when I simply needed encouragement. Your brilliance is inspiring.

To Dr. Jean Hu, thank you for furthering my knowledge in statistics. I did not know I could enjoy it more than I already did, but then I sat through your class and you made it happen. You always took the time to see me when I needed extra help in class or with this thesis. I hope you inspire others as much as you have inspired me.

To Dr. Ollie Seay, I took so many classes with you not because I had to, but because they were a breath of fresh air. I thoroughly enjoyed each and every one of them and actually looked forward to weekly meetings. Thank you for always providing advice, knowledge, and help when needed.

To Adrienne Koller, there is nothing I looked forward to more than our weekly dates during the last few years. We laughed, we cried, and it felt like we studied every waking moment. Thanks for always encouraging me when I needed it, and most of all, thank you for your friendship. Our talks and time together helped me get through this program.

## TABLE OF CONTENTS

	<b>Page</b>
ACKNOWLEDGEMENTS .....	vi
LIST OF TABLES .....	viii
LIST OF FIGURES .....	ix
ABSTRACT .....	x
CHAPTER	
I. INTRODUCTION .....	1
II. REVIEW OF THE LITERATURE .....	6
III. RESEARCH DESIGN AND METHODOLOGY .....	22
IV. RESULTS .....	26
V. DISCUSSION .....	33
LITERATURE CITED .....	45

## LIST OF TABLES

<b>Table</b>	<b>Page</b>
1. Description of PPI-R Scales.....	10
2. Means and Standard Deviations for Eight Subscales/Three Factors of the PPI-R Scale with a Sample Size of $N = 188$ .....	26
3. Correlation Matrix for Family Function, PPI-R Subscales, and PPI-R Factors .....	27
4. Correlation Matrix for Family Function and BPAQ Subscales.....	28
5. Regression Models for Physical Aggression .....	29
6. Regression Models for Hostility .....	31

## LIST OF FIGURES

<b>Figure</b>	<b>Page</b>
1. Standardized regression coefficients between family function and physical aggression as mediated by Factor 2 of the PPI-R scale .....	30
2. Standardized regression coefficients between family function and hostility as mediated by Factor 2 of the PPI-R scale.....	32

## ABSTRACT

This study assesses the interrelationships between psychopathy, family function, and aggression. While separate relationships have been established between these variables, there is a lack of understanding with respect to their interrelationships. Studies have shown that a negative family environment cultivates maladaptive behaviors and aggression associated with psychopathy. This study attempted to delineate the interrelationships between family function *and* aggression and their relationships with psychopathy. It was anticipated that psychopathic traits would be positively associated with an undesirable family history and also with higher levels of aggression. However, it is unclear whether family function mediates the relationship between psychopathy and aggression. Participants ( $N = 188$ ) completed an online survey consisting of demographic questions, the Psychopathic Personality Inventory-Revised, The McMaster Family Assessment Device, and the Buss Perry Aggression Questionnaire. The data was analyzed using a regression approach to establish whether psychopathy facilitates the relationship between family history and aggression. Results suggested that while there is a correlation between family function and physical aggression, Factor 2 “Self-Centered Impulsivity” of the PPI-R scale was a mediating factor. Similar results were shown with family function and hostility, with Factor 2 providing a mediating effect between the two variables. In both cases, Factor 2 was the mediating factor, suggesting that Factor 2 facilitates or enhances the relationship between family function and physical aggression/hostility. The findings of this research have the potential to better inform

professionals in fields such as forensic psychology, by leading to a better understanding of how family history moderates psychopathic traits and aggression

## I. INTRODUCTION

Psychopathy is a personality/mental disorder, characterized by specific behaviors (Cooke & Michie, 2001), such as amoral and/or antisocial behavior, lack of ability to love or establish meaningful personal relationships, extreme egocentricity, and failure to learn from experience (Hare, 1996). Although a key feature of psychopathy is antisocial behavior, it is important to differentiate it from antisocial personality disorder (APD). The standard for APD is not related to any particular etiology, while psychopathy has solid etiological foundation in neurobiology (Wall, Wygant, & Sellbom, 2014). APD has been heavily linked to many environmental factors, such as antisocial parents, antisocial acquaintances, males, poor parent-child relationships, low socio-economic status, minorities, low intellect, and low accomplishments (Farrington, 2006). While the previous can be true of psychopathy, psychopathy can be (and is) influenced by both neurobiological functioning and environmental factors (Raine, 2002). Labeling someone as psychopathic does not rely solely on environmental influence; rather, genetic influences have also been identified (Raine, 2002).

Psychopaths are at high risk for criminal behavior (Juarez, Kiehl, & Calhoun, 2013), underscoring the importance of understanding factors (both genetic and environmental) that contribute to its etiology. Many studies have been conducted to understand the personality characteristics associated with psychopathy, as well as causal factors associated with the disorder. Twin studies suggest a strong genetic influence in the presentation of psychopathic traits (e.g., callous/unemotional, impulsive/irresponsible, grandiose/manipulative), but less strongly for grandiose/manipulative traits (Larsson, Andershed, & Lichtenstein, 2006). However, other studies suggest that while genetic

predisposition is important, trauma or abuse during childhood may be necessary in order for psychopathic traits to be manifested (Raine, 2002). Of particular relevance to this study, a stressful family environment has been identified as a major risk factor in the development of certain psychopathic traits (Brower & Price, 2001; Raine, 2002).

Psychopathy is extremely difficult to treat, and individuals with psychopathic personality traits are at a higher risk of leading a criminal lifestyle (Juarez, Kiehl, & Calhoun, 2013). The overall prevalence of psychopathy is low, approximately 1% of the general population. However, in a prison population, that percentage jumps to approximately 20%. In the overall prison population, it is estimated that there are more than half a million psychopaths incarcerated (Kiehl & Buckholtz, 2010). There are mixed opinions about treatments for this disorder and whether the limited treatment options currently available are effective. In fact, some influential psychopathy experts believe that there are no effective treatments for psychopathy currently available (Cleckley, 1988; Hare, 2003; Harris & Rice, 2007). This over-representation in the prison population could be due to the lack of early intervention (Juarez et al., 2013), which would in turn lead individuals to a criminal lifestyle. A deeper understanding in factors that contribute to psychopathy and their interrelationships could lead to a better understanding of the factors that differentiate successful psychopaths (those with little to no criminal history) from unsuccessful psychopaths (those with a history of criminal behavior). This may inform our understanding of the development of this disorder (Sifferd & Hirstein, 2013), with implications for prevention and treatment.

The purpose of this research was to examine the relationships between psychopathic personality traits and family function in college students. Furthermore, this

research investigated aggressive response tendencies, motivated by the fact that there are certain triggers, such as physical provocation, that elicit aggression in psychopaths (Jones & Paulhus, 2010), especially those with impulsive tendencies (Brower & Price, 2001; Strüber, Lück, & Roth, 2008). Aggressive tendencies have been linked to both genetic and environmental factors, especially abuse and/or childhood trauma (Caspi et al., 2002). If aggressive tendencies are largely genetically determined, then they should not be related to family history, but may be related to psychopathic traits. However, it was more likely that family history would be predictive of psychopathic traits associated with impulsivity.

Participants in this study were given the Psychopathic Personality Inventory-Revised (PPI-R; Lilienfeld & Andrews, 1996), a demographic questionnaire, a family function questionnaire (McMaster Family Assessment Device; MFAD; Epstein, Baldwin, & Bishop, 1983), and an aggression questionnaire (Buss Perry Aggression Questionnaire; BPAQ; Buss & Perry, 1992). The primary hypothesis was that individuals who have a history of negative family issues (as indexed by the MFAD) would have higher scores on the Psychopathic Personality Inventory-Revised (PPI-R;) global score, which may further be dependent upon scores on specific subscales of the PPI-R or upon three factors consisting of subsets of these eight subscales. The eight subscales of the PPI-R are Social Influence, Fearlessness, Stress Immunity, Machiavellian Egocentricity, Rebellious Nonconformity, Blame Externalization, Carefree Nonplanfulness, and Coldheartedness. These subscales load differentially onto 3 factors: Fearless Dominance (Social Influence, Fearlessness, and Stress Immunity), Self-Centered Impulsivity (Machiavellian Egocentricity, Rebellious Nonconformity, Blame Externalization, and Carefree

Nonplanfulness), and Coldheartedness (Coldheartedness). Based on previous research, it was expected that psychopathic traits would be positively associated with a negative family history.

A secondary hypothesis was that individuals who scored higher on the PPI-R, especially subscales associated with Factor 2 “Self-Centered Impulsivity” (Machiavellian Egocentricity, Rebellious Nonconformity, Blame Externalization, and Carefree Nonplanfulness) would also display higher levels of aggression as indexed by the BPAQ. It is possible to link higher scores on the BPAQ with primary psychopathy, rather than secondary, because this self-report measure was designed to measure direct aggression (Archer & Webb, 2006). With respect to the role of family history in aggression and psychopathic traits, results are harder to predict. For example, it was possible that family history would act as a mediator between psychopathic traits and aggression. Conversely, it may have differential influences on these variables.

The results of this research have the potential to inform our understanding of psychopathy by clarifying the relationship between family history, psychopathic personality traits, and aggressive tendencies. A better understanding of how family history moderates psychopathic traits and aggression is of high relevance for forensic psychiatry and psychology, especially with respect to the development of programs for the management of individuals with psychopathy, who are at high risk for repeated violent offenses (Hempill, Hare, & Wong, 1998). Understanding the links between aggressive behaviors, psychopathy and family history may help to elucidate how individual differences in upbringing could shape personality, potentially leading to innovations in therapeutic treatments for antisocial behavior disorders such as

psychopathy. The information presented in the following chapter will further highlight psychopathy, inform the reader of relevant studies related to psychopathy, aggression, and family function, as well as provide explanations on how these factors are measured.

## II. REVIEW OF THE LITERATURE

An accurate characterization of psychopathy and a description of its traits and etiology remain elusive. As previously stated, psychopathy is a personality/mental disorder, commonly thought to be interchangeable with antisocial personality disorder (APD). However, the diagnoses are not synonymous. According to *The Diagnostic and Statistical Manual of Mental Disorders*, 5<sup>th</sup> ed. (DSM-5; American Psychiatric Association, 2013), criteria for accurate diagnosis of APD requires the individual to be at least 18 years of age, and the symptoms of misconduct must be apparent and documented before 15 years of age. Individuals must also have an extensive pattern of indifference for others, as well as have a pattern of disrupting the rights of others (American Psychiatric Association, 2013). In contrast, not all persons that have psychopathy have a disregard for the rights of others, and not all have diagnosed conduct disorders before 15 years of age. Therefore, there are features unique to psychopathy, which suggest that it is not merely a manifestation of APD. To be diagnosed with APD, the focus relies heavily on the behavior of being antisocial, whereas psychopathy encompasses this aspect as well as other functional impairments (Blair, 2007).

Psychopathy is a multi-faceted construct that is associated with a complex array of genetic and environmental factors (Raine, 2002). Studies support the idea that antisocial behavior and aggressive behavior are influenced by genetics (Raine, 1993; Rowe, 2001; Rutter, 1997), and psychophysiological issues (e.g., lower resting heart rate in antisocial individuals) are also a factor (Raine, 2002). How these various influences ultimately result in psychopathic or violent/aggressive tendencies in a particular individual require further elucidation (Wahlund & Kristiansson, 2009). In this chapter,

some of the relevant aspects of psychopathy (for the purposes of this study) will be emphasized. Neuropsychology will be discussed since antisocial behavior and poor emotion control can arise from damage or underdevelopment of the prefrontal lobe (Raine, 2002). A discussion of the subtypes of psychopathy are also included, as they are essential in understanding the various manifestations of this disorder, including successful and unsuccessful psychopaths, as well as primary and secondary psychopathy. Familial influences in the etiology of psychopathy are highlighted, since a negative or positive domestic environment can contribute to antisocial and aggressive behaviors (Raine, 2002). A trait of particular relevance to this study, aggression, and its relationship to psychopathy, as well as family history, will also be examined.

Three common diagnostic tools are the Hare Psychopathy Checklist-Revised (PCL-R; Hare, 1991), the Personality Assessment Inventory (PAI; Morey, 1991), and the PPI-R (Lilienfeld & Andrews, 1996). The PCL-R was originally developed for use with prisoners (Benning, Patrick, Hicks, Blonigen, & Krueger, 2003), and utilizes several methods in order to attain the diagnosis of psychopathy; these methods include a semi-structured discussion with the individual, case-history information, and scored measures of 20 items (Hare, Clark, Grann, & Thornton, 2000). The criteria actually limit the use of the PCL-R in the general populace, and make it more suitable for use in the criminal population (Benning et al., 2003). The 20 items scored on the PCL-R are glibness/superficial charm, grandiose sense of self-worth, need for stimulation/proneness to boredom, pathological lying, conning manipulative, lack of remorse or guilt, shallow affect, callous/lack of empathy, parasitic lifestyle, poor behavioral controls, promiscuous sexual behavior, early behavior problems, lack of realistic/long-term goals,

irresponsibility, failure to accept responsibility for own actions, many short-term marital relationships, juvenile delinquency, revocation of conditional release, and criminal versatility (Hare, 1991).

Self-report measures of psychopathy have also been developed, most notably, the PAI and the PPI-R. The PAI was designed to provide information on individuals that can aid in offender classification, treatment planning, and risk assessment (Morey & Quigley, 2002). This assessment is comprised of a 344-item questionnaire. Similar to the PPI-R scale, individuals are asked to check the response to the question/statement that most correctly explains him or her (Morey & Quigley, 2002). In this study, the PPI-R was utilized. The PPI-R is a self-report questionnaire designed for the evaluation of psychopathy; it is used frequently in incarcerated populations, but also serves as a good assessment in psychopathy for the general public (Lilienfeld & Andrews, 1996). In fact, the PPI-R is usually used in non-incarcerated populations (Anderson, Sellbom, Wygant, & Andrews, 2013). This questionnaire contains 154 self-report questions designed to assess the degree to which a person may or may not display psychopathic traits. The PPI-R provides a global (overall) score. There are also three factor scores and eight content scale scores given (Anderson et al., 2013). Factor 1 (Fearless Dominance) includes three content scales, which are Social Influence, Fearlessness, and Stress Immunity. Factor 2 (Self-Centered Impulsivity) contains four content scales, which are Machiavellian Egocentricity, Rebellious Nonconformity, Blame Externalization, and Carefree Nonplanfulness. The last factor, Factor 3 (Coldheartedness) includes only the content scale of Coldheartedness.

The PPI-R global score, and scores on the content scales, suggest differences in the level of the traits that are measured by each of the scales (Lilienfeld & Widows, 2005). The higher the score, the more prominent the traits are within the individual taking the test (Lilienfeld & Widows, 2005). It is hypothesized that individuals who score higher on the PPI-R overall would more than likely have a propensity towards proactive/instrumental aggression (explained in further detail below), because this is the type of aggression most often displayed by psychopaths in general (Coccaro et al., 2014). See Table 1 for a description of the eight content scales. There has been increasing research that suggests the PPI-R is a valid test of psychopathy and factors of psychopathy (Ross, Benning, Patrick, Thompson, & Thurston, 2008).

<b>Table 1</b>		
<i>Description of PPI-R Scales.</i>		
<i>Factor 1 includes: SOI, F, STI; Factor 2 includes: ME, RN, BE, CN; Factor 3 includes: C</i>		
Scale	Number of Items	Construct Description
<b>Content scales</b>		
Machiavellian Egocentricity (ME)	20	Narcissistic and ruthless attitudes in interpersonal functioning
Rebellious Nonconformity (RN)	16	Reckless lack of concern regarding social norms
Blame Externalization (BE)	15	Tendency to blame others for one's problems and to rationalize one's misbehavior
Carefree Nonplanfulness (CN)	9	Attitude of indifference in planning one's actions
Social Influence (SOI)	18	Perceived ability to influence and manipulate others
Fearlessness (F)	14	Absence of anticipatory anxiety concerning harm and a willingness to participate in risky activities
Stress Immunity (STI)	13	Absence of marked reactions to anxiety-provoking events
Coldheartedness (C)	16	Propensity toward callousness, guiltlessness, and lack of sentimentality
<b>Validity scales</b>		
Virtuous Responding (VR)	13	Positive impression management
Deviant Responding (DR)	10	Tendency to admit bizarre symptoms not indicative of known psychopathy
Inconsistent Responding 15 (IR15)	15 item pairs	Tendency to answer related pairs of items in an inconsistent manner
Inconsistent Responding 40 (IR40)	40 item pairs	Alternative longer inconsistency scale

Psychopathy can be further broken down into subtypes. According to Karpman (1941), one of these subtypes is primary versus secondary psychopaths. A primary psychopath would be someone with a genetic predisposition toward the disorder. A secondary psychopath would be someone whose environment (e.g., a traumatic event, neglect, or abuse) triggers this disorder. Interestingly, a primary psychopath may

actually have lower anxiety levels, be less likely to show any emotional expression, and commit more premeditated crimes; whereas a secondary psychopath can easily be more anxious, emotionally explosive, and commit more spontaneous and impulsive crimes (Karpman, 1941). Although the PPI-R does not directly measure/differentiate between primary and secondary psychopathy, it should be able to be deduced from an individual's scores on certain variables within the PPI-R. For example, primary psychopathy is associated with a deficit that may lead a person to inherited traits, such as callousness, lack of empathy, and fear insensitivity (Lander, Lutz-Zois, Rye, & Goodnight, 2012). This would more than likely mean that an individual with traits of primary psychopathy would score higher on certain subscales belonging to the three factors in the content scale of the PPI-R (e.g., Machiavellian Egocentricity, Fearlessness, and Coldheartedness). Since secondary psychopathy is associated with a combination of environmental and inherited factors, these individuals are sometimes able to have emotional connections and experience feelings of anxiety and culpability (Lander et al., 2012). It can be inferred, then, that they would have higher scores on specific items of the content scale (e.g., Machiavellian Egocentricity, Stress Immunity events, Coldheartedness).

In one study, which included an offender sample and a normative group (college students), participants were given several tests simultaneously, as a method of gauging the association between the PPI-R and primary/secondary psychopathy. It was observed that seven of the content scales related to primary psychopathy: ME, RN, BE, CN, SOI, F, and C (see Table 1; Lilienfeld & Widows, 2005). Primary psychopathy was also associated with the total score of the PPI-R, Self-Centered Impulsivity, and Coldheartedness. In this sample, secondary psychopathy was significantly related to six

of the content scales: ME, RN, BE, CN, F, and STI; as well as the total score and Self-Centered Impulsivity (Lilienfeld & Widows, 2005).

Another distinction between subtypes of psychopathy that has been posited is between the successful versus the unsuccessful psychopath. Unsuccessful psychopaths are individuals that have a criminal history, with records of their misconduct (Sifferd & Hirstein, 2013). The unsuccessful psychopath would be more likely to lack impulse control and more likely to commit impulsive criminal acts, while the successful psychopath may possess a small record of misconduct and criminal history or no criminal history of note (Sifferd & Hirstein, 2013). Successful psychopaths do not display some of the less desirable characteristics of the disorder, such as antisocial behavior (Babiak, 2008). They may often be seen as brash, unemotional, uncaring, etc.; however, they are able to lead a fairly normal life. They will more than likely use their psychopathic traits to further their careers, and they tend to operate well in mainstream society (Coyne & Thomas, 2008). Studies have shown that successful psychopaths may have intact neurobiological processes in some domains, such as better executive functioning, and normal prefrontal gray matter and amygdala volumes (Gao, Raine, & Phil, 2010). This could help explain why successful psychopaths are frequently more able to lead a normal lifestyle and able to use noncriminal methods to reach their goals (Gao et al., 2010).

Neuropsychological and neurological deficits, specifically those linked with executive function, are a well-established observation associated with antisocial conduct in children, adolescents, and adults (Moffitt, 1990; Morgan & Lilienfeld, 2000; Raine, 1993). There are two important neuropsychological functions that are implicated when discussing psychopathy, the amygdala and the prefrontal cortex, more specifically, the

ventromedial prefrontal cortex (vmPFC; Blair, 2008). Those with prefrontal cortex damage, or undeveloped prefrontal cortex may display some of the undesirable characteristics of the disorder, especially deficits in emotion regulation and impulse control (Raine, 2002). According to Raine (2002), the prefrontal cortex performs various executive functions such as continual attention, behavioral flexibility to varying contingencies, working memory, self-regulation and self-consciousness, abstract decision-making, preparation, and organization. Structural abnormalities in the prefrontal cortex or damage to this area make individuals more susceptible to displaying the symptoms associated with psychopathy due to deficits in executive function. Critical for the purposes of this study is the commonly held assumption that cognitive control of emotion relies on proper functioning of the prefrontal areas (Ozawa, Matsuda, & Hiraki, 2014). Since aggression is an emotion, and prefrontal damage or undeveloped prefrontal regions are associated with poor emotional control, individuals with prefrontal issues can have a more difficult time regulating their aggression.

Impairments in amygdala function can also cause a person to exhibit signs of psychopathy (Blair, 2007). According to Blair (2007), structural and/or functional abnormalities in the amygdala and ventromedial prefrontal cortex (vmPFC) and connecting fibers place an individual at risk for deficits in decision-making, including deficits in moral decision-making. These structures are critical for the evaluation of items, actions, and events, as well as subsequent response selection (Blair, 2007).

Amygdala activation is typically elicited to stimuli that are arousing, especially those that are associated with emotions (Gallagher & Chiba, 1996). Similar to the problems associated with damage to the vmPFC, neuroimaging has shown that the amygdalae of

psychopaths show less activation relative to controls when the brain is responding to emotional words (Blair, 2007). This suggests that the emotional reactions of psychopaths may not be as intense as non-psychopaths. Furthermore, it has been posited that low levels of amygdala activation are associated with overall low levels of arousal, which may prompt an individual to engage in thrill-seeking behaviors, including criminal activity (Raine, 2002). The amygdala has also been associated with the ability to understand emotions in others (Graham & LaBar, 2012), and psychopaths show deficits in the ability to extract information about emotions from social stimuli such as faces (Blair, Colledge, Murray, & Mitchell, 2001). Therefore, the amygdala plays an important role in how we perceive and respond to emotional events and our ability to empathize with others.

Psychopathy is characterized by various personality attributes; one of these traits, as mentioned above, is aggression. Understanding aggression and the role it has in the disorder is vital. Aggression can be social, physical, and verbal (Ehrenreich, Beron, Brinkley, & Underwood, 2014). It can include an array of acts including, but not limited to, social exclusion, manipulation, hitting, slapping, and malicious gossip (Ehrenreich et al., 2014). Aggression can cause substantial bodily and psychological damage to individuals displaying the trait, as well as to others that may be exposed to it, and it can have negative social and societal implications (Coccaro, Lee, & McCloskey, 2014). Deficiencies in the prefrontal cortex and amygdala have been linked with behavioral/impulse control, and defects in these areas could produce aggressive behavior (Nelson & Trainor, 2007). Individuals with amygdalae that are not fully functioning due to lesions or other developmental issues have been shown to have negative effects when

it comes to aggression (i.e. inability to regulate aggressive behavior; Goldstein, Rasmusson, Bunney, & Roth, 1996). In order to fully appreciate how aggression is related to psychopathy, it is important to understand what is meant by aggression, to explore the four subtypes of aggression, and how they relate to psychopathy.

According to Walters (2006), the first subtype of aggression is known as proactive, or instrumental aggression. This is the type of aggression that psychopaths most often demonstrate (Coccaro et al., 2014). This is where a person exhibits verbal or physical aggression, but with a goal in mind that goes beyond physical violence, such as hijacking a vehicle, or an act of aggression with any other goal-oriented purpose (Cornell et al., 1996). Reactive, or hostile aggression occurs when someone commits violence against another because they are retaliating for a perceived wrongdoing (Walters, 2006), and this is the type least likely to be demonstrated in psychopathic individuals (Coccaro et al., 2014). This is an aggressive act that is sparked by a frustrating or frightening incident, regularly accompanied by anger (Blair, 2008). In other words, it is a form of aggression induced out of provocation (Cornell et al., 1996). Another distinguishing factor between these two types of aggression is that proactive aggression usually occurs when the person committing the violence sees a benefit from committing the offense, while reactive aggression usually occurs when the person committing the aggressive act perceives a threat to his/her person. Understanding the differences between proactive and reactive aggression is relevant to this study because research suggests these two types of aggression are associated with a negative family history (e.g., parents dismissing or invalidating emotions of their children; Skripkauskaite, 2015), as well as psychopathy.

According to Walters (2006), two other facets of aggression are direct and nondirect aggression. Direct aggression is intended to hurt someone by confronting him or her; there is no sneaking around or trying to hide. An example of direct aggression would be punching someone because you are feeling angry. Indirect aggression involves the use of devious methods to cause someone injury or damage, including methods of manipulation to hurt the intended target (Walters, 2006). For example, something as seemingly insignificant as spreading a rumor can be a form of nondirect aggression (Vaillancourt & Sunderani, 2011). Both direct and nondirect aggressions are seen in psychopathic individuals; however, direct aggression is more common with this disorder (Warren & Clabour, 2009). It is key to understand the distinction between direct and nondirect aggression in psychopathy. Given the focus of this research on the relationship between aggression, family function, and psychopathy, it is critical to fully understand the various subtypes of aggression because some forms of aggression may be more prone to environmental influences such as family history. Furthermore, certain forms of aggression are more strongly associated with psychopathy than others. Studies examining these issues are outlined in further detail below.

The importance of distinctions between forms of aggression in discussing its relationship with psychopathy is underscored by a study by Coyne and Thomas (2008) that examined relationships between primary and secondary psychopathy and aggression, primary and secondary psychopathy, as well as the relationship between primary and secondary psychopathy with indirect aggression, direct aggression, and cheating behavior. For the purpose of this study, cheating behavior meant being dishonest in an academic environment. Over 200 participants were used; mostly females, and all were

undergraduates from a large university (Coyne & Thomas, 2008). The study was centered theoretically around the Cheater and Warrior Hawk hypotheses (Book & Quinsey, 2004), which focuses on two psychopathic traits (cheating and aggression), two facets of psychopathy that can be adaptive under certain circumstances (Coyne & Thomas, 2008). While understanding cheating and aggression are relevant to understanding psychopathy, they do not account for possible differences in these traits across primary and secondary psychopaths (Coyne & Thomas, 2008).

Coyne and Thomas (2008) hypothesized that primary psychopathy would be positively linked with elevated levels of cheating behavior and high levels of both direct and nondirect aggression (Coyne & Thomas, 2008) because primary psychopaths have been shown to have lower levels of remorse, compassion, and anxiety relative to secondary psychopaths (making cheating behavior more likely (Cleckley, 1976)). Coyne and Thomas (2008) further hypothesized that secondary psychopathy would be associated with indirect and direct aggression, but not cheating behavior. In other words, secondary psychopaths should show elevated levels of impulsivity predictive of aggression; however, they should also have higher levels of remorse and anxiety compared to primary psychopaths, making cheating less probable (Cleckley, 1976). Results confirmed that cheating behavior, indirect aggression, and direct aggression all predicted primary psychopathy. Furthermore, secondary psychopathy was unrelated to cheating behavior; however, it was related to direct and nondirect aggression (Coyne & Thomas, 2008). Primary psychopathy was better predicted by indirect aggression, whereas secondary psychopathy was better predicted by direct aggression (Coyne & Thomas, 2008). The results of this study suggest that distinctions between subtypes of aggression and

psychopathy are important in understanding relationships between aggression and psychopathy. These distinctions between subtypes of psychopathy and aggression are a major consideration in this research.

The familial background of the individual has been identified as a major risk factor in the etiology of psychopathy (Raine, 2002). It has been suggested that a positive family environment can help to lessen antisocial/violent behavior (Raine, 2002). Negative effects of biological risk factors can predispose individuals to antisocial behavior, but it is widely accepted that the manifestation of psychopathic traits is strongly associated with early childhood experiences, including a negative family setting (Raine, 2002). Similarly, attachment to members of a person's household has been associated with the development of psychopathy (Woods, 2010). This is because when an individual has poor or detached relationships with their main caregivers, it can negatively influence their personality over their lifetime (Arrigo & Griffin, 2004).

Numerous studies have examined the influence of familial background on individuals that display antisocial behaviors. According to Mednick (1977) and Raine and Venables (1981), it has been proposed that there is a "social push" hypothesis. This theory suggests that biological factors are more likely to lead to antisocial behavior in individuals that come from a more stable environment, whereas those that come from environments with more dysfunction may have other socially influenced causes of their antisociality. In other words, environment appears to be a major determinant of psychopathy, but only when the environment is dysfunctional (Raine, 2002). Individuals who have violent backgrounds, social and biological factors combine to influence the development of personality, including psychopathic and/or aggressive traits. Blair (2007)

stated that there are no identified environmental factors alone that can produce the pathophysiology noticed in psychopathy. However, environmental factors in combination with neuropsychological deficits and genetic predispositions can cause the characteristics seen in the disorder (Blair, 2007).

While previous research has established that psychopathy is associated with both aggression and family history, the relationships between these variables are complicated by the fact that negative family history is also associated with aggression and other negative outcomes. For example, experience with trauma in childhood is connected with higher susceptibility to psychiatric disorders (Kendler et al., 2000). Negative family history can cultivate some of the characteristics of psychopathy, particularly aggression. A history of familial aggression, meaning parents that were verbally or physically aggressive towards their offspring, predisposes those offspring to engage in aggressive acts (Garcia, Restubog, Klewitz, Scott, & Tang, 2014).

In a study involving 173 male prisoners, researchers sought to examine the relationship of childhood mistreatment with maladaptive traits (e.g., smoking, illegal substance abuse, self-injurious behavior) and mental health problems (e.g., depression, aggression; Sergeantanis et al., 2014). Individuals were given a questionnaire to assess whether they were abused or neglected as a child, the CAGE questionnaire for alcohol abuse, the Buss-Perry Aggression Questionnaire, the Brown-Goodwin Lifetime History of Aggression, the Barratt Impulsivity Scale, and the Spectrum of Suicidal Behavior Scale. Childhood maltreatment, a poor functioning family environment in particular, was associated with more pronounced aggression and may cause an individual to display aggressive tendencies as an adult (Sergeantanis et al., 2014). Observing parental conflict

and violence, relationship problems between parents and children, or antisocial conduct in a parent can all contribute to developmental problems and predispose individuals to physical aggression in adult relationships (Ehrensaft, 2009).

As outlined in this literature review, while there has been research that establishes solid relationships between psychopathy and aggression, psychopathy and family history, and aggression and family history, it was unclear whether the link between family history and psychopathy was mediated by the relationship between familial history and aggression. On one hand, the association between family history and psychopathy may at least be partially explained by the relationship between family history and aggression. Alternatively, family history and aggression may be independently associated with psychopathy, as well as one another. The overall objective of this research was to examine these interrelationships while maintaining distinctions between subtypes of psychopathy and aggression. Given that both direct and indirect aggression are associated with psychopathy (both primary and secondary; Coyne & Thomas, 2008), a positive relationship between negative family function and psychopathy, as well as higher scores in aggression with individuals who score higher on the PPI-R were expected. Furthermore, more negative family histories should have been associated with higher psychopathy and aggression scores. Interrelationships between these variables are more difficult to predict. For example, aggression could mediate the relationship between family history and psychopathic traits or it could have differential associations with these variables.

The results from this study have the potential to advance our understanding of both aggression and psychopathy, with implications for forensic psychiatry and

psychology. Understanding how environmental influences such as family history shape the development of aggressive tendencies and psychopathy have the potential to allow for early interventions and therapeutic treatments for aggression and psychopathy, as well as other antisocial personality disorders.

### III. RESEARCH DESIGN AND METHODOLOGY

#### *Participants*

Texas State University undergraduate college students ( $N = 188$ ), 59 males and 129 females, were recruited for this study via the Psychology Research Experience (subject pool) in the Department of Psychology (<http://www.psych.txstate.edu/research/PSY1300.html>). Study procedures were approved by the Texas State Institutional Research Board. 45 males fell between the ages of 17-24, 9 were 25-30 years old, and 6 were 31 years of age or older. For the females, 110 fell between the ages of 17-24, 11 were 25-30 years old, and 7 were 31 years of age or older.

#### *Self-report measures*

Three self-report scales were used in this research, as well as basic demographic information (e.g., sex, age, ethnicity, and college classification). The first part of the survey consisted of the demographic questions (mentioned above) included in the McMaster Family Assessment Device (MFAD). The MFAD scale was designed to describe and evaluate families and consists of 53 questions. The MFAD measures structural, organizational, and transitional characteristics of families (Epstein et al., 1983). It is made up of seven scales that measure problem solving, communication, roles, affective responsiveness, affective involvement, behavior control, and general functioning. Studies have concluded that this questionnaire has internal reliability and validity when using the seven scales individually and when using general functioning as an overall predictor as opposed to the individual scores (Kabacoff, Miller, Bishop, Epstein, & Keitner, 1990). In the psychometric study by Kabacoff et al. (1990),

Cronbach's alpha ranged from .83-.86 for the general functioning score. Therefore, the general functioning subscale score was used as an overall index of family history for this study.

The second scale was the PPI-R scale. According to Nikolova (2013), who examined the psychometric properties of the PPI-R in a mixed gender sample, there was internal consistency of the scales, predictive validity in global scores and Self-Centered Impulsivity, and predictive validity in global score with regard to violent offenses. The PPI-R has been shown to have high internal consistency and test-retest reliability (Blonigen, Carlson, Krueger, & Patrick, 2003). Cronbach's alpha coefficients range from .82-.93 for the PPI-R global score and .70-.91 for its subscales (Lilienfield & Andrews, 1996).

The third scale that was used was the Buss Perry Aggression Questionnaire (BPAQ), which consists of 29 questions. This aggression scale was chosen because it is a well-established and tested scale, and has been used to assess aggression in many populations (Gerevich, Bacskai, & Czobor, 2007). This is a self-report survey where individuals report if a question posed on the survey ranges from "extremely uncharacteristic of me" to "extremely characteristic of me" (Buss & Perry, 1992). When scored properly, the survey gives four dimensions of aggression to the rater: physical aggression, verbal aggression, anger, and hostility (Buss & Perry, 1992). Studies have concluded that the BPAQ has appropriate internal consistency, test-retest reliability, convergent validity, and discriminant validity (Valdivia-Peralta, Fonseca-Pedrero, Gonzalez-Bravo, & Lemos-Giraldez, 2014). Valdivia-Peralta et al. (2014) estimated Cronbach's alpha to range between .72-.89.

### *Procedure*

Participants were recruited via the Psychology Research Experience (subject pool) in the Department of Psychology. Participants signed up via the SONA system. Prior to participation, students read a short description of the study and were encouraged to email the primary investigator if they had any questions about the experiment. Individuals who were interested were informed about the study, including the procedures that were used and the variables that were being measured. If they decided to participate, they clicked on a link to an online consent form on the SONA system. Consent was obtained via SONA, and the volunteers were only able to proceed to the survey once they provided consent. Participants then completed the survey, which took approximately 30 minutes.

### *Analytic Strategy*

The design used for this study was a basic, within-subjects design, and the data was analyzed using a regression approach. Preliminary analysis in the form of exploratory correlations was used to decrease the number of predictors used in subsequent regressions. The thought was to use either the three factors of the PPI-R or the eight content scales of the PPI-R in the regression analyses, and which set was used were determined by exploratory correlations. It was also essential to narrow down whether all the subscales of the BPAQ were of importance in this study, or whether fewer scales or composite scores could be used to reduce the number of variables in the regression analyses. Next, a series of multiple regressions were employed to find the significance of family function on physical aggression, with factors of the PPI-R scale

included. Finally, a subsequent series of regressions were used to find the impact of family function on hostility, with factors of the PPI-R scale included.

## IV. RESULTS

### *Exploratory Correlations*

The goal of this study was to investigate the relationship among family function, psychopathy and aggression in a sample of undergraduate college students ( $N = 188$ ). To address this, several zero order correlations were conducted among family function and subscales/factor scores of psychopathy (PPI-R) and aggression (BPAQ).

### *Exploratory Correlations*

Table 2 shows the descriptive statistics for the eight subscales and three factors of the PPI-R for the study sample.

**Table 2**

*Means and Standard Deviations for Eight Subscales/Three Factors of the PPI-R Scale with a Sample Size of  $N = 188$ .*

Variable	<u><i>M</i></u>	<u><i>SD</i></u>
ME	42.19	9.62
RN	34.81	8.40
BE	31.88	8.38
CN	32.96	7.72
SOI	47.74	8.89
F	32.32	9.15
STI	32.06	7.54
C	30.55	7.45
Factor 1	141.80	25.49
Factor 2	112.12	18.84
Factor 3	30.55	7.45

Since the goal of this study was to investigate the relationship among family function, psychopathy and aggression, several zero order correlations were conducted among family function and subscales/factor scores of psychopathy (PPI-R) and aggression (BPAQ). Initial correlations determined that it would be beneficial to use the three factors of the PPI-R scale rather than the eight subscales, some of which were highly intercorrelated. Table 3 shows the correlation matrix of the eight subscales and factors. Among the three factors (Fearless Dominance/Factor 1, Self-Centered Impulsivity/Factor 2, Coldheartedness/Factor 3), family function was significantly correlated with Factor 2,  $r = .271, p < .05$ .

**Table 3**

*Correlation Matrix for Family Function, PPI-R Subscales, and PPI-R Factors.*

	FF	ME	RN	BE	CN	SOI	F	STI	C	F1	F2	F3
FF	1.00											
ME	0.16*	1.00										
RN	0.16*	0.51	1.00									
BE	0.24**	0.46	0.39	1.00								
CN	0.26***	0.44	0.44	0.18**	1.00							
SOI	-0.09	0.29***	0.35	0.13	0.03	1.00						
F	0.03	0.43	0.55	0.22*	0.24***	0.38	1.00					
STI	-0.16*	-0.09	-0.02	-0.16*	-0.23***	0.26***	0.28***	1.00				
C	-0.00**	0.40	0.20**	0.01	0.33	0.15*	0.34	0.30***	1.00			
F1	0.27***	0.83	0.78	0.68	0.67	0.28***	0.49	-0.16*	0.32	1.00		
F2	-0.09	0.31***	0.43	0.10	0.04*	0.76	0.78	0.66	0.35	0.30***	1.00	
F3	-0.00	0.40	0.20**	0.01	0.33	0.15*	0.38	0.30***	1.00	0.32	0.35	1.00

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$

Another set of preliminary correlations including the BPAQ subscales and family function indicated that among the four subscales (physical aggression, verbal aggression, anger, hostility), family function was significantly correlated with physical aggression,  $r = .151, p < .05$  and hostility,  $r = .191, p < .01$ . Table 4 shows the correlations between family function and the four subscales of the BPAQ.

**Table 4**  
*Correlation Matrix for Family Function and BPAQ Subscales.*

	FamFun	PhysAgg	VerbAgg	Anger	Hostility
FamFun	1.00				
PhysAgg	0.15*	1.00			
VerbAgg	0.05	0.41	1.00		
Anger	0.14	0.44	0.49	1.00	
Hostility	0.19*	0.41	0.39	0.49	1.00

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$

After candidate variables were chosen, a series of regressions were conducted in order to determine relationships between psychopathy, family function, and aggression.

#### *Regression*

A series of multiple regression analyses were employed to examine the effect of family function on physical aggression. The mediating effect of psychopathy was also examined. The objective was to determine whether psychopathy mediates the relationship between family function and aggression. Table 5 shows these regression models and the corresponding regression coefficients.

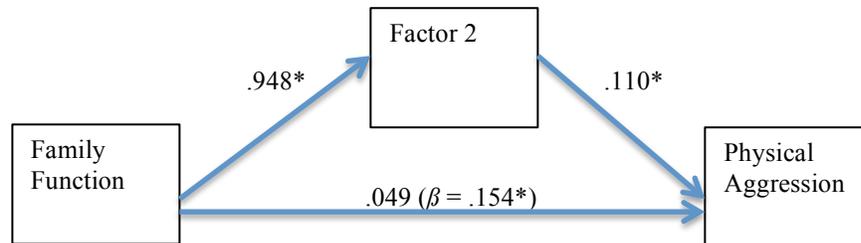
**Table 5***Regression Models for Physical Aggression.**DV: Dependent Variable, IV: Independent Variable,  $\beta$ : Standardized Regression Coefficient, S.E.: Standard Error,  $p$ :  $p$  value,  $R^2$ : Coefficient of Determination*

Model	DV	IV	$\beta$	S.E.	$p$	$R^2$
1	Physical aggression	Family Function	0.154	0.074	0.038*	0.023*
2	Physical aggression	Factor 1	0.042*	0.029*	0.149	0.174
		Factor 2	0.097	0.021*	0.000***	
		Factor 3	0.079	0.073	0.282	
3	Factor 2	Family Function	0.948	0.247	0.000***	0.073
4	Physical aggression	Family Function	0.049*	0.071	0.489	0.156
		Factor 2	0.110	0.020*	0.000***	

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ 

In the first regression, family function served as the predictor, and physical aggression worked as the criterion variable. Results revealed that family function significantly predicted physical aggression,  $\beta = .151$ ,  $t = 2.085$ ,  $p = .038$ . In the second regression, psychopathy Factor 1, 2, and 3 served as the predictors, and Factor 2 significantly predicted physical aggression,  $\beta = .334$ ,  $t = 4.612$ ,  $p < .01$ , but not Factor 1,  $\beta = .106$ ,  $t = 1.448$ ,  $p = .149$ , and not Factor 3,  $\beta = .080$ ,  $t = 1.078$ ,  $p = .282$ . In the third regression, family function served as the predictor and it significantly predicted Factor 2,  $\beta = .247$ ,  $t = 3.833$ ,  $p < .01$ . Lastly, to test the mediating effect of Factor 2 between family function and physical aggression, family function and Factor 2 were used together as predictors to predict physical aggression. Results of this regression revealed the effect of

Factor 2 on physical aggression was still significant ( $\beta = .379, t = 5.395, p = .000$ ). However, the effect of family function on physical aggression did not reach significance,  $\beta = .049, t = .694, p = .489$ . The model below (see Figure 1) illustrates the relationship between family function and physical aggression with the mediating effect of Factor 2. This result suggests that Factor 2 improves the relationship as a mediator, or facilitator, between family function and physical aggression.



*Figure 1. Standardized regression coefficients between family function and physical aggression as mediated by Factor 2 of the PPI-R scale. The coefficient between family function and physical aggression (without controlling for Factor 2) is in parentheses, while the coefficient after controlling for Factor 2 is shown outside.*

Next, a series of multiple regression analysis was employed to examine the effect of the predictor variable, family function on hostility as the criterion. The mediating effect of psychopathy was also examined. Table 6 shows these regression models and the corresponding regression coefficients.

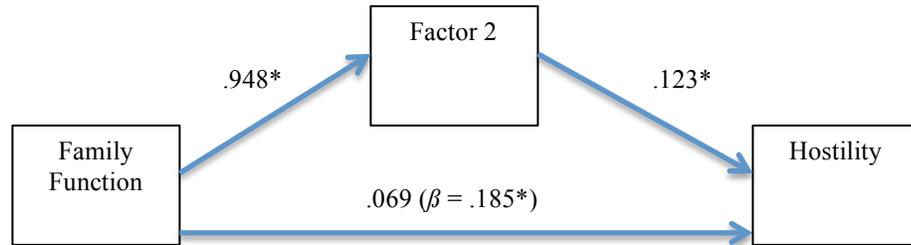
**Table 6***Regression Models for Hostility.**DV: Dependent Variable, IV: Independent Variable,  $\beta$ : Standardized Regression Coefficient, S.E.: Standard Error,  $p$ :  $p$  value,  $R^2$ : Coefficient of Determination*

Model	DV	IV	$\beta$	S.E.	$p$	$R^2$
1	Hostility	Family Function	0.185	0.070	0.009	0.036*
2	Hostility	Factor 1	-0.096	0.025*	0.000***	0.290
		Factor 2	0.157-	0.019*	0.000***	
		Factor 3	0.077	0.065	0.238	
3	Factor 1	Family Function	-0.236	0.189	0.214	0.008**
4	Factor 2	Family Function	0.948	0.247	0.000***	0.073
5	Hostility	Family Function	0.069	0.066	0.294	0.218
		Factor 2	0.123	0.019*	0.000***	

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ 

Results revealed that family function significantly predicted hostility,  $\beta = 0.191$ ,  $t = 2.652$ ,  $p = .009$ . Psychopathy Factor 1 correlated with hostility,  $\beta = -.256$ ,  $t = -3.768$ ,  $p = .000$ , as did Factor 2,  $\beta = .566$ ,  $t = 8.426$ ,  $p = .000$ . However, Factor 3 was not correlated with hostility,  $\beta = -.081$ ,  $t = -1.184$ ,  $p = .238$ . Family function significantly predicted Factor 2,  $\beta = .271$ ,  $t = 3.833$ ,  $p = .000$ . However, family function did not significantly predict Factor 1,  $\beta = -.091$ ,  $t = -1.248$ ,  $p = .214$ . Lastly, to test the mediating effect of Factor 2, family function and Factor 2 acted as the predictors and the criterion was hostility. Results of this regression analysis revealed the effect of Factor 2 on hostility is still significant ( $\beta = .443$ ,  $t = 6.563$ ,  $p = .000$ ). However, the effect of family function on hostility failed to reach significance with the inclusion of Factor 2,

$\beta = .071, t = 1.052, p = .294$ . The model below (see Figure 2) illustrates the relationship between family function and hostility with the mediating effect of Factor 2. This result suggests that Factor 2, again, is a mediator between family function and hostility.



*Figure 2. Standardized regression coefficients between family function and hostility as mediated by Factor 2 of the PPI-R scale. The coefficient between family function and hostility (without controlling for Factor 2) is in parentheses, while the coefficient after controlling for Factor 2 is shown outside.*

## V. DISCUSSION

Psychopathy is a personality disorder associated with well-established maladaptive behaviors such as antisocial behavior, extreme egocentricity, and the inability to establish meaningful relationships or love and to learn from past experiences (Hare, 1996). Psychopathy and APD are not interchangeable, with one of the most important differences being that psychopathy has a solid etiological foundation in neurobiology while APD is not tied to any one specific etiology (Wall, Wygant, & Sellbom, 2014). Individuals that suffer from APD have a disregard for the rights of others, and may be prone to violating laws (DSM-IV-TR, American Psychiatric Association, 2000). The presence of these behaviors can appear at any time during development from early childhood through to adulthood (DSM-IV-TR, American Psychiatric Association, 2000). While psychopathic signs do begin as early as childhood, there are noticeable etiological findings in psychopathy, such as frontal lobe dysfunction and executive dysfunction (Blair, Newman, Mitchess, Richell, Leonard, & Morton, 2006). It is evident that psychopaths are not only antisocial, but they have specific neurocognitive markers that are seen in psychopathic individuals (Perez, 2012).

There is an abundance of literature in several areas of psychopathy, including separate relationships between psychopathy, family function, and aggression. However, the interrelationships between these variables require elucidation. It is well established that psychopathy includes aggressive tendencies in many forms, i.e. social exclusion, manipulation, hitting, slapping, malicious gossip (Ehrenreich et al., 2014). It is also understood by experts in the field that the etiology of psychopathy includes a major risk factor of negative familial history, and a positive home environment or less negativity

within their family unit can decrease the risk of violent and antisocial behavior in individuals predisposed towards psychopathy (Raine, 2002). It is possible that a negative family environment, coupled with deficits in the prefrontal cortex and amygdala, could progress to aggressive tendencies in the absence of intervention. However, increased intervention during childhood (e.g., family therapy, anger management) could help to decrease the risk of aggression in psychopaths. Not all psychopathic individuals necessarily involve themselves with proactive/reactive aggression, or direct/nondirect aggression. Indeed, research suggests that a positive familial background provides emotional support, and a more positive environment overall, which appears to mediate the genetic predisposition toward the disorder (Raine, 2002). The interrelationships between all three of these variables (family function, aggression, and psychopathy) require further examination.

The main objective of this study was to examine the relationships between psychopathic personality traits, aggression, and family function in undergraduate college students. Likewise, the relationship between aggressive response tendencies, family history, and psychopathy was of interest. Previous research suggests that family history can foster or hinder individuals' relationships with family members and contribute to personality disorders. For example, if an individual is predisposed to psychopathy, biological risk factors coupled with negative childhood experiences both contribute to the development of the disorder (Raine, 2002). Furthermore, aggression comes in many different forms (e.g., social, physical, verbal) and is instrumental in psychopathy as a whole (Ehrenreich, Beron, Brinkley, & Underwood, 2014).

It is necessary to understand the classifications of the three factors of the PPI-R as well and how these are related to family history and aggression. Factor 1 “Fearless Dominance” includes the three content scales of Social Influence, Fearlessness, and Stress Immunity. The four content scales of Machiavellian Egocentricity, Rebellious Nonconformity, Blame Externalization, and Carefree Nonplanfulness are included in Factor 2 “Self-Centered Impulsivity”. This factor in particular may be related to aggression, because it should be associated with deficits in emotion regulation and impulse control. And the last, Factor 3 “Coldheartedness” includes the content scale of Coldheartedness alone. Nevertheless, exactly how family history and aggression contribute to different facets of psychopathy, specifically Factor 1 and Factor 2 psychopathy scores, is unclear.

The first hypothesis was that psychopathic traits, specifically those included in Factors 1, 2, and 3 of the PPI-R, would be positively associated with a negative family history. In particular, it was hypothesized that a negative family history would be predictive of psychopathic traits linked with impulsivity, such as Factor 2. The first set of regressions revealed that this hypothesis was partially accurate. The relationship between family function and Factor 2 of the PPI-R was in fact highly significant. However, Factors 1 and 3 were not included in further regressions because the relationship between these factors and physical aggression was not significant. Coldheartedness (Factor 3) was not correlated with any variables of interest, so it was left out of further regressions. Unsuccessful psychopaths, or those that are known to have a more lengthy criminal record (2013), are also more likely to have a negative family history with damaging physical and emotional early childhood experiences (Raine, 2002).

This suggests that a poor home environment does have an effect on an individual's interpersonal functioning, disregard for social norms, blaming others, and a general indifference in attitude as proposed by Raine (2002). The results of the current study converge with previous findings of the relationship between psychopathy and family history.

Walters (2006) found that proactive aggression was the most common subtype of aggression that psychopaths display in general, which includes both verbal and physical aggression. Therefore, the second hypothesis was that individuals who scored higher on the PPI-R would show higher levels of aggression as measured by the BPAQ.

Exploratory correlations revealed that family function correlated with two of the four subscales in the BPAQ: physical aggression and hostility. However, these correlations also revealed that family function was not significantly related to verbal aggression and anger. These results were unexpected because both verbal and physical aggression influence individuals to act in aggressive ways from an early age (Garcia et al., 2014), and aggression in any form is one of the key traits in psychopathy. The above findings are partially consistent with previous research. For example, according to Ehrensaft (2009), individuals are susceptible to engage in physical aggression in adulthood if they are subjected to familial conflict at a young age (e.g., parent conflict/violence, problems between parents/children, or antisocial conduct in one or more parents). Likewise, individuals may also react in a hostile manner when provoked during a family conflict. However, the finding that not all anger subscales were correlated with family function was somewhat surprising.

One possible reason why the relationships between the variables of family function, verbal aggression, and anger were not significant may have been due to the large proportion of female participants in the study. Generally, males tend to be more aggressive and hostile than females (Felson, Savolainen, Hughes, & Ellonen, 2015); therefore, men and women are not similar in how they express anger. Although research suggests that psychopathic traits, such as antisociality and criminal behavior, are similar in men and women (Hare, 2003), a major difference in gender lies with the manifestation of psychopathic traits, or how males and females display their traits (Hare, 1991). For example, women tend to commit fewer sexual crimes and more property crime offenses (Nicholls & Petrila, 2005). Furthermore, women are more aggressive in the home environment, displaying aggression towards family, friends, and acquaintances rather than people they do not know (Robbins, Monahan, & Silver, 2003). The majority of studies that focus on psychopathy employ incarcerated males as the participants; therefore, the profile of results with respect to anger found in this study may be due to the inclusion of women.

The overarching goal of this study was to examine interrelationships between psychopathy, aggression, and family function. Regression analyses revealed that while family function was significantly associated with physical aggression, when Factor 2 “Self-Centered Impulsivity” and family function were used together to predict physical aggression; the relationship between family function and physical aggression became not significant, while the relationship between Factor 2 and physical aggression remained significant. This result suggests that Factor 2 improves, or facilitates, the relationship between family function and physical aggression. Similar results were found for family

function, psychopathy, and hostility: family function was associated with hostility but when Factor 2 was entered, this relationship was no longer observed. Overall, these results suggest that Self-Centered Impulsivity mediates the relationships between family environment and certain kinds of anger (hostility and physical aggression). This result is plausible because individuals with psychopathy, specifically unsuccessful psychopaths, lack impulse control and are more prone to commit impulsive criminal acts (Sifferd & Hirstein, 2013). A tendency toward impulsive behavior for self-gratification may make successful psychopaths more prone to commit acts of physical aggression and/or to react in a hostile manner.

One of the possible limitations of this specific study is the small sample size. While there are well into 30,000+ individuals enrolled at Texas State University, a sample size of 188 participated in the research. Due to the relatively small number of people who participated, the generalizability of the results to a wider population and the ability to find relationships is limited (reduces power). There were some variables that may have shown significant correlations with other variables if a larger sample size had been utilized. For example, the relationship between Factor 3 and family function was not significant; however, an increase in sample size (and the resultant increase in statistical power) could change the strength of observed relationships. An increase in sample size would also allow for the inclusion of more variables in the regressions, allowing researchers to examine higher-order relationships among predictors and criterion variables. Furthermore, the individuals who chose to take part in this study were mainly of a younger age. Being that the sample size was constrained to an

undergraduate, younger, college populace, it is unlikely that the results of this study could be generalizable to the population as a whole.

On a related note, it is unlikely that the results would generalize to a prison population, although there is an overrepresentation of individuals with psychopathy in prisons (Kiehl & Buckholtz, 2010). Most studies that utilize prisoners study males and not females due to a higher incidence of psychopathy in the male prison population, so male samples are much more convenient (Hare, 1996). Therefore, much of the previous research conducted on psychopathic traits has focused on primarily Caucasian male samples (Skeem, Polaschek, Patrick, & Lilienfeld, 2011). Additionally, psychopathy is commonly thought to be more of a male disorder than a female disorder, with males ordinarily displaying greater levels of psychopathic characteristics relative to females (Cale & Lilienfeld, 2002). It is noteworthy that this study included more female than male participants, and still revealed significant relationships between family function and aggression, which were mediated by Factor 2 (impulsivity). Further investigation is necessary to examine the generalizability of the current results to a wider population; however, similar if not stronger interrelationships between family function, aggression and impulsive tendencies in psychopaths would be expected.

One way to further inform the results of this study would be to add neuroimaging. A study by Aziz-Zadeh et al. (2010) used Factor 3 PPI-R scores, Coldheartedness, in conjunction with fMRI scans (and other self-report measures) to link affective empathy and neural activity. They discovered that higher scores on the Coldheartedness scale suggest deficits in empathic capability (Aziz-Zadeh et al., 2010), which coincides with current literature on psychopathy (e.g., lack of empathy). Another fruitful area for

neuroimaging would be to explore family function more deeply with respect to psychopathic traits and structural and/or functional differences in the brain. The cortex as a whole may not be implicated in psychopathy; it appears that only specific areas of the prefrontal cortex and amygdala may be causing the dysfunction in psychopathic individuals (Perez, 2012). These particular parts of the brain (specifically, the amygdala and vmPFC) are heavily involved in impulse control and behavioral problems (Perez, 2012). Some individuals with psychopathic characteristics and brain dysfunction also have important environmental factors in common, such as attachment disorder and antisociality (Perez, 2012). This study could benefit from exploring the relationships between family background and neurocognitive deficits further, and this exploration could provide insight on how early intervention may be advantageous for individuals who display psychopathic traits.

If psychopaths are unable to fully control their actions due to prefrontal cortex and amygdala dysfunction, how can a positive family environment help something that these individuals cannot control? Raine (2002) stated the importance of having a positive family background even in individuals who display the antisocial traits commonly associated with psychopathy. Psychopathic traits as a child due to neurocognitive deficits and genetic predispositions (Blair, 2007) such as underdeveloped or damaged prefrontal cortices, and a dysfunctional environment (Raine, 2002) may create a perfect storm of factors that can influence what kind of adult the child will become. Male psychopaths, who are incarcerated, commonly have a history of negative family influences compared to the non-psychopathic prisoners (Gao, Raine, Chan, Vebables, & Mednick, 2009). Psychopathic individuals tend to report abuse and neglect when they were children (Gao

et al., 2009). Although individuals cannot help their neurocognitive deficits, family background can be a positive or negative factor in psychopathy and the exact reasons how it contributes to the manifestation of the disorder are worthy of further investigation.

Another potential limitation of the current study was that the mood of the participant was not monitored and may have affected responses. It may be beneficial for future studies to take this into account because a person's mood state may affect how he/she completes self-report measures. Self-report measures of psychopathy, specifically the PPI-R, may have questions that can be difficult for some participants to answer. The same holds true for questions contained on an aggression scale, such as the BPAQ, certain items on the scale are more difficult for individuals to respond to than others and individuals in a negative mood state may be more likely to endorse aggressive tendencies. In addition, the variables examined in this study were derived from self-report measures, and self-reports by nature are biased due to the feelings and actions of the person taking the surveys, as well as by social desirability effects. Some of the students may have underreported on more sensitive questions or a question that may be outside their comfort zone, introducing error in subscale and factor scores for all measures used in this study. Another important consideration when using self-report measures for the assessment of psychopathy is that psychopaths are frequently dishonest; therefore they may deliberately respond dishonestly on certain questions (Lilienfeld & Fowler, 2006), which can skew scores and results significantly. It may prove useful to utilize self-report measures in future studies, but combine their use with one-one interviews with a licensed professional with expertise in the area of psychopathy. Similarly, more objective measures (e.g., skin conductance, heart rate, brain activity) can be combined with self-report measures to

establish neurological and/or physiological markers of psychopathy that are less prone to social desirability biases. Nevertheless, although disadvantages in self-report measures exist, there are advantages. Self-report measures are usually brief, and can be administered by individuals with little training (Lilienfeld & Fowler, 2006). Also, interrater reliability is not an issue because self-report measures are completed only by the respondents (Lilienfeld & Fowler, 2006).

To summarize, the main objective of this study was to examine the interrelationships of psychopathy, family function, and aggression. It was hypothesized that psychopathic traits would be positively associated with a negative family history, and also that individuals who scored higher on the PPI-R would display higher levels of aggression. While a strong relationship was initially found between family function and physical aggression, this relationship contained a mediating factor, Factor 2 “Self-Centered Impulsivity”, meaning that Factor 2 affects the impact of family function on physical aggression. Similar results were found between family function and hostility; Factor 2, once again, affected the impact of family function on hostility. These results suggest that in noncriminal or successful psychopaths, self-centered impulsivity may increase the likelihood of physical aggression and/or hostility, especially if there is a background of negative family history in an individual.

By replicating this study, and conducting future research, the potential is there to change the way that psychopathy is conceptualized and a better understanding of its relationship with aggression and family function may lead to early intervention programs to improve emotion regulation skills in children at risk for psychopathy. The importance of family function in this study also underscores the importance of family involvement in

therapeutic interventions for conduct disorders or other at-risk individuals. One way to further inform this line of research would be to add neuroimaging, which can help researchers to better comprehend which areas of the brain are activated while viewing emotional stimuli and relating these activations with self-report measures. This would help to develop interventions that focus on changing the activity of specific brain areas that are associated with psychopathic tendencies. Other factors to consider for future research would be assessing current mood state and using a larger and more diverse sample that includes a wider range of ages, as well as criminal and noncriminal populations. Combining these variables in future research would improve our current understanding of psychopathy and the role biological and environmental factors play in its development.

Understanding the environmental and biological factors that can incline an individual toward a criminal lifestyle versus those who are able to function outside of a prison environment is especially important for the treatment and prevention of criminal behavior. It could better equip clinicians and researchers to assist individuals to avoid aggressive criminal behavior and incarceration, as well as to help at-risk individual function more effectively in the environment around them. We have only just begun to scratch the surface of how interrelationships between genetics and environment contribute to the development of psychopathy, especially with respect to the different aspects of the disorder. This study sought to bridge the gaps in understanding of how family function, psychopathy, and aggression are interrelated and the relative roles of each of these variables. Overall, the findings of this study highlight the relationships between family function, physical aggression, and hostility, suggesting that Self-Centered

Impulsivity is a mediating factor between family function and these particular forms of aggression or that Factor 2 could possibly help elucidate the relationship between family function and physical aggression and the relationship between family function and hostility. Most importantly, this research gives rise to future exploration and questions that can be derived from this study.

## LITERATURE CITED

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5<sup>th</sup> ed.). Washington, DC: Author.
- Anderson, J. L., Sellbom, M., Wygant, D. B., & Edens, J. F. (2013). Examining the necessity for and utility of the psychopathic personality inventory-revised (PPI-R) validity scales. *Law and Human Behavior, 37*(5), 312-320.
- Archer, J., & Webb, I. A. (2006). The relation between scores on the Buss-Perry Aggression Questionnaire and Aggressive Acts, Impulsiveness, Competitiveness, Dominance, and Sexual Jealousy. *Aggressive Behavior, 32*(5), 464-473.
- Arrigo, B. A., & Griffin, A. (2004). Serial murder and the case of Aileen Wuornos: Attachment theory, psychopathy, and predatory aggression. *Behavioral Sciences and the Law, 22*, 375-393.
- Aziz-Zadeh, L., Sheng, T., Gheyntanchi, A. (2010). Common premotor regions for the perception and production of Prosody and correlations with empathy and prosodic ability. *PLoS ONE, 5*(1), e8759.
- Babiak, P. (2008). When psychopaths go to work: A case study of an industrial psychopath. *Applied Psychology, 44*(2), 171-188.
- Benning, S. D., Patrick, C. J., Hicks, B. M., Blonigen, D. M., & Krueger, R. F. (2003). Factor structure of the Psychopathic Personality Inventory: Validity and implications for clinical assessment.
- Blair, R. J. R., Colledge, E., Murray, L., & Mitchell, D. G. V. (2001). A selective impairment in the processing of sad and fearful expressions in children with psychopathic tendencies. *Journal of Abnormal Child Psychology, 29*(6), 491-498.

- Blair, K. S., Newman, C., Mitchess, D.G.V., Richell, R. A., Leonard, A., & Morton, J. (2006). Differentiating among prefrontal substrates in psychopathy: Neuropsychological test findings. *Neuropsychology*, *20*(2), 153-165.
- Blair, R. J. R. (2007). The amygdala and ventromedial prefrontal cortex in morality and psychopathy. *Trends in Cognitive Sciences*, *11*(9), 387-392.
- Blair, R. J. R. (2008). The amygdala and ventromedial prefrontal cortex: functional contributions and dysfunction in psychopathy. *Philosophical Transactions of the Royal Society B*, *363*, 2557-2565.
- Blonigen, D. M., Carlson, S. R., Krueger, R. F., & Patrick, C. J. (2003). A twin study of self-reported psychopathic personality traits. *Personality and Individual Differences*, *35*(1), 179-197.
- Book, A. S., & Quinsey, V. L. (2004). Psychopaths: Cheaters or Warrior-Hawks? *Personality and Individual Differences*, *36*, 33-45.
- Brower, M. C., & Price, B. H. (2001). Neuropsychiatry of frontal lobe dysfunction in violent and criminal behaviour: A critical review. *Journal of Neurology, Neurosurgery & Psychiatry*, *71*(6), 720-726.
- Buss, A. H., & Perry, M. P. (1992). The aggression questionnaire. *Journal of Personality Psychology*, *63*, 452-459.
- Cale, E. M., & Lilienfeld, S. O. (2002). Sex differences in psychopathy and antisocial personality disorder: A review and integration. *Clinical Psychology Review*, *22*(8), 1179-1207.

- Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Craig, I. W., ... & Poulton, R. (2002). Role of genotype in the cycle of violence in maltreated children. *Science*, *297*(5582), 851-854.
- Cleckley, H. M. (1976). *The mask of sanity* (5<sup>th</sup> ed.). Mosby, St. Louis, MO.
- Cleckley, H. M. (1988). *The mask of sanity: An attempt to reinterpret the so-called psychopathic personality* (5<sup>th</sup> ed.). Oxford, England: Mosby.
- Coccaro, E. F., Lee, R., & McCloskey, M. S. (2014). Relationship between psychopathy, aggression, anger, impulsivity, and intermittent explosive disorder. *Aggressive Behavior*, *40*(6), 526-536.
- Cooke, D. J., & Michie, C. (2001). Refining the construct of psychopathy: Towards a hierarchical model. *Psychological Assessment*, *13*(2), 171-188.
- Cooper, B. S., Hughes, H., & Yuille, J. C. (2012). Psychopathy and memory for violence. *International Journal of Forensic Mental Health*, *6*(2), 123-135.
- Cornell, D. G., Warren, J., Hawk, G., Stafford, E., Oram, G., & Pine, D. (1996). Psychopathy in instrumental and reactive violent offenders. *Journal of Consulting and Clinical Psychology*, *64*(4), 783-790.
- Coyne, S. M., Thomas, T. J. (2008). Psychopathy, aggression, and cheating behavior: A test of the Cheater-Hawk hypothesis. *Personality and Individual Differences*, *44*(5), 1105-1115.
- Ehrensaft, M. K. (2009). *Family and relationship predictors of psychological and physical aggression, in psychological and physical aggression in couples: Causes and interventions*. Washington, DC, US: American Psychological Association.

- Ehrenreich, S. E., Beron, K. J., Brinkley, D. Y., & Underwood, M. K. (2014). Family predictors of continuity and change in social and physical aggression from ages 9 to 18. *Aggressive Behavior, 40*(5), 421-439.
- Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster family assessment device. *Journal of Marital and Family Therapy, 9*(2), 171-180.
- Farrington, D. P. (2006). Family background. In C.J. Patrick (Ed.), *Handbook of psychopathy* (pp. 229-250). New York: Guilford Press.
- Felson, R. B., Savolainen, J., Hughes, L. A., & Ellonen, N. (2015). Gender, Provocation, and Intimate Partner Aggression. *Partner Abuse, 6*(2), 180-196.
- Gallagher, M., & Chiba, A. A. (1996). The amygdala and emotion. *Current Opinion in Neurobiology, 6*(2), 221-227.
- Gao, Y., Raine, A., & Phil, D. (2010). Successful and unsuccessful psychopaths: A neurobiological model. *Behavioral Sciences and the Law, 28*, 194-210.
- Garcia, P. R. J. M., Restubog, S. L. D., Kiewitz, C., Scott, K. L., & Tang, R. L. (2014). Roots run deep: Investigating psychological mechanisms between history of family aggression and abusive supervision. *Journal of Applied Psychology, 99*(5), 883-897.
- Gerevich, J., Bacskai, E., & Czobor, P. (2007). The generalizability of the Buss-Perry Aggression Questionnaire. *International Journal of Methods in Psychiatric Research, 16*(3), 124-136.

- Goldstein, L. E., Rasmusson, A. M., Bunney, B. S., & Roth, R. H. (1996). Role of the amygdala in the coordination of behavioral, neuroendocrine, and prefrontal cortical monoamine responses to psychological stress in the rat. *Journal of Neuroscience*, *16*(1996), 4787-4798.
- Graham, R., & LaBar, K. S. (2012). Neurocognitive mechanisms of gaze-expression interactions in face processing and social attention. *Neuropsychologia*, *50*(5), 553-566.
- Hare, R. D. (1991). *The Hare Psychopathy Checklist-Revised*. Multi-Health Systems: Toronto, ON.
- Hare, R. D. (1996). Psychopathy: A clinical construct whose time has come. *Criminal Justice and Behavior*, *23*, 25-54.
- Hare, R. D., Clark, M. A., Grann, M., Thornton, D. (2000). Psychopathy and the predictive validity of the PCL-R: An international perspective. *Behavioral Sciences and the Law*, *18*, 623-645.
- Hare, R. D. (2003). *The Hare Psychopathy Checklist-Revised technical manual* (2<sup>nd</sup> ed.). Toronto, Ontario, Canada: Multi-Health Systems.
- Harris, G. T., & Rice, M. E. (2007). Psychopathy research at Oak Ridge: Skepticism overcome. *The Psychopath: Theory, research, and practice*, 57-76.
- Hemphill, J. F., Hare, R. D., & Wong, S. (1998). Psychopathy and recidivism: A review. *Legal and Criminological Psychology*, *3*(1), 139-170.
- Juarez, M., Kiehl, K. A., & Calhoun, V. D. (2013). Intrinsic limbic and paralimbic networks are associated with criminal psychopathy. *Human Brain Mapping*, *34*, 1921-1930.

- Jones, D. N., & Paulhus, D. L. (2010). Different provocations trigger aggression in narcissists and psychopaths. *Social Psychological and Personality Science, 1*(1), 12-18.
- Kabacoff, R. I., Miller, I. W., Bishop, D. S., Epstein, N. B., & Keitner, G. I. (1990). A psychometric study of the McMaster Family Assessment Device in psychiatric, medical, and nonclinical samples. *Journal of Family Psychology, 3*(4), 431-439.
- Karpman, B. (1941). On the need of separating psychopathy into two distinct clinical types: The symptomatic and the idiopathic. *Journal of Criminology and Psychopathology, 3*, 112-137.
- Kendler, K. S., Bulik, C. M., Silberg, J., Hettema, J. M., Myers, J., & Prescott, C. A. (2000). Childhood sexual abuse and adult psychiatric and substance use disorders in women: An epidemiological and co-twin control analysis. *Arch Gen Psychiatry, 57*, 953-959.
- Kiehl, K., & Buckholtz, J. (2010). Inside the mind of a psychopath. *Scientific American, 22*-28.
- Kolia, N. J., Malcolm, C., Attard, S., Arenovich, T., Blackwood, N., Hodgins, S. (2013). Childhood maltreatment and aggressive behavior in violent offenders with psychopathy. *The Canadian Journal of Psychiatry, 58*(8), 487-494.
- Lander, G. C., Lutz-Zois, C. J., Rye, M. S., & Goodnight, J. A. (2012). The differential association between alexithymia and primary versus secondary psychopathy. *Personality and Individual Differences, 52*(1), 45-50.

- Larsson, H., Andershed, H., & Lichtenstein, P. (2006). A genetic factor explains most of the variation in the psychopathic personality. *Journal of Abnormal Psychology, 115*(2), 221-230.
- Lilienfeld, S. O., & Andrews, B. P. (1996). Development and preliminary validation of a self-report measure of psychopathic personality traits in noncriminal populations. *Journal of Personality Assessment, 66*, 488-524.
- Lilienfeld, S. O., & Widows, M. R. (2005). *Psychopathic Personality Inventory-Revised professional manual*. Odessa, FL: PAR.
- Lilienfeld, S. O., & Fowler, K. A. (2006). The self-report assessment of psychopathy: Problems, pitfalls, and promises. In C. J. Patrick (Ed.), *Handbook of Psychopathy* (107-132). New York: Guilford Press.
- Mednick, S. A. (1977). A bio-social theory of the learning of law-abiding behavior. In S. A. Mednick & K. O. Christiansen (Eds.), *Biosocial bases of criminal behavior*: New York: Gardner Press.
- Moffitt, T. E. (1990). The neuropsychology of delinquency: A critical review. In M. Tonry & N. Morris (Eds.), *Crime and justice: A review of research*. Chicago: University of Chicago Press.
- Morey, L. C. (1991). *Personality Assessment Inventory (PAI)*. Lutz, FL: Psychological Assessment Resources.
- Morey, L. C., & Quigley, B. D. (2002). The use of the Personality Assessment Inventory (PAI) In assessing offenders. *International Journal of Offender Therapy and Comparative Criminology, 46*(3), 333-349.

- Morgan, A. B., & Lilienfeld, S. O. (2000). A meta-analytic review of the relation between antisocial behavior and neuropsychological measures of executive function. *Clinical Psychology Review, 20*, 113-156.
- Nelson, R. J., & Trainor, B. C. (2007). Neural mechanisms of aggression. *Nature Reviews Neuroscience, 8*, 536-546.
- Nicholls, T., & Petrila, J. (2005). Gender and psychopathy: An overview of important issues and introduction to the special issue. *Behavior Sciences and the Law, 23*(6), 729-741.
- Nikolova, N. L. (2013). The psychopathic personality inventory-revised: Evaluation of its psychometric properties, incremental validity, and moderating effects of gender in a correctional sample (Doctoral dissertation). Retrieved from Summit-Simon Fraser University.
- Ozawa, S., Matsuda, G., & Hiraki, K. (2014). Negative emotion modulates prefrontal cortex activity during a working memory task: A NIRS study. *Frontiers in Human Neuroscience, 8*.
- Perez, P. (2012). The etiology of psychopathy: A neuropsychological perspective. *Aggression and Violent Behavior, 17*(6), 519-522.
- Raine, A., & Venables, P. H. (1981). Classical conditioning and socialization- a biosocial interaction. *Personality and Individual Differences, 2*, 273-283.
- Raine, A. (1993). *The psychopathology of crime: Criminal behavior as a clinical disorder*. San Diego: Academic Press.
- Raine, A. (2002). Biosocial studies of antisocial and violent behavior in children and adults: A review. *Journal of Abnormal Child Psychology, 30*(4), 311-326.

- Ritzer, G. (1992). *Sociological theory* (3<sup>rd</sup> ed). New York: McGraw-Hill.
- Robbins, P. C., Monahan, J., & Silver, E. (2003). Mental disorder, violence, and gender. *Law and Human Behavior, 27*(6), 561-571.
- Ross, S. R., Benning, S. D., Patrick, C. J., Thompson, A., & Thurston, A. (2008). Factors of the psychopathic personality inventory: Criterion-related validity and relationship to the BIS/BAS and five-factor models of personality, *16*(1), 71-87.
- Rowe, D. C. (2001). *Biology and crime*. Los Angeles: Roxbury Publishing.
- Rutter, M. L. (1997). Nature-nurture integration: The example of antisocial behavior. *American Psychologist, 52*, 390-398.
- Sergentanis, T. N., Sakelliadis, E. I., Vlachodimitropoulos, D., Goutas, N., Sergentanis, I. N., Spiliopoulou, C. A., & Papadodima, S. A. (2014). Does history of childhood maltreatment make a difference in prison? A hierarchical approach on early family events and personality traits. *Psychiatry Research, 220*(3), 1064-1070.
- Sifferd, K., & Hirstein, W. (2013). On the criminal culpability of successful and unsuccessful psychopaths. *Neuroethics, 6*, 129-140.
- Skeem, J. L., Polaschek, D. L., Patrick, C. J., & Lilienfeld, S. O. (2011). Psychopathic personality: Bridging the gap between scientific evidence and public policy. *Psychological Science in the Public Interest, 12*, 95-162.
- Stryker, S. (1972). Symbolic interaction theory: A review and some suggestions for comparative family research. *Journal of Comparative Family Studies, 3*, 17-32.
- Vaillancourt, T., Sunderani S. (2011). Psychopathy and indirect aggression: The roles of cortisol, sex, and type of psychopathy. *Brain and Cognition, 77*(2), 170-175.

- Valdivia-Peralta, M., Fonseca-Pedrero, E., Gonzalez-Bravo, L., & Lemos-Giraldez, S. (2014). Psychometric properties of the AO aggression scale in Chilean students. *Psicotherma*, 26(1), 39-46.
- Wahlund, K., & Kristiansson, M. (2009). Aggression, psychopathy and brain imaging- Review and future recommendations. *International Journal of Law and Psychiatry*, 32(4), 266-271.
- Wall, T. D., Wygant, D. B., & Sellbom, M. (2014). Boldness explains a key difference between psychopathy and antisocial personality disorder. *Psychiatry, Psychology and Law*, 22(1), 94-105.
- Walters, G. D. (2006). Proactive and reactive composite scales for the psychological inventory of criminal thinking styles. *Journal of Offender Rehabilitation*, 42(4), 23-36.
- Warren, G. C., & Clarbour, J. (2009). Relationship between psychopathy and indirect aggression use in a noncriminal population. *Aggressive Behavior*, 35, 408-421.
- Woods, R. L. (2010). Etiological factors in the development of psychopathy: Gender-based and cross-cultural variations. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 71(1-B), 701.