9-24-2009

Of Fists and Fangs: An Exploration of the Degree to which the Graduation Hypothesis Predicts Future Adolescent Delinquency and Aggression

Cassandra L. Reyes
Indiana University of Pennsylvania

OF FISTS AND FANGS: AN EXPLORATION OF THE DEGREE TO WHICH THE GRADUATION HYPOTHESIS PREDICTS FUTURE ADOLESCENT DELINQUENCY AND AGGRESSION

A Dissertation

Submitted to the School of Graduate Studies and Research

in Partial Fulfillment of the

Requirements for the Degree

Doctor of Philosophy

Cassandra L. Reyes

Indiana University of Pennsylvania

December 2009

Indiana University of Pennsylvania
The School of Graduate Studies and Research
Department of Criminology

We hereby approve the dissertation of

Cassandra L. Reyes

Candidate for the degree of Doctor of Philosophy

July 21, 2009 — Signature on file
Rosemary L. Gido, Ph.D.
Professor of Criminology, Advisor

July 21, 2009 — Signature on file
David L. Myers, Ph.D.
Professor of Criminology

July 21, 2009 — Signature on file
John A. Lewis, Ph.D.
Assistant Professor of Criminology

July 21, 2009 — Signature on file
Claire J. Dandeneau, Ph.D.
Professor of Counseling

ACCEPTED

Signature on file
Michele S. Schweitz, Ph.D.
Assistant Dean for Research
The School of Graduate Studies and Research

Title: Of Fists and Fangs: An Exploration of the Degree to which the Graduation Hypothesis Predicts Future Adolescent Delinquency and Aggression

Author: Cassandra L. Reyes

Dissertation Chair: Rosemary L. Gido, Ph.D.

Dissertation Committee Members: David L. Myers, Ph.D.
John A. Lewis, Ph.D.
Claire J. Dandeneau, Ph.D.

Prior limited research has focused on the Graduation Hypothesis and its ability to predict future behavior. The recent growth in the number of juvenile arrests for violent offenses creates a need to be vigilant of childhood behaviors that could escalate into more violent behavior. The present research, utilizing secondary data from the Project on Housing Development in Chicago Neighborhoods (PHDCN) longitudinal study, focused on the degree to which the Graduation Hypothesis could predict adolescent delinquency and aggression based on the commission of childhood animal cruelty, hyperactivity, bed wetting, delinquency, aggression, alcohol/drug usage, and poor school work. This task was only partially accomplished because of the small number of children who indicated they committed animal cruelty and used alcohol/drugs. In addition, an attempt was made to determine whether female fire setters progress into adolescent delinquency and aggression. However, again, due to the few female fire setters in the sample, this analysis could not be performed.

This present research did reveal information on the children and their families in the PHDCN with regard to several significant relationships between adolescent delinquency and aggression. It was discovered that gender, hyperactivity, familial dysfunction, childhood delinquency, and childhood aggression were significantly related to adolescent delinquency. In addition, childhood hyperactivity and aggression, along

with familial dysfunction were significantly related to adolescent aggression within this sample. These statistically significant findings provide some insight on childhood behaviors and familial situations which could lead to future delinquency and aggression.

ACKNOWLEDGEMENTS

I cannot believe that I finally came to the end of this long and often grueling journey. I learned a lot about myself along the way. I found the inner strength to continue my stride after I stumbled, ever focused on the finish line. However, I could not have completed this voyage without the guidance and support of several people.

First, I would like to thank my dissertation committee chairperson, Dr. Rosemary Gido. Rosemary, I truly appreciate your direction and mentoring throughout this process. I am grateful for your steadfast guidance over these past few years. You have taken me under your wing and I aspire to follow in your footsteps. You have instilled the skills necessary for me to become a great professor. You have been more than a mentor and a colleague to me, you became a friend. I do not believe that I would have finished this dissertation without you.

Second, I would like to thank my committee members, Dr. David Myers, Dr. John Lewis, and Dr. Claire Dandeneau, without each of you; this process would not be complete. Dave, I thank you for staying committed to this project, even when your University responsibilities increased. You have been a remarkable role model and a valued committee member. You have supported me through the ups and downs and I have learned a lot from you. For this, I am grateful. John, my “Stats Go to Guy,” your statistical assistance has been priceless. I could always count on you for patient explanations, especially factor analysis, no matter how many times I confused myself. Your door was always open and I could rely on your sense of humor when I was frustrated. Thank you for everything. Last, but definitely not least, Claire, it means so much to me that you took time out of your hectic schedule to serve on the committee. By

making me think outside of the box (the criminological approach) and look through the counseling lens to see another perspective. Thank you again.

Thirdly, there are three other people who especially cheered me on during my recent time here at IUP, Dr. Alida Merlo, Mrs. Donna Griffith, and Mr. Dennis Hulings. Dr. Merlo, my "Expeditor," you are a phenomenal mentor and always kept me on track. You knew to crack the whip when I lacked motivation and when to let me take a break. You have inspired me to go as far along my professional path as I desire. Thank you for being so supportive. Donna, you have been a fabulous guide for me during this expedition called graduate school. You taught me how to dust off the dirt when I fell and not to throw in the towel when I wanted to quit. You also knew how to rein me in when I was too involved with University commitments so that I could accomplish this ultimate goal. Denny, you are a tremendous leader. You taught me to keep smiling and my chin up when things became difficult. I will never forget the hurdles that we crossed together.

Next, I would like to thank my family and friends. Mom, Dad, Randy, Jackie, Grandma Bullers, and Grandma Jordan, thank you for raising me to become the woman that I am today. Megan, Carl, Seth, Aunt Beth, Uncle Lowell, Jordan, Hunter, Aunt Sue, Uncle Doug, and Laura, thank you for being there through thick and thin. To my girls, Audrey and Robyn, you two are the best friends anyone could ask for. Although we do not talk or see each other as often as we would like, we always have been there for each other. To all of my family and Jaime's, your support and love have made me strong enough to face any challenge head-on, no matter how complicated. I also thank our cats, Honey Girl and Dylan, who have been by my side throughout this chapter of my life.

Most importantly, I would like to thank my soul mate and husband, Jaime. Words will never express how indebted I am to you. You are the reason why I have made it this far and I cannot imagine even one day without you in my life. You made so many selfless sacrifices so that I could focus on my education. You have put up with my mood swings and loved me unconditionally. You made me laugh until I cried when I became aggravated and taught me not to sweat the small stuff. I am eternally grateful for everything you have done for me. You know that I will do anything for you and will support you in whatever path you choose to take. I am truly blessed to have you by my side. I love you now and forever.

I would like to dedicate this dissertation to the memory of those who have passed on before me, especially to my grandfathers, Walter Bullers and Bill Jordan; my friend, Kathy Shupp; and Sammy. Grandpa Bullers, you always told me that I could accomplish anything I set my mind to and your words rang true. Grandpa Jordan, I am still grieving from losing you last year. You were there to help raise me and I still feel your presence around me. Kathy, you left this earth way too young. You were such a strong woman and a terrific friend. Sammy, you were with me for most of this journey. I know that I will see you again on the Rainbow Bridge.

This section of the journey has ended so that the next one can begin. However, according to an old Irish proverb, “The longest road out is the shortest road home” (Author unknown).

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I: THE NEED TO EXAMINE THE GRADUATION HYPOTHESIS

> The expression of hostile feelings may take the form of recurrent cruelty, as when a child hatches schemes to hurt another innocent person, or sets fire to ant hills, or goes out of his way to kill frogs, toads, and other creatures. The subject of cruelty in children is in need of study from a developmental point of view, for "cruel" behavior may represent varying combinations of hostility, thoughtlessness, and exploratory interest at different developmental levels. (Jersild, 1954, p. 888)

Introduction

The arrest rate of violent juvenile offenders has recently been on the rise, prompting an examination of potential avenues to predict and prevent this behavior. The Graduation Hypothesis could be one such approach. The Graduation Hypothesis suggests that people who are cruel to animals progress or graduate into more serious forms of interpersonal violence (Arluke, Levin, Luke, & Ascione, 1999; Beirne, 2004; Wright & Hensley, 2003; Zilney, 2003). The Graduation Hypothesis has some similarities to Moffitt's (1993) life-course persistent development theory, which outlines the progression of children into antisocial behavior later in life. However, there has been limited testing of the Graduation Hypothesis to determine its usefulness.

Much of the research stemming from the Graduation Hypothesis focuses on murderers and other prisoners. It is untested in childhood and early adolescence to determine if early warning signs are being missed. This gap in the literature has been partially addressed by the present research. The purpose of the present study was to assess the degree to which the Graduation Hypothesis predicts the progression from animal cruelty and other childhood behaviors such as hyperactivity, delinquency, and

aggression to adolescent delinquent and aggressive behavior via a secondary data analysis. This investigation has been conducted utilizing data from a longitudinal study that followed 4,850 children and their primary caretakers from 1994 to 2002.

Overview of the Problem

If the degree to which the Graduation Hypothesis predicts future behavior is statistically salient, it could be applied to assist with the prevention of violent juvenile offending. However, a foundation created with evidence of an increase in juvenile violence should be constructed first. A summary of juvenile offenses including animal cruelty cases and violent juvenile arrest rates provided a basis for testing this hypothesis. Subsequently, a review of the literature on the relationship between several childhood behaviors, including animal cruelty, delinquency, and aggression, and future delinquent, aggressive, and firesetting behavior follows. Next, theoretical perspectives beginning with developmental theories and focusing on the Graduation Hypothesis are discussed. This provides the support to warrant further examination of the Graduation Hypothesis.

Previous Research

One possible predictor of juvenile violent offenses and other delinquent behaviors is the commission of cruelty to animals during childhood. There have been a number of studies about the relationship between animal cruelty and future delinquent and aggressive behavior, which is reviewed in Chapter II.

Chapter II begins with an overview of two types of violent juvenile behavior, animal cruelty and other offenses. For example, between 2000 and 2008, there were 725 cumulative animal abuse cases committed by persons under the age of 18 within the United States listed on Pet-Abuse.com (Pet-Abuse.com, 2008). Other violent juvenile

offenses include assault and murder. The Office of Juvenile Justice and Delinquency Prevention (OJJDP) (2007) and Zahn, et al. (2008) have provided information about the increase in the arrest rates for juvenile violent offending. A more in-depth examination of these data follows in Chapter II.

Animal cruelty can be a precursor to future delinquent and aggressive behavior (Flynn, 2000). Several studies assessed this relationship, which also would lend support to the Graduation Hypothesis (Arluke et al., 1999; Ascione, 1993; Beirne, 1995; Felthous & Kellert, 1987; Goodney-Lea, 2005; Merz-Perez, Heide, & Silverman, 2001; Santtila & Haapasalo, 1997; Tallichet & Hensley, 2004). Some research has established a relationship between prior animal cruelty and future juvenile delinquency (Becker, Stuewig, Herrera, & McCloskey, 2004; Dadds, Whiting, & Hawes, 2006; Felthous, 1981; Henry, 2004; Tapia, 1971). Homicidal behavior also has been determined to be another behavior resulting from earlier animal cruelty (Beirne, 1999; Sauder, 2000; Thomas & Beirne, 2002). Further, it has been concluded that childhood animal cruelty also can lead to future deviant sexual behavior (Ascione, 1999; Fleming, Jory, & Burton, 2002; Hensley, Tallichet, & Singer, 2006; Tapia, 1971). These studies have supported the progression from animal cruelty to delinquent and aggressive behavior, which is the main premise of the Graduation Hypothesis.

The relationship of animal cruelty to firesetting is another area of study. Several studies have found support for this linkage (Felthous & Yudowitz, 1977; Heath, Hardesty, & Goldfine, 1984; Hellman & Blackman, 1966; Tapia, 1971; Wax & Haddox, 1974; Yarnell, 1940). Further information about this connection is provided in Chapter II.

Although several studies provided support for the relationship between animal cruelty and delinquent and aggressive behavior, other research contradicts those results. For example, Miller and Knutson (1997), Piper (2003), and Piper and Myers (2006) have all conducted research that disputes this support. This contradiction provides cause for further examination of the potential link between animal cruelty and future delinquent and aggressive behavior.

Chapter II provides a discussion of the theoretical perspectives. The Graduation Hypothesis is similar in concept to developmental theories. Therefore, the section on theoretical perspectives begins with a broad review of the developmental theories literature. The discussion then critiques the Graduation Hypothesis.

Developmental theories explain the links between behavior and crime as a person matures from childhood. There also may be precursor behaviors that predict future delinquent and aggressive behavior (Thornberry, 2005). For instance, numerous studies have verified that childhood antisocial behavior could predict future delinquent behavior along with adult aggression, antisocial behavior, and criminality (Donker, Smeenk, van der Laan, & Verhulst, 2003; Loeber, 1982; Loeber & Dishion, 1983; Loeber & Schmaling, 1985; Moffitt, 1993, 1990; Robins, 1978; Robins & Ratcliff, 1979; Robins & Wish, 1977; Sampson & Laub, 1992, 1990; Simons, Wu, Conger, & Lorenz, 1994; White, Moffitt, Earls, Robins & Silva, 1990). This progression of behaviors would provide a foundation for the Graduation Hypothesis.

A few studies have refuted the Graduation Hypothesis (Beirne, 2004; Bulc, 2002; Cahill, 2002) suggesting the findings supporting the theory were based on poorly designed studies. However, one suggestion was made to assist with future testing of the

hypothesis. Beirne proposed better clarification of the terms included in animal cruelty and recommended testing of the hypothesis based on longitudinal studies. The latter is a recommendation that is one of the main goals of the present research.

Limitations of Previous Research

Although there have been a number of studies conducted about the relationship between animal cruelty and future delinquent and aggressive behavior, they have not been without limitations. Several of the studies that focus on inmates and college students create a problem with generalization. Because much of the research has incorporated past behavior, issues with recall make it possible that the respondents were not providing accurate information. In addition, some of the Graduation Hypothesis research has centered on serial killers, who are relatively rare. Finally, as suggested by Beirne (2004), there is an apparent lack of longitudinal studies assessing this relationship. The aim of the present research was to fill these gaps by testing the Hypothesis through an analysis of the data collected through a longitudinal study.

The present study has conducted a secondary data analysis using data collected from children and adolescents along with their primary caregivers who reside in a large city in the United States. Next, the respondents were asked to answer questions based on behaviors exhibited within the previous six months. This should deal with issues of recall. Finally, as previously stated, the data have been elicited from a longitudinal study, thus allowing for an assessment of the causal relationship between childhood animal cruelty and subsequent adolescent delinquency and aggression.

Conceptual Model

Because the present research utilized data collected through a longitudinal study, it attempted to assess the degree to which the Graduation Hypothesis predicts an individual's actions. The present study partially answered three research questions that evolved from the previous literature about the Graduation Hypothesis. To answer these questions, three hypotheses were formulated from the prior research testing the Graduation Hypothesis.

The first hypothesis tested the progression from childhood bed wetting, delinquency, aggression, hyperactivity, and poor school work to adolescent delinquent behavior. The second hypothesis has investigated the graduation from childhood, bed wetting, delinquency, aggression, hyperactivity, and poor school work into adolescent aggressive behavior. Depending on the situation, the definitions for delinquent and aggressive behavior can include different actions. For example, delinquency is behavior against the criminal code by a person who is under the age of 18, but it can include acts such as truancy, which is not considered to be against the criminal code (Bartol & Bartol, 1989). In addition, some definitions of aggression have included the attributes of the behavior, assumptions about the instigators, or the intent of the actions (Bandura, 1973). As a result, both of these behaviors have been operationalized (see Chapter III) as they relate to the present study. Finally, the third hypothesis focused specifically on females. It was proposed to analyze the progression from childhood firesetting, bed wetting, animal cruelty, delinquency, aggression, hyperactivity, alcohol/drug usage, poor school work, destruction of own property, physical interpersonal attacks, truancy, and vandalism to adolescent firesetting.

Based on the hypotheses, 16 variables, 3 dependent and 13 independent variables, have been considered. These variables are described in detail in Chapters II and III. The specifics about the methodology of the proposed study will be discussed in depth in Chapter III.

The Purpose of this Research

The recent growth in juvenile arrest rates for violent offenses creates a need to be vigilant of childhood behavior that may escalate into more violent behavior. However, the prior research that has focused on the degree to which the Graduation Hypothesis predicts future behavior has been limited. Conducting an analysis using data from a longitudinal study to test the degree to which the Graduation Hypothesis predicts future behavior can afford support for this progression of behavior. The present study adds to the research by addressing the previously noted limitation. In addition, no known studies have tested the Graduation Hypothesis through longitudinal data; this study assists in filling the void in this research.

The present research has concentrated on several issues regarding the Graduation Hypothesis and animal cruelty relationships with other behaviors. It is necessary to test the Graduation Hypothesis to determine the extent it can predict adolescent behavior based on childhood behavior. The study also attempted to explore whether children who engage in animal cruelty progress into delinquent and aggressive behavior.

Policy Implications

The Office of Juvenile Justice and Delinquency Prevention (OJJDP) (2007) and Zahn et al. (2008) have documented the recent increase in violent juvenile arrest rates. This trend creates a need to provide possible modes to predict and prevent this behavior.

Further examination of the Graduation Hypothesis could produce a means to identify possible precursory behavior that leads to some forms of delinquent and aggressive activity. Early intervention programs that involve individual, family, school and community prevention also could prevent this future behavior (Welsh & Farrington, 2007). Sauder (2000) also suggested intervention at an early age because childhood behavior is more important than adolescent behavior in predicting future violence and may be easier to treat and control.

CHAPTER II: LITERATURE REVIEW

> If he is not to stifle his human feelings, he must practise [sic] kindness toward animals, for he who is cruel to animals becomes hard also in his dealings with men. We can judge the heart of a man by his treatment of animals. (Kant, trans. 1963, p. 240)

Although the field of criminology does not research animal cruelty extensively, sociological and psychological research has documented this relationship between this type of behavior and other behaviors, including juvenile delinquency and aggression. For example, psychologists and psychiatrists have studied animal cruelty and found it to be an integral part of understanding human violence. In 1905, Freud advised his fellow psychoanalysts to be vigilant in cases of childhood animal abuse because of its connections to other forms of violence (as cited in Ascione & Arkow, 1999). Since that time, numerous articles and books have been published about this topic.

The first section of this chapter focuses on two areas of violent juvenile behavior, animal cruelty and offenses against people. A review of the literature about the relationship between childhood animal cruelty and future delinquency and aggression follows. Finally, theoretical perspectives, stemming from developmental theories and the Graduation Hypothesis, are discussed as they relate to a child's progression from the commission of animal cruelty and other behaviors to juvenile delinquency, aggression, and firesetting.

Overview of Juvenile Animal Cruelty and Violent Behavior

This section provides data about recent violent juvenile offenses related to animal cruelty. It begins with a discussion about the gender and age of the offender. Next, the rates of juveniles who commit various acts of animal cruelty are presented. This section closes with an examination of the trend of juvenile violent interpersonal offense arrests.

Animal Cruelty Cases

Current available statistics about animal cruelty throughout the United States can provide information about the extent of this problem. In addition to the literature, according to Gerbasi (2004), Pet-Abuse.com is one such source for these data. Pet-Abuse.com is a website dedicated to presenting nationwide statistics about both alleged and convicted abusers in animal abuse cases. Since its inception in December 2001, Pet-Abuse.com has maintained a cumulative listing of animal abuse cases. The majority of the cases recorded have occurred since 2000. Pet-Abuse.com obtains the majority of its data from court documents, police reports, and the media. Although these methods often are flawed due to underreporting of cases, it does provide a good basis for the number of known animal cruelty cases in the United States.

As of March 17, 2008, Pet-Abuse.com (2008) listed 9,127 cumulative animal abuse cases within its system. In Appendix A[1], there is a graph of cases by age and gender of the alleged or convicted perpetrator (Pet-Abuse.com). This graph shows that the number of animal abuse cases, 1,811, peaked for both male and female offenders who were between the ages of 31 and 40 years old (Pet-Abuse.com). However, when we

[1] Pet-Abuse.com and the Animal Abuse Registry Database Administration System (AARDAS) project created this graph.

examine rates for individuals aged 15 to 25, the younger group committed 2,406 offenses (Pet-Abuse.com). This rise was followed by a decrease to 954 cases committed by the 26 to 30 age group.

A summary of animal cruelty offense cases, specifically by gender and age range of the offenders, is provided in Appendices B through O[2] as follows:

Appendix B: Number of beating cases;

Appendix C: Number of bestiality cases;

Appendix D: Number of "burning-caustic substances" cases;

Appendix E: Number of "burning-fire or fireworks" cases;

Appendix F: Number of "choking/strangulation/suffocation" cases;

Appendix G: Number of drowning cases;

Appendix H: Number of fighting cases;

Appendix I: Number of hanging cases;

Appendix J: Number of "kicking/stomping" cases;

Appendix K: Number of "mutilation/torture" cases;

Appendix L: Number of poisoning cases;

Appendix M: Number of shooting cases;

Appendix N: Number of stabbing cases; and,

Appendix O: Number of throwing cases.

Given these data, what do the numbers relay regarding animal abuse variation by gender and age? Because females generally commit the offenses at different frequencies and ages than males, they will be discussed separately. In addition, because the focus of

[2] Pet-Abuse.com and the AARDAS project created these graphs.

this present study is delinquent and aggressive behavior, only the aggressive and violent offenses were highlighted. These are offenses that if committed interpersonally would be listed under the Violent Crime Index, and they could be considered acts of physical aggression. The purpose of the present research is to study the behavior of individuals under the age of 18 years old; therefore, only the offenses performed by the abusers who are younger than 18 were listed. These offenses also were presented according to Pet-Abuse.com's (2008) age ranges that are "under 10," "10 to 14," and "15 to 17" years old.

Pet-Abuse.com (2008) listed 725 total abusers under the age of 18 years; this includes all types of animal cruelty within their system. However, when only the aggressive and violent offenses were selected, there were 649 abusers under the age of 18. Each offense and age range was highlighted in turn. The offenses were listed in descending order from the highest number of abusers to the lowest. In addition, a graph of each of the offenses was referenced. Both genders were discussed in this manner, starting with the males. As mentioned earlier, all of the abusers listed were under the age of 18

Male Abusers

Pet-Abuse.com (2008) listed several aggressive and violent offenses that were committed by either alleged or adjudicated juvenile males. In total, there are 147 cumulative cases of males committing the act of "beating" since 2000 (Appendix B). One-hundred-three abusers were listed under the category of "shooting" and 102 were under the offense of "burning-fire or fireworks" (Appendices M and E, respectively). The offense of "mutilation/torture" showed 72 abusers; "fighting" had 70 abusers, and "stabbing" listed 30 abusers (Appendices K, H, and N, respectively). Twenty-four

abusers were listed under “throwing;” 21 were under “kicking/stomping,” and 9 under “hanging” (Appendices O, J, and I, respectively). Seven abusers were listed under “drowning” (Appendix G). “Bestiality,” “choking/strangulation/suffocating,” and “poisoning” each had six offenders (Appendices C, F, and L, respectively). The final offense, “burning with caustic substances,” listed five abusers (Appendix D). The three age ranges and the top three offenses for each are discussed next.

According to Pet-Abuse.com (2008), the abusers who were under the age of 10 were responsible for 21 cases of “beating,” 6 cases of “mutilation/torture,” and 4 cases of “drowning.” The next age range, 10 to 14-year-olds, committed a slightly different order of offenses. There were 47 abusers listed under “beating,” 38 under “burning-fire or fireworks,” and 26 listed under “shooting.” Finally, the 15 to 17-year-olds committed similar offenses as the younger group. Pet-Abuse.com listed 79 abusers under “beating,” 77 under “shooting,” and 62 under the offense of “burning-fire or fireworks.” Overall, the violent nature of these offenses should be a concern to the criminal justice and social service systems due to their relationship with future interpersonal violence, which is discussed subsequently.

Female Abusers

The female abusers exhibited a slightly different trend in their aggressive and violent offending than the males. According to Pet-Abuse.com (2008), the largest number of juvenile females, 11, committed the offense of “mutilation/torture” (Appendix K). The offenses of “beating” and “burning-fire or fireworks” each listed seven abusers (Appendices B and E, respectively). There were four abusers listed under the offense of “throwing” and three under “kicking/stomping” (Appendices O and J, respectively). The

offenses of “choking/strangulation/suffocating” and “stabbing” each listed two offenders (Appendices F and N, respectively). Whereas, “bestiality,” “burning with caustic substances,” “fighting,” “hanging,” and “poisoning” each had one abuser listed (Appendices C, D, H, I, and L, respectively). Notably, there were no female abusers listed under “drowning” and “shooting” (Appendices G and M, respectively).

The three age ranges of the female abusers also were different from the males. According to Pet-Abuse.com (2008), no female abusers under the age of 10 committed animal cruelty. In the age range between 10 and 14 years old, four abusers committed “mutilation/torture” and two committed “burning-fire or fireworks.” Additionally, there was one abuser listed under each of the offenses of “bestiality,” “hanging,” “kicking/stomping,” and “throwing.” The final group, ages 15 to 17 years old, displayed a similar trend. There were seven abusers listed under the offense of “mutilation/torture,” six under “beating,” and five under “burning-fire or fireworks.” Although the numbers of females who were listed for the offenses were remarkably smaller than the males, 41 total females compared to 608 total males, the statistics do show that this is a problem affecting society regardless of the gender of the perpetrator.

The act of animal cruelty is not the only type of aggression or violence that today’s youths demonstrate. The juvenile arrest rate for violent offenses has been a recent upward trend. The next section provides some insight about this increase in juvenile violent arrest rates.

Other Juvenile Violent Offenses

The Office of Juvenile Justice and Delinquency Prevention [OJJDP] (2007) reported that, overall, juvenile arrest rates for offenses included in the Violent Crime

Index, which encompasses offenses such as murder, forcible rape, robbery, and aggravated assault fell between 1994 and 2003. Zahn et al. (2008) echoed a similar trend from 1980 to 2003. However, this appeared to be due to changes in boys' arrest rates. Zahn et al. concluded that this is a reasonable justification because the arrest rates for girls during that time increased 46% for the offenses in the Violent Crime Index. In addition, according to the OJJDP, the overall rate rose 12% between 2004 and 2006. Recently, in 2006, there were 302 arrests for every 100,000 juveniles between the ages of 10 and 17 for those violent offenses (OJJDP). This totals 100,700 juvenile arrests for violent offenses in 2006 (OJJDP). An examination of juvenile arrest rates for specific violent offenses, including arson, follows.

The OJJDP (2007) found that of the juvenile arrest rates for violent offenses, which include murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault, murder displayed the greatest increase. Between the mid-1980s until it peaked in 1993, the juvenile arrest rate for murder has more than doubled; however, it declined in 2004 to a rate of 77% below the 1993 level (OJJDP).

The juvenile arrest rate for aggravated assault decreased 40% between 1980 and 2006 (OJJDP, 2007). Other offenses such as forcible rape and arson also declined 30% and 5%, respectively, since 1994 while the rate for robbery increased 53% after 2002 (OJJDP). In addition, the juvenile arrest rate for weapons offenses has inflated 33% since 2002 (OJJDP). Although 1994 was the peak year for juvenile violent offense arrests, there is evidence that the overall violent arrest rate is again on the rise.

According to Zahn et al. (2008), there also has been an increase in girls' violent offenses between 1980 and 2005. Although the previous statistics consisted of both male

and female juveniles, the trend of arrest rates of girls should be noted. In fact, by 2004, girls were reported to account for 30% of all juvenile offenses. In 2005, girls comprised 24% of all juvenile arrests for aggravated assault. Even though this is a smaller portion than that of the males, the growth of their arrest rates was higher than the males for aggravated assaults. Specifically, the arrest rate for girls in 2003 for aggravated assault was 88.3 girls per 100,000 compared to 45 girls per 100,000 in 1980 (Zahn et al., 2008). During the same period, the boys' arrest rate for aggravated assault only increased 12.5% from 239.4 boys per 100,000 in 1980 to 269.5 boys per 100,000 in 2003.

Interestingly, the increase in the number of juvenile arrests for violent offenses has occurred while the population of persons under the age of 18 has remained virtually the same. According to the OJJDP (2007), in 1999, 70.5 million people in the United States were under the age of 18, which represented more than 25% of the population. This segment of the populous is increasing at a slower rate than other age groups. The OJJDP reported that the number of persons under the age of 18 is expected to increase 8% between the years of 1995 and 2015. This increase of persons under 18 years old is at a much slower rate compared to the expected rise in the rates of 22% for the age group of 18 to 24 years, 18% between the ages of 25 to 64, and 36% for those aged 65 and older (OJJDP). Although the population of juveniles has and is expected to remain relatively stable, the growth in juvenile arrest rates for violent offenses warrants further examination for possible ways to predict this behavior.

The statistical overview of aggressive and violent juvenile behavior, including animal cruelty and interpersonal offenses, has demonstrated the empirical base for the present research. Although the sources for this information have not provided any

theoretical explanations for these behaviors, possible causal factors are discussed in the theoretical perspectives section at the end of this chapter. However, research that has evaluated the causal link from animal cruelty to future delinquent behavior is introduced first.

Future Behavior Indication

A number of studies have found support for the relationship between childhood animal cruelty and future delinquent, aggressive, and violent behavior. This section opens with a review of the literature that assesses the connection between animal cruelty and juvenile delinquency. A discussion about aggressive and violent behavior follows. This section then closes with information about research that is contradictory to these studies.

Juvenile Delinquency

Gifts (2003) defined *juvenile delinquent* as follows: ". . . minors who have committed an offense ordinarily punishable by criminal processes, but who are under the statutory age for criminal responsibility" (p. 284). Therefore, when a juvenile commits such an offense, the action is considered juvenile delinquency (Gifts).

Much of the research about developmental theories focuses on antisocial behavior, which includes behaviors such as hyperactivity, impulsivity, stealing, truancy, vandalism, and disobedience (Loeber, 1982; Loeber & Dishion, 1983; Loeber & Schmaling, 1985). As mentioned earlier, there is a documented association between animal cruelty and juvenile delinquency. The support for this connection is examined throughout the literature.

Several studies have focused on the relationship between animal cruelty and juvenile delinquency. In their study of 131 children, Dadds et al. (2006) determined that

cruelty to animals was correlated with the children's temperamental characteristics. In addition, they learned that only the males exhibited general externalizing problems, such as conduct disorder, with cruelty. Finally, they concluded that it is possible that animal cruelty will be an early indicator of traits that place children at risk for developing ongoing problems (Dadds et al.).

In a study of 169 students in an introductory psychology class, Henry (2004) found that in the relationship to the "ever" delinquency (ever committed delinquent acts), those who reported observing animal cruelty had higher delinquency scores than those who did not, with the males having higher delinquency scores than the females. As with the "ever" delinquency scores, there was a significant main effect with the "past year" delinquency (committed delinquent acts within the past year) scores and observation of animal cruelty reports compared to those who did not observe said acts. Those who indicated participation in acts of animal cruelty were significantly more likely to score higher on the "ever" delinquency score than those who did not participate. However, these main effects were non-significant for the "past year" delinquency scores. When these analyses were re-run with persons who participated in more than two acts of animal cruelty compared to one or fewer acts, both the "ever" and the "past year" delinquency scores were significantly higher for those who participated in more acts (Henry).

In addition, Becker et al. (2004) determined that animal cruelty was not related to juvenile court referrals; however, 25.8% of the children in their study who were referred to juvenile court for violent offenses self-reported animal cruelty versus 14.2% who denied animal cruelty. Becker et al. concluded that marital violence increased the propensity for both firesetting and animal cruelty. Additionally, paternal pet abuse and

drinking were related to firesetting and harsh parenting was associated with animal cruelty. Finally, firesetting and animal cruelty were connected to adolescent delinquency.

Tapia (1971) and Felthous (1981) also have contributed to this body of literature. Tapia discovered that 10 (56%) of the children who were cruel to animals demonstrated tendencies for bullying and fighting, 6 (33%) exhibited lying and/or stealing, and 6 (33%) showed destructiveness. In addition, citing an unknown sample, Felthous reported that over 60% of the participants who were cruel to cats or dogs also exhibited childhood temper tantrums, destructive or assaultive outbursts, fighting, and truancy.

These studies have shown support between animal cruelty and future juvenile delinquency. This literature has led to the creation of Hypothesis 1 in the present study. The specifics of this hypothesis and relevant research are discussed in Chapter III.

As with juvenile delinquency, previous research has shown a relationship between animal cruelty and aggressive and violent behavior. A review of this literature follows.

Aggression and Violence

Broidy et al. (2003) suggested that physical aggression and violence are probably the most feared of behavioral disorders. They wrote that, conceptually, the relationship between childhood physical aggression and physical violence in adulthood is a focus in developmental theory and violence research. As cited earlier, animal cruelty could be considered a form of physical aggression. If physical aggression is a risk factor for future physical violence, a focus on this aggression could increase the prediction of later behavior (Broidy et al.).

Animal abuse may be a precursor for future aggressive and delinquent behavior. Flynn (2000) wrote that animal abuse could be a predictor of future violent behavior. He

outlined why professionals dealing with family issues should focus more on animal abuse. Flynn stated,

> After looking at why animal abuse has not received attention, it is argued that those who study and work with families need to attend to animal abuse for seven reasons: (a) animal abuse is a serious antisocial behavior by children and adolescents; (b) it is a relatively common childhood occurrence; (c) it has potential negative developmental consequences; (d) violence toward animals is related to interpersonal violence; (e) it is connected to and may be a marker of family violence; (f) the well-being of companion animals is being neglected; and (g) it will help achieve a less violent society. (p. 87)

It appears that family professionals do not readily concentrate on these areas. Flynn further concluded: "But if we are to address the needs of children and families, if we are to promote a nonviolent society, then we must pay attention to all forms of violence, including violence against animals" (p. 94). As suggested by Flynn, animal abuse could be a signifier of future interpersonal violence. As a result, the review focuses on this relationship.

Although previous research has yielded contradictory results about the connection between animal cruelty and future interpersonal violence, several studies have shown that there is a relationship between the two. Berrios (as cited in Ascione, Weber, & Wood, 1997) wrote that in 1809, the psychiatrist Pinel found in his case studies that childhood animal cruelty could advance into fatal domestic assaults. In addition, Ascione (2001), after examining several studies about incarcerated men, concluded, "Taken together, these studies suggest that animal abuse may be a characteristic of the developmental

histories of between one in four and nearly two in three violent adult offenders (p. 4)." Abundant research also has established support for this link (e.g. Arluke et al., 1999; Ascione, 1993; Beirne, 1995; Kellert & Felthous, 1985; Merz-Perez et al., 2001; Santtila & Haapasalo, 1997; Strandberg, 1999).

Beirne (1995) concentrated on how animals have been included in criminological discourse: as perpetrators, as partners of humans, as basis of comparison for human behavior, and as passive objects of human criminal action against another human. He indicated that there are two main avenues of research that have examined this intersection point: one centered on the psychological and sociological characteristics of children ("assaultive children") who assault animals and the other on the developmental relationship between the abuse of animals by children and adolescents and, subsequently, their eventual maturation into violent adults. He discovered that animals already provide a surprising amount of material for diverse problems such as the configuration of rural class relations in 18th century England, the alleged links between crime and human nature, and the behavioral manifestations of children who are likely to be violent as adults.

Arluke et al. (1999) revealed in a study of 153 animal abusers and 153 "control" individuals that 37% of the animal abusers versus 7% of the "controls" committed violent offenses. Additionally, Beirne (1995) wrote that children who assault animals could mature into violent adults. Strandberg (1999) concluded that the aggressive and violent acts may be directed toward other people, they could be expressed in animal cruelty or they might include firesetting. In addition, Ascione (1993) cited several studies that

outlined the possible linkage between childhood animal abuse and future interpersonal violence, such as murder, assault, and sexual homicide.

Inmate-based samples often have been utilized to conduct further investigations about this relationship. For example, Kellert and Felthous (1985) found that aggressive criminals committed childhood animal cruelty to a significantly greater degree than non-aggressive criminals or non-criminals. Additionally, Merz-Perez et al. (2001) surveyed 45 violent and 45 non-violent prisoners and determined that 56% of the violent offenders and 20% of the non-violent offenders committed abuse against wild, farm, pet, and stray animals. They concluded that of the violent offenders, who also were childhood animal abusers, 33% committed murder, 2% committed attempted murder, 30% committed sex offenses, and 21% committed assault and/or battery.

Other inmate research has demonstrated similar results. Santtila and Haapasalo (1997) randomly selected a small sample of inmates. They yielded minimally significant results showing that five of the respondents in the homicidal group (38%) were cruel to animals compared to one in each the nonviolent (9%) and violent groups (7%). Additionally, through a study using 1,935 random offender case reports, Heller, Ehrlich, and Lester (1984) verified that there was a significant relationship between animal cruelty and those charged with violent crime (4.1%) versus those charged with non-violent crime (1.3%).

Similarly, Felthous and Kellert (1987) and Goodney-Lea (2005) confirmed support for this relationship. Felthous and Kellert exposed several factors of a child's cruelty to animals were the most predictive of later aggression: direct involvement in the act; lack of self-restraint and remorse; a range of cruel acts and species victimized; and

actions that are directed at socially valuable animals such as dogs. Goodney-Lea focused on 570 young adults to ascertain the connection between animal cruelty and other childhood/adolescent antisocial behaviors. In addition, she examined the extent that childhood/adolescent animal cruelty predicts adult violence. Goodney-Lea learned that animal cruelty is correlated with violent behavior, including bullying, and non-violent behavior, including shoplifting, vandalism, and firesetting. She determined that men reported cruelty to animals and engaged in antisocial behaviors more frequently than women. However, Goodney-Lea derived through logistic regressions that animal cruelty in comparison to other antisocial behaviors had no significant power in predicting adult interpersonal violence.

As noted earlier, there is inconsistency in the literature about the relationship between childhood animal cruelty and future interpersonal violence. Felthous and Kellert (1987) attempted to uncover the methodological issues of the prior research that may have led to the inconsistencies. One of the problems that they encountered was that the definition of animal cruelty was broadened to the point that it included an action such as swatting at flies or gently disciplinarily slapping a dog. These behaviors are not an indication of abnormal aggression. In addition, several different interpretations of the definition of personal aggression also led to discrepancies (Felthous & Kellert).

The majority of this research has verified support for the link between childhood animal cruelty and future interpersonal violence and aggression. As a result, one hypothesis in the present study has been formulated, Hypothesis 2. This hypothesis and the supporting literature are discussed in detail in Chapter III.

Homicide

One of the offenses listed in the Violent Crime Index is murder. A few studies (see: Beirne, 1999; Sauder, 2000; Thomas & Beirne, 2002) have investigated the relationship between animal cruelty and homicidal behavior in the past decade. As a result, a brief review of that literature follows.

Sauder (2000) wrote that the Federal Bureau of Investigation (FBI) recognized the link between animal abuse and interpersonal violence in the 1970s after interviewing 36 multiple murderers. Of these, 36% admitted killing or torturing animals during childhood and 46% did so as adolescents. In order to help prevent animal abusers from abusing humans, Sauder made a few suggestions; however, only one is noted as it relates to future behavior: "Prosecutors must treat even minor acts of cruelty seriously and recommend appropriate sentences and treatment as a condition of sentence and/or probation in order to prevent violent conduct (p. 16)."

In their review of this relationship between animal cruelty and future homicidal behavior, Thomas and Beirne (2002) listed several well-known serial killers who abused animals. For example, they wrote that Thomas Lee Dillon was reported to have stomped and shot 1,000 cats and dogs. Albert DeSalvo, otherwise known as the Boston Strangler, shot arrows at trapped dogs and cats. Jeffrey Dahmer, also known as the Milwaukee Cannibal, was reported to have impaled the head of a dog on a stick and have impaled or staked frogs and cats to trees in his youth. In addition, Ted Bundy spent much of his childhood torturing animals. Also mentioned by Beirne (1999) were Luke Woodham and Kip Kinkel, who were known to kill animals before their participation in school killings.

Although serial killers are a rarity compared to other types of offenders, their histories of committing animal cruelty prior to progressing to interpersonal homicidal behavior has provided support for this relationship. Another offense listed in the Violent Crime Index is forcible rape. Sexual offenses are another area of study to determine their relationship to animal cruelty. In this section, literature about deviant sexual behavior is reviewed.

Deviant Sexual Behavior

Deviant sexual behavior is an offense that has been shown to have a connection with animal cruelty. However, as with homicidal behavior, the research about this relationship is limited. Hensley and Tewksbury (2003) define sexual deviance as follows: "A sexual act is commonly perceived as deviant according to one or a combination of the following conditions: (1) the degree of consent, (2) the nature of the sex object, (3) the nature of the sex act, or (4) the setting in which the sex act occurs" (p. 3).

The following three studies discuss this deviant behavior as it relates to animal cruelty.

There is limited research about the relationship between animal cruelty and deviant sexual behavior. Tapia (1971) discovered that four (22%) of the children who were cruel to animals exhibited excessive interest in sex. In addition, to assessing the relationship between sexual behavior with animals and interpersonal violence, Fleming et al. (2002) distributed an anonymous self-report questionnaire to 381 institutionalized, adjudicated, male youthful offenders in three facilities in a Midwestern state. These facilities included the state's largest training school, the state's largest residential treatment center and the state's largest non-profit group home. Fleming et al. revealed that 96% of the juveniles who had engaged in sex with nonhuman animals admitted to

committing sexual offenses against humans. In addition, they reported more offenses against humans than other sex offenders of the same age and race.

Hensley et al. (2006) also conducted research about the relationship between deviant sexual behavior with animals and interpersonal violence. Sixteen respondents indicated that they had engaged in bestiality. Of these inmates, 75% were convicted of interpersonal crimes. This study provided support for the correlation between bestiality and interpersonal violence. In addition, the results suggest a link between childhood sexual abuse of animals and future adult interpersonal violence.

These studies show some support for the linkage between animal cruelty and the commission of future deviant sexual behavior. As with other studies where information is gathered utilizing recall, the memories of the respondents are not always 100% accurate. Although not every child who abuses animals will progress into sexual deviance, the research has established a possible pattern of behavior. Violent crimes often are associated with animal cruelty, but there appears also to be the plausible correlation between animal cruelty and some property crimes.

Arson is considered a property crime and is listed in the Property Crime Index. As discussed earlier, juveniles are found in animal abuse statistics for burning animals. As a result, research about firesetting and its connection to animal cruelty is evaluated.

Firesetting

In addition to its connection to interpersonal violence, animal cruelty has been revealed among children and juveniles who are firesetting recidivists. However, there is conflicting research about the association between firesetting and animal cruelty. Like

other animal cruelty relationships, some studies have shown support while others would cast doubt on this connection.

Tapia (1971) discovered that five of the children who were cruel to animals (28%) exhibited firesetting tendencies. Slavkin (2001) also documented some support for this link. He revealed that children who were cruel to animals were more likely to set fires than those who were not cruel to animals. Additionally, Wax and Haddox (1974) examined a number of institutionalized male adolescent delinquents who had histories of firesetting and animal cruelty. They learned that these six adolescents were the most assaultive and potentially dangerous ones who remained for care, thus showing some support that those who exhibit this relationship of behaviors may progress into future violent behavior.

Other research has provided support for this relationship. When Heath et al. (1984) controlled for animal cruelty, they found significant relationships between non-enuretic (non-bed wetting) firesetting with animal cruelty. Specifically, 35% of the fire setters who did not suffer from enuresis were cruel to animals compared to 12.4% of non-fire setters. Finally, Hellman and Blackman (1966) verified a relationship between firesetting, animal cruelty, and future aggression. Of the 31 prisoners who were charged with interpersonal aggression, 16 (52%) were cruel to animals and 16 (52%) were fire setters. These numbers also indicated an overlap of behaviors for some of the prisoners. In comparison, of the 53 non-aggressive prisoners, 9 (17%) were cruel to animals and 8 (15%) were fire setters.

Additionally, in a study of female inmates, Felthous and Yudowitz (1977) [as cited in Miller, 2001] compared a group of 11 assaultive prisoners and a group of 13 non-

assaultive prisoners and discovered that 36% of the assaultive prisoners had a history of animal cruelty and 45% had a history of firesetting. However, none of the prisoners in the non-assaultive group had a history of animal cruelty and only 23% had a history of firesetting.

These studies have demonstrated a basis for the final hypothesis in the present study, Hypothesis 3. This hypothesis and supporting information are discussed later in Chapter III.

Contradictory Research

Although there has been an abundance of literature that is supportive of the relationship between animal cruelty and other forms of behavior such as juvenile delinquency, aggression, violence, sexual deviance, and firesetting, some studies contradict these findings. Therefore, it is important to assess studies that do not support this connection.

Miller and Knutson (1997) performed a two-part study, the first part focused on 314 inmates at a prisoner classification center and the second part entailed 308 undergraduates enrolled in either of two introductory psychology courses at the University of Iowa. Approximately 66% of all of the inmate respondents reported that they had some exposure to animal cruelty. Additionally, around 11% indicated witnessing or experiencing sexual contact with animals. However, there were no statistically significant differences between the groups in reference to the reports of total animal cruelty exposure.

In the second part of their study, Miller and Knutson (1997) found that 48.4% of the student sample reported some exposure to animal cruelty, with 57% of those

respondents indicating that they only witnessed the acts. Of the 308 respondents in this part of the study, 20.5% stated that they actually engaged in animal cruelty acts. Males consisted of 61.1% of those who committed the act compared to 74.2% of the females denying the commission of those acts. This means that males committed 68.9% of the acts.

Miller and Knutson (1997) found that approximately 59% of those students who witnessed the killing or torturing of animals said that it occurred when the respondent was aged 6 to 12 and nearly 31% indicated that it occurred when they were adolescents. Ten of the respondents said that they killed their pets (not mercy killings) and six reported that this occurred more than once. Forty-four of the respondents stated that they killed stray animals. In addition, more than two-thirds of the males had childhood exposure to some type of animal cruelty, which is similar to the respondents in the first part. However, the males in this sample were more likely to admit animal cruelty experiences than the females. Finally, Miller and Knutson wrote that six respondents reported some exposure to sexual activity with animals. In conclusion, the findings in this research do not provide support for the hypothesis that exposure to animal cruelty is related to criminal activity, specifically violent behavior (Miller & Knutson).

In another study, Piper (2003) conducted a review of the literature and research about the link between animal abuse and interpersonal violence. She argued that the discourse is inherently flawed that people who are cruel to animals are more likely to be aggressive toward their partners and children. She did not state that this link does not exist; however, its use of language narrows options and limits knowledge and understanding. Piper suggested that the arguments have a potential to create moral panic

due to an inappropriate simplification of selected academic works that support these links.

Finally, Piper and Myers (2006) focused on Becker and French's (2004) research by examining the proposed "links" in terms of their assumptions, definitions, methods, and logic. Piper and Myers wrote that Becker and French did share the concern for the necessity to provide a clear definition of abuse in order to be able to compare it. However, they stated that Becker and French did not provide research that emphasized definition. In addition, they indicated that the media accounts which present support for the link relied on a small sample of five or six infamous criminals, including Jeffrey Dahmer. Additionally, in referring to the existing research about the link, Piper and Myers wrote, "Any argument that relies on consequential fallacy is flawed, and therefore invalid" (p. 184). Piper and Myers concluded that retrospective studies only demonstrate correlation and cannot provide causal evidence.

The previous literature has yielded substantial support for the relationship between animal cruelty and future behaviors, such as juvenile delinquency and aggression. However, some studies have produced contradictory results. It would appear that this association has generally been upheld. Nevertheless, because there may be some doubt about this link, further research is necessary and is conducted in the present study. First, the theoretical perspectives are discussed to understand the theoretical framework for the relationship. Then, the methodology of the present study is described in detail in Chapter III.

Theoretical Perspectives

There have been several theoretical perspectives offered to explain the relationship between animal abuse and interpersonal violence. These have included Social Learning Theory and the Graduation Hypothesis. However, the focus of this present study is the testing of the Graduation Hypothesis; therefore, Social Learning Theory is not discussed. In this section, developmental theories are discussed as a basis for the Graduation Hypothesis. The latter perspective is the focus of the present study and it is addressed last.

Developmental Theories

The main premise of developmental theories is that different factors affect offenders differently at various ages (Vold, Bernard, & Snipes, 2002). This leads to the explanation of crime throughout the life course as a child matures into adolescence, adulthood, and old age (Vold et al.). Although criminal behavior is uncommon during childhood, precursor behaviors may be exhibited (Thornberry, 2005). The onset of these behaviors rapidly increases generally between the ages of 10 to 14 (Thornberry). This involvement tends to peak around age 16 and then rapidly declines through the late teens (Thornberry). Since the late 1970s, several studies have focused on this relationship between age and crime.

Robins and Wish (1977) elicited some support for this developmental process through their research on adolescent males in the 1940s. They focused on educational issues such as school absence, failure, and dropping out along with substance usage and interpersonal relationship factors. They discovered that a child's absentee rates and academic failure did not accelerate with age; however, dropout rates peaked at age 16 and

then declined. In addition, drug usage other than marijuana and alcohol problem rates stayed similar to the rate at the age of the initiation of the behavior. Finally, the rates of sexual relationships, alcohol and marijuana usage, marriage, and leaving home at the end of childhood accelerated and continued to be high two years later.

As a follow-up to the above study, Robins (1978) conducted research about three populations of participants: ex-child guidance patients in 1920s St. Louis, the adolescent men in 1940s St. Louis mentioned in the previous study, and Vietnam veterans and non-veterans throughout the United States in the 1960s. Robins also established support for developmental theory. Robins indicated that virtually every type of childhood antisocial behavior predicted a high level of adult antisocial behavior. As well, approximately 67% or more of the antisocial adults were highly antisocial children, with more than 90% of the adults displaying some childhood antisocial behaviors (Robins). Lastly, childhood behavior was a better predictor of adult behavior than family background.

Robins and Ratcliff (1979) also used the St. Louis sample from the 1940s; however, they shifted their focus to antisocial behavior that was exhibited before the age of 15. They discovered that the most effective single predictor of adult antisocial behaviors was the number of childhood antisocial behaviors exhibited. In addition, very antisocial children become very antisocial adults in about half of the cases, but serious antisocial behavior in adults rarely occurs when the high level of childhood antisocial behavior is absent. These results concur with the earlier studies.

Loeber and colleagues (Loeber, 1982; Loeber & Dishion, 1983; Loeber & Schmaling, 1985) conducted three literature reviews that centered on the predictability value of childhood antisocial behavior. Loeber found that the youths who demonstrated

extremely frequent early antisocial behavior were at the highest risk for becoming chronic offenders. In addition, Loeber and Dishion established that the composite measures of parental family management were the most predictive of juvenile delinquency. The children's problem behavior, stealing, lying, and truancy also predicted juvenile delinquency. Finally, Loeber and Schmaling discovered that youth who are clearly overtly antisocial were recognized as early as preschool age as children who displayed both overt (confrontational) and covert (concealed, behind adults' backs) antisocial behavior. The children who express high rates of both types of antisocial behavior are more likely to be at risk for police contact due to juvenile delinquency. Huesmann, Eron, Leftowitz, and Walder (1984) also echoed this in finding that early aggressiveness in school often turns to severe antisocial behavior in young adulthood. These studies also have shown support that childhood antisocial behavior may lead to future antisocial behavior.

Further research conducted by Donker et al. (2003) about the covert and overt antisocial behavior yielded similar results. They determined that the association between childhood and adolescent covert behavior was stronger than between childhood and adulthood. Additionally, those children who had a deviant score on both types of antisocial behavior were three times more likely to display adult overt behavior than during adolescence. As a final point, children who displayed overt behavior and were involved in status violations were three times more likely to exhibit adolescent covert behavior than in adulthood.

These early antisocial behaviors also were predictive of later behavior noted in research by White et al. (1990). They determined that behavior problems during

preschool predicted antisocial behavior at age 11 and those behavior problems at age 5 could predict future conduct issues. Additionally, the strongest predictors at age 5 were when the parents reported that the children were difficult to manage and they were externalizing these behaviors.

Moffitt (1993) also studied antisocial behavior and formulated a theory about juvenile delinquency. Akers and Sellers (2004) wrote that this theory is based upon neuropsychology and developmental psychology. In her research about antisocial behavior, Moffitt stated that there are two types of offenders, life-course persistent and adolescent-limited. Life-course persistent offenders begin their antisocial behavior at an early age and they continue this behavior throughout their lives. However, only a small portion of the population would fall into this category. Adolescent-limited offenders comprise a larger portion of the population and their antisocial behavior is temporary. She argued that each group has a different motivation for offending. Life-course persistent offenders were more likely to have a biological or psychological trait that makes them more prone to antisocial behavior. Adolescent-limited offenders often would engage in "social mimicry" of the life-course persistent offenders.

These two groups of offenders also would tend to commit different offenses (Moffitt, 1993). The life-course persistent offenders are more likely to commit crimes against people such as interpersonal violence and crimes later in life. However, the adolescent-limited offenders commit offenses that signify privilege such as vandalism and that demonstrate autonomy such as status offenses. These life-course persistent offenders will become the focus of the present research.

In prior research about life-course persistent and adolescent limited offenders, Moffitt (1990) concentrated on the traits of these two types. She discovered that non-delinquent children with Attention Deficit Disorder (ADD) showed antisocial behavior that tended to be mild and transient and that they were significantly antisocial only between the ages 9 and 11. These children recovered from their antisocial behavior by age 15. In addition, in the non-ADD delinquent group, Moffitt determined that their antisocial behavior developed at an accelerated rate after age 11 and by age 13, they demonstrated the same level as the ADD + delinquent group. Finally, the ADD + delinquent group had persistent antisocial behavior, which deteriorated over the years. However, this behavior increased between the ages of five and seven.

Simons et al. (1994) also focused on early starters, who are similar to life-course persistent offenders, and late starters, who are comparable to adolescent-limited offenders. They revealed that for late starters, oppositional/defiant behavior was not related to having deviant peers and criminal justice system involvement. However, this was the opposite for early starters, for which oppositional/defiant behavior was correlated with affiliation with deviant peers and criminal justice system involvement. The results with the latter group support the theory that childhood antisocial behavior is linked with problematic adult behavior. This research is like other studies about the life-course perspective.

According to Williams and McShane (2004), life-course theory is an integrated theory that is based on social control, ecology, and Sampson and Laub's (1990, 1992, 1993) perspective about the Glueck's (1950) data. Glueck and Glueck (1950) followed 1,000 juveniles until the age of 32. In their analysis of the study, Sampson and Laub

found that delinquent experiences predicted adult criminality (Williams & McShane). They concluded that crime could be explained by change over time (Williams & McShane). However, they posited that informal social control also affects the likelihood of juvenile delinquency. Adult events, including job stability that assisted in decreasing criminality are referred to as "turning points" (Williams & McShane).

Williams and McShane (2004) further wrote that Sampson and Laub (1990, 1992, 1993) built upon Hirschi's (1969) concept of the bond that they call "social capital." Social capital is the idea that ". . . the quality of interpersonal relationships among people produces resources for an individual to draw upon" (Williams & McShane, p. 280). As a result, there will be greater conformity with greater resources due to what could be lost. However, if these bonds are weak or broken, crime and deviance will result (Sampson & Laub, 1990). Sampson and Laub (1992) also acknowledged the differences in children that will influence those, for example, the family, who are trying to control them. Although they disagree with Gottfredson and Hirschi's (1989) belief that self-control is unchanged after age 8 compared to a plausible change based on turning points knocking one off of a previous trajectory or path, Sampson and Laub (1990) asserted that social control could influence an individual's propensity to antisocial behavior and change behavior into conformity (Williams & McShane).

Sampson and Laub (1990, 1992) conducted research about the life-course perspective as it relates to antisocial behavior and juvenile delinquency. Like others, they determined that adult antisocial behavior generally requires the presence of childhood antisocial behavior. They also learned that childhood delinquency is related to adult crime, alcohol abuse, general deviance, educational failure, and even military charges.

In subsequent research, Laub and Sampson (1993) focused on a qualitative assessment of the men in the Gluecks' (1950) study. They asserted that salient life events and adult social ties could counteract early childhood development trajectories. In their theory, Laub and Sampson attempted to combine continuity and change within a sociological view about crime in the life course. They concluded that major turning points in the life course of the men who refrained from adult crime included stable employment and good marriages.

Similarly, Nagin and Tremblay (1999) conducted a longitudinal study and assessed 1,037 boys from the age of 6 until they were 15 years old. They sought to determine which developmental trajectories best predicted physically violent and nonviolent juvenile delinquency up to age 17. They utilized four developmental trajectories, chronic behavior, high-level near-desister, moderate level desister, and no problem trajectories.

Nagin and Tremblay (1999) revealed that the boys in their study were generally displaying less physical aggression, opposition, and hyperactivity as they grew older. For example, only one-eighth of the boys who showed elevated levels of physical aggression during kindergarten continued that level into adolescence. However, they determined that a chronic oppositional trajectory, with the physical aggression and hyperactivity trajectories being held constant, let to covert juvenile delinquency (theft). Additionally, Nagin and Tremblay established that the chronic physical aggression trajectory, when the oppositional and hyperactivity trajectories were held constant, led to overt juvenile delinquency (violence) and to the most serious delinquent acts. This result was echoed in

Kokko, Tremblay, Lacourse, Nagin, and Vitaro (2006). Kokko et al. also discovered that physical violence at age 17 was predicted solely by earlier physical aggression.

In an international study, Broidy et al. (2003) found similar results. Broidy et al. (2003) conducted longitudinal research about physical aggression trajectories that covered three countries, Canada, New Zealand, and the United States. They established that male childhood physical aggression was the most consistent predictor of both violent and nonviolent adolescent offending. However, early non-aggressive conduct problems increased the risk of future violent juvenile delinquency, independent of physical aggression. Additionally, early oppositional behaviors increased the likelihood of nonviolent juvenile delinquency. Further, when compared to their chronically physically aggressive male counterparts, the girls had lower average rates of physical aggression. In contrast, the chronically aggressive girls' average rates of physical aggression were higher than that of the non-chronic boys. Broidy et al. (2003) also learned that chronic physical aggression was unusual for both genders. However, unlike the Canadian and New Zealand samples, there was evidence in the American samples that physical aggression was on the rise. This last finding would mirror the OJJDP's (2007) and Zahn et al.'s (2008) reports on juvenile violence mentioned earlier.

This body of research has provided some support for the trajectory followed by children who have an early onset of antisocial behavior. It would appear that some antisocial children further their offending careers into adulthood. Although the majority of the developmental literature has focused on childhood antisocial behavior, it has failed to include childhood animal cruelty as it relates to these future behavioral patterns. The Graduation Hypothesis, which is based on developmental theory, helps to bridge this gap.

Graduation Hypothesis

The second perspective that can explain the pathway from childhood/adolescent behavior along the life course is the Graduation Hypothesis. However, the Graduation Hypothesis more specifically focuses on childhood/adolescent animal cruelty and its relationship with future aggressive and violent behavior. The Graduation Hypothesis indicates that animal abusers later progress into or graduate onto more serious forms of violence against humans (Wright & Hensley, 2003). In particular, Farrington (2002) [as cited in Beirne, 2004] stated:

> People graduate from hyperactivity at age two to cruelty to animals at age six, shoplifting at ten, burglary at fifteen, robbery at twenty, and eventually spouse assault, child abuse and neglect, alcohol, and employment and later health problems later on in life. (p. 58)

This is a perspective that is reminiscent of Moffitt's (1993) life-course-persistent developmental theory, which states that a child often will begin with discipline problems that progress into antisocial adult life-styles.

Wright and Hensley (2003) conducted research to examine the link between childhood animal cruelty and serial murder with the application of the Graduation Hypothesis. The researchers used a case study analysis for this study. They examined 354 cases of serial murder, of which 75 (21%) were known to have committed animal cruelty. For the purposes of this study, the focus of five of their cases is summarized.

Wright and Hensley (2003) began with Carroll Edward Cole. When Cole was eight years old, a young girl sat on him and smothered him with her genitals. He ran and hid, only to be followed by the family's puppy, which he strangled until it died. The same

day, after being harassed by a group of boys, he jumped on top of a boy and drowned him under water. In the end, Cole was charged with 16 murders throughout his criminal career.

Wright and Hensley's (2003) next case study was Jeffery Lionel Dahmer. When Dahmer was 10 years old, he began experimenting with dead animals. He collected road kill and other dead animals and dissected them. As he became older, he would catch and kill animals so that he could examine them. He would skin them, soak their bones in acid and place their heads on stakes behind his house; he then did this with humans. Dahmer was later found guilty of 15 counts of murder.

Wright and Hensley's (2003) third case study was Edmund Emil Kemper III. Kemper's mother was very domineering and he had fantasies about killing her. He took the family's cat and buried it up to its neck, then cut off its head for a trophy to display in his bedroom. His mother got another cat and he chopped it into pieces with a machete, putting the bloody parts in his closet. After moving in with his grandparents, at the age of 15, he murdered them simply to see what it felt like. He was eventually charged with eight counts of murder.

Wright and Hensley's (2003) fourth case study was Henry Lee Lucas. After his father left, his mother was very violent towards him. When Lucas was 10 years old, her paramour, Bernie, introduced him to bestiality by stabbing a calf and having sex with the dying animal. He then started killing animals to have sex with them. He also enjoyed killing them and turned to catching and skinning live small animals for fun. When Lucas was 15, he killed a 17-year-old girl (p. 81). In time, law enforcement officials claimed to have evidence that he killed at least 69 people.

Wright and Hensley's (2003) final case study was Arthur Shawcross. Shawcross reported that numerous neighborhood girls sexually molested him. At the age of 11, he had his first homosexual experience with a boy. He eventually started having sex with sheep because he believed that their genitals were similar to women. He began to dominate, sexually violate, and beat farm animals. He ultimately sexually assaulted and mutilated humans. He was finally charged with 11 murders.

Based on these case studies, Wright and Hensley (2003) elicited support for the Graduation Hypothesis. Each of the featured serial killers appeared to enact the frustration that they felt from adults onto weaker animals. They eventually enacted these actions on humans, utilizing the same methods that they used with the animals. O'Grady, Kinlock, and Hanlon (2007) also discovered that inmates in both the murderer and attempted murderer groups had a history of torturing animals as children, supporting this Hypothesis.

Arluke et al. (1999) studied 153 animal abusers and 153 control individuals to challenge the Graduation Hypothesis that animal abusers are predisposed to conduct interpersonal violence. They established that the animal abusers were more likely to commit several types of antisocial behaviors, including property crimes, and not just violent offenses. They also discussed the temporal relationship problems between the two types of violence. Arluke et al. did confirm; however, that animal abusers were more likely to commit the antisocial behaviors than the control group.

Zilney (2003) also tested this hypothesis, defined as whether individuals engaged in violence against animals as youths, progress to violence against humans at a later stage in the life course. In addition, she tested another hypothesis as follows: "The generality of

deviance hypothesis, which suggests that individuals may engage in abuse of animals during youthful experimentation, but mature from this behavior with no further abusive actions toward any species" (p. xi). Zilney contacted 691 homes, with 287 respondents agreeing to participate in the self-report study. She found partial support for her first hypothesis. She also verified that animal abuse during adolescence was a significant predictor of later abuse against a domestic partner along with nonhuman abuse at any stage of life remained a significant predictor of partner abuse. However, Zilney did not find any support for her second hypothesis. As with other literature, Zilney has provided some support for the Graduation Hypothesis; however, some research has contradicted these findings.

Cahill (2002) contradicted the research conducted by Arluke et al. (1999) about the graduation model of escalating violence by citing examples from his personal past. He concluded that although many young people commit animal cruelty, they all do not mature into individuals who are more violent. He also stated that many more apparently graduate to remorseful psychological distance from their former abusive lives.

In addition, Bulc (2002) argued against the Graduation Hypothesis. Bulc analyzed the public's reaction to a case in Tržič Town, Slovenia, where three 19-year-old high school boys were accused of killing more than 40 cats inhumanely within a 15-month period. Bulc mainly focused on the media's role in the increased public belief that the juveniles who killed cats in the highly publicized case would become serial killers. This further perpetuated a theory that children who torture animals also would become serial killers when they are older. Finally, Bulc wrote that although studies that deal with an assumption about the graduation from animal abuse to interpersonal violence (e.g.,

Beirne, 1999), there is no firm evidence that serial killers have to torture/kill animals when they are young.

As a final rebuttal to the Graduation Hypothesis, Beirne (2004) provided a critical assessment of the "progression thesis," which is another name for the hypothesis. Beirne wrote that the there are problems with evidence about the progression thesis, specifically with the empirical data, the absence of longitudinal studies and the usage of concepts such as "animal abuse" and "cruelty." Thus, Beirne suggested that studies in the future clarify the terminology and utilize longitudinal analysis. The present study adds to the literature by testing the Graduation Hypothesis through an analysis of data collected from a longitudinal study.

CHAPTER III: METHODS

> I am convinced that violent behavior, even at its most apparently senseless, incomprehensible, and psychotic, is an understandable response to an identifiable, specifiable set of conditions; and that even when it is motivated by 'rational' self-interest, it is the end product of a series of irrational, self-destructive, and unconscious motives that can be studied, identified, and understood. (Gilligan, 1996, p. 102)

Overview of Research Design

The objective of this study was to perform an exploratory examination of the degree to which the Graduation Hypothesis predicts adolescent behavior based on childhood behavior. This evaluation utilized data gathered from a longitudinal study of 820 children over two time periods, at age 6 and, later, at age 12, as they entered adolescence. This secondary data analysis attempted to answer three research questions and test three hypotheses that were derived from the Graduation Hypothesis.

This chapter begins with a presentation of the research design that was employed beginning with the research questions and hypotheses. Next, information about the sampling techniques and the survey instrument of the original study is provided. A discussion follows about the dependent and independent variables that were proposed to be tested by the hypotheses. Because the study is quantitative, the data analysis procedures are then described. The chapter closes with a brief explanation of the human subjects' protection and summary of the methodology of the present research, including its strengths and weaknesses.

Research Questions

Based on the review of the literature, three questions have been formulated to examine the Graduation Hypothesis. The previous research has provided contradictory conclusions about the hypothesis (Arluke et al., 1999; Beirne, 2004; Bulc, 2002; Cahill, 2002; O'Grady et al., 2007; Wright & Hensley, 2003; Zilney, 2003). However, no known research about the hypothesis has been conducted via longitudinal data, which could provide for a better test.

The first two questions have assessed the hypothesis in a more general manner about its basic concepts. The last question was based on studies conducted by Huesmann et al. (1984), and Tallichet and Hensley (2004) that portray gender differences in behavior as they relate to animal abuse. For example, Huesmann et al.'s research about children and adolescents in New York revealed that males had significantly higher aggression scores than females. Tallichet and Hensley also supported this gender-based difference through their examination of male inmates who were convicted of interpersonal violence.

The present study attempted to address the following three research questions:

1. Do children who engage in animal cruelty progress onto delinquent and aggressive behavior?
2. Do children who set fires progress onto delinquent and aggressive behavior during adolescence?
3. What are the gender differences, if any, in the relationship between childhood animal cruelty and future delinquent and aggressive behavior?

Hypotheses 1 and 2 will assess the first and third research questions. Hypothesis 3 will evaluate Research Question 2.

Hypotheses

Three specific hypotheses were created from the review of the literature, the three research questions, and the objective of the present study. Because the null hypothesis (H_o) predicts that the independent variables have no effect on or significant relationships with the dependent variables, the following three alternative hypotheses (Ha) were formulated to test the Graduation Hypothesis and to fail to reject or reject the H_o.

Supporting research is provided after each of the alternative hypotheses is listed. In addition, further information about the hypotheses is presented in Appendix P. This appendix supplies the hypotheses, the concepts to be tested, variables, and corresponding questions within the Project on Human Development in Chicago Neighborhoods (PHDCN) Child Behavior Checklist (CBCL), along with other PHDCN questionnaires.

Graduation Hypothesis

Abundant research has provided support for the Graduation Hypothesis through various studies involving the progression from childhood animal cruelty to other behaviors. However, they have primarily focused on inmates and serial killers. Hypotheses 1 and 2 have partially tested the progression of childhood animal cruelty and other behaviors into adolescent delinquency and aggression. As mentioned in Chapter II, for the purposes of this study, delinquency and aggression have been operationalized to reflect the items in the CBCL delinquent and aggressive scales.

> H_a (1): Children who commit animal cruelty and other behaviors will progress into adolescent delinquent behavior.

Several recent studies have examined the predictability of childhood animal cruelty, bed wetting, delinquency, aggression, hyperactivity, alcohol/drug usage, and poor school work in leading to juvenile delinquency (Becker et al., 2004; Broidy et al, 2003; Dadds et al., 2006; Donker et al, 2003; Henry, 2004; Huesmann et al, 1984; Kokko et al, 2006; Loeber, 1982; Loeber & Dishion, 1983; Loeber & Schmaling, 1985; Moffitt, 1993; Nagin & Tremblay, 1999). For example, Henry established that those college students who committed animal cruelty when they were young were significantly more likely to have "ever" committed delinquent acts than those who did not engage in animal cruelty. Broidy et al. also found that non-aggressive behavior led to juvenile delinquency. The previous literature has provided some support for this causal relationship; therefore, it was expected that children who commit animal cruelty and the other listed behaviors will progress into adolescent delinquent behavior.

> H_a (2): Children who commit animal cruelty and other behaviors will progress into adolescent aggressive behavior.

Numerous studies have supported the pathway from childhood animal cruelty, bed wetting, delinquency, aggression, hyperactivity, alcohol/drug usage, and poor school work to future aggressive behavior (Beirne, 2004; Broidy et al., 2003; Felthous, 1981; Hellman & Blackman, 1966; Kokko et al., 2006; Merz-Perez et al., 2001; Nagin & Tremblay, 1999; O'Grady et al., 2007; Santtila & Haapasalo, 1997; Tallichet & Hensley, 2004; Rigdon & Tapia, 1977; Wax & Haddox, 1977). In their study of prisoners, Merz-Perez et al. learned that the 56% of the violent offenders committed childhood animal cruelty. Santtila and Haapasalo also concluded that 38% of the offenders in the homicide group also committed earlier animal cruelty. In addition, Kokko et al. found that children

who were aggressive also were aggressive during adolescence. Based on this prior research, it was expected that children who commit animal cruelty and these included behaviors will progress into adolescent aggressive behavior.

Childhood Firesetting

There has been limited research about female childhood animal cruelty and firesetting and their relationship to adolescent firesetting (Felthous & Yudowitz, 1977). The majority of the previous literature has focused on male childhood firesetting (Hellman & Blackman, 1966; Santtila & Haapasalo, 1997; Wax & Haddox, 1974). In addition, the CBCL delinquent and aggressive scales for females do not include firesetting as they do for the males (Achenbach & Edelbrock, 1983), which possibly afforded the ability to examine female firesetting as a separate behavior in the present study. The last hypothesis attempted to test whether female children who engage in animal cruelty and firesetting progress into adolescent firesetting.

> H_a (3): Female children who commit animal cruelty and firesetting will progress into adolescent firesetting.

Slavkin (2001) conducted a study about juvenile fire setters. He verified that those who committed earlier animal cruelty were more likely to set fires as adolescents. It appears that this would be another likely causal relationship stemming from childhood behavior. In a study performed by Felthous and Yudowitz (1977) on female adult prisoners, it was discovered that those inmates who set fires during their childhood were likely to commit criminal acts later in life. However, they did not conduct research on the relationship with childhood firesetting and adolescent firesetting. Because it was determined to be related to future criminal acts, it is expected that children who set fires

will progress into adolescent firesetting. Therefore, it is expected that female children who commit animal cruelty and firesetting will progress into adolescent firesetting.

Methodology for Proposed Study

This research analyzed a secondary data set from the Project on Human Development in Chicago Neighborhoods (PHDCN) longitudinal study conducted by Earls and colleagues between 1994 and 2002. The PHDCN was chosen for two main reasons. First, it included questions about animal cruelty and second, it is a longitudinal study. Assessing the degree of animal cruelty and other behaviors has allowed for testing causal order of behaviors over time. According to Blumstein (2005), a longitudinal study allows for analysis of an individual's developmental processes. It also provides a means for a detailed examination of the connections between the onset, course and desistance of behavior. Thus, this longitudinal study provided the opportunity to study the Graduation Hypothesis in a manner that no other known research has performed.

Overview of the Project on Human Development in Chicago Neighborhoods

The present research has utilized data that have been archived through the ICPSR, "Project on Human Development in Chicago Neighborhoods (PHDCN): Child Behavior Checklist, Wave 1, 1994-1997" ICPSR 13582 and "Project on Human Development in Chicago Neighborhoods (PHDCN): Child Behavior Checklist, Wave 3, 2000-2002" ICPSR 13679. The original purpose of this interdisciplinary longitudinal cohort study was to advance the understanding about the development of both positive and negative human social behaviors. The project examined the cause and pathways of juvenile delinquency, adult criminal activity, substance abuse and violence (Earls, Brooks-Gunn, Raudenbush, & Sampson, 2005b). In addition, the study, which focused on the City of

Chicago beginning in 1994, provided detailed environmental data about Chicago including the residents, institutions and resources (Earls et al.). The PHDCN in its entirety included three waves of interviews, ending in 2002. Waves 1 and 3 will be the focus of the present research; however, Wave 2 will be discussed briefly.

Interviews

Sample

Wave 1. In Wave 1 of the PHDCN, conducted between 1994 and 1997, Earls et al. (2005b) chose Chicago as the site for their study for its diverse racial, ethnic and social-class populous. Utilizing a stratified probability sample method for the selection of respondents from 80 Chicago neighborhoods, over 6,000 respondents were randomly selected from 343 neighborhood clusters [NCs] (Earls et al.). The NCs were based on seven racially/ethically composed groupings and three socioeconomic status levels. In providing a definition of the NCs, the geographic boundaries and knowledge of the Chicago's neighborhoods were taken into account (Earls et al.). There were approximately 8,000 residents in each NC.

Earls et al. (2005b) identified pregnant women, children and young adults in the seven age cohorts (birth, 3, 6, 9, 12, 15, and 18 years) using in-person screening of the approximate 40,000 dwelling units in the 80 NCs. They obtained an 80% response rate during the screening process. The children who were within six months of the qualifying birthday were selected for the Longitudinal Cohort Study (Earls et al.). A total of 6,228 of the 8,347 eligible participants were selected for the study. The overall response rate for the entire study was 75%. Wave 1 will serve as Time 1 for the present research.

Wave 2. Wave 2 of the PHDCN was conducted from 1997 to 2000. There were 5,338 individuals interviewed in the follow-up from Wave 1 (Earls, Brooks-Gunn, Raudenbush, & Sampson, 2006b). However, this wave has been excluded from the present research because the respondents were not asked any questions about cruelty to animals.

Wave 3. Wave 3 of the PHDCN was conducted from 2000 to 2002. A total of 4,850 respondents participated, representing an overall response rate of 78.19 percent (Earls et al., 2006b). Like Wave 1, the respondents in this wave were again asked about cruelty to animals. Wave 3 will serve as Time 2 for the present research.

The present research focused originally on Cohort 6 in Wave 1 and Cohort 12 in Wave 3. These chosen cohorts appeared to represent the maturation from Cohort 6 (6-year-olds) in Wave 1 to Cohort 12 (12-year-olds) in Wave 3. Because the present study only included those individuals who participated throughout all three waves, Wave 3 defined the sample size. In addition, a request was made and granted for the identification (ID) variables that link the data across the waves after IRB approval was received. This allowed for the comparison between times one and two. According to Earls et al. (2006b), Cohort 12 in Wave 3 had 820 respondents (p. vii). This originally provided a sample size of 820 participants for the present research.

Procedure

A longitudinal cohort study was the research design utilized to obtain the information in the PHDCN, which followed over 6,000 randomly selected children, adolescents, young adults and their primary caregivers over time (Earls et al., 2005b). This study was created to observe the changing circumstances in their lives, including

their personal characteristics, which might lead them toward or away from varying antisocial behaviors (Earls et al.). Numerous measures were used to determine the various aspects of human development, including individual differences and influences from family, peers, and school (Earls et al.).

The primary caregiver and the child were interviewed in both waves of the present study (Earls et al., 2006b). The researchers defined the primary caregiver as the person who spent the most time taking care of the child (Earls et al., 2005b). Separate research assistants conducted the primary caregiver and child interviews. Face-to-face interviews were the primary method of data collection; however, if the participant refused to complete the personal interview, the interview was conducted telephonically.

In Wave 1, the languages used for the interviews were Spanish, English and Polish. The complete protocol was translated into Spanish and Polish. Interpreters were hired for the respondents who spoke languages other than the ones listed. In Wave 3, the research assistants administered an abbreviated version of the primary caregiver's questionnaire. However, it was not translated into another language. If the respondent spoke Spanish, the research assistant had a household member translate the questions at the time of the interview (Earls et al., 2006b). In both waves, the respondents were paid between $5 and $20 per interview, depending on the participant's age and wave of the data collection. In addition, other incentives included free museum and aquarium passes and monthly prize drawings (Earls et al.).

Instrument

The PHDCN Child Behavior Checklist (CBCL) is based on the CBCL that was first developed by Achenbach (1966) and was used to evaluate childhood maladaptive

behavioral and emotional problems between the ages of 2 and 18 (Earls et al., 2005b). The interviews encompassed a wide range of questions including impulse control, cognitive development, leisure activities, juvenile delinquency, substance usage, friends' activities and self-perception (Earls et al., 2005b). The caregivers were asked about the family structure, parental characteristics, parental discipline styles, family mental health and familial history of criminal behavior and drug abuse (Earls et al., 2005b). To reduce any respondent bias that might occur due to a preconceived notion regarding the presence or absence of a particular order, the questions in the PHDCN CBCL were presented alphabetically to the participants (Earls et al., 2006b).

It is important that the original CBCL is both reliable and valid basis for the research to be conducted in the present study. Its reliability and validity are each discussed in turn.

Reliability. Achenbach and Edelbrock (1983) conducted several reliability tests on the CBCL. They utilized the intraclass correlation coefficient (ICC) by using one-way analyses of variance.

According to Blalock (1979), ICC measures a product-moment correlation between all of the possible pairs of cases within the categories of the nominal-scale variable. It also measures the degree of homogeneity of the classes related to the total variability of the interval scale (Blalock). In this usage, class would be defined as a set of elements that possess one or more common characteristics (Haggard, 1958). Additionally, ICC provides information about both interobserver agreement and intraobserver reliability (Suen & Ary, 1989). Maximum positive correlation will occur when all of the intraclass scores are identical and the scores differ only from class to class

(Haggard). This would indicate that the ICC would be +1.0 when the categories are perfectly homogeneous (Blalock). As the relative heterogeneity of the intraclass scores increases, the ICC will decrease (Haggard). Therefore, maximal negative correlation will occur when the intraclass score heterogeneity is maximal and all of the class means are the same (Haggard). When the between and within estimates are exactly equal, the ICC would be zero (Blalock). However, the ICC would have a lower limit of -1.0 when there is an average of two cases within each class (Blalock).

Hardy and Bryman (2004) wrote that the absolute value of correlations will show the strength of the association between two variables. Traditionally, correlations between the range of 0.1 and 0.3 are considered weak (Hardy & Bryman). Correlations that fall between 0.4 and 0.6 are moderate and those falling between 0.7 and 0.9 being strong (Hardy & Bryman). These ranges become important when assessing the strength of the reliability of the CBCL.

Achenbach and Edelbrock (1983) used the ICC to measure the various types of reliability in scoring the behavior problem and social competence items. First, they performed a test-retest reliability of item scores. They yielded an overall ICC of .952 for the 118 behavior problems and .996 for the 72 social competence items ($p<.001$). They also showed longer-term stability of the item scores by calculating the ICCs for the CBCLs that were obtained from 12 months at three-month intervals. These ICCs were .838 for the behavior problems and .974 for the social competence items ($p<.001$). As a result, the ICCs for the test-retest item scores show strong correlations.

Next, Achenbach and Edelbrock (1983) focused on the interparent agreement and inter-interviewer reliability of the item scores. The interparent agreement reliability was

derived from the parents of 168 children. The overall ICC was .985 for the behavior problems and .978 for the social competence items (both $p<.001$). To assess the inter-interviewer reliability, Achenbach and Edelbrock compared the scores of three interviewers on three sets of 241 children who were matched for age, sex, race and socioeconomic status. They found an overall ICC of .959 for the behavior problems and .927 for the social competence items (both $p<.001$). These ICCs show very strong correlations for both the interparent agreement and interviewer reliability on the item scores.

Finally, Achenbach and Edelbrock (1983) assessed the test-retest reliability of the scale scores. The scales evaluated were the behavior problems scale; internalizing, externalizing, total behavior problem score, social competence scales, and total competence score. They started with the test-retest correlations between scale scores. Utilizing Pearson correlations, they found that out of 110 correlations, 105 were statistically significant at $p=.05$ or better. They found a median correlation of .89. This median value depicts a strong correlation.

In addition to the above reliability tests, Achenbach and Rescorla (2001) also provided information about the internal consistency of the scale scores. According to DeVellis (2003), internal consistency centers on the homogeneity of the items within a scale. Generally, internal consistency is equated with Cronbach's coefficient alpha (α) (DeVellis).

DeVellis (2003) defined alpha as "the proportion of a scale's total variance that is attributed to a common source, presumably the true score of a latent variable underlying the items" (p. 31). Alpha can theoretically range in value from 0.0 to 1.0 (DeVellis).

However, DeVellis has provided a ranking of the ranges of alpha values for research scales. He presented the following, “Below .60, unacceptable; between .60 and .65, undesirable; between .65 and .70, minimally acceptable; between .70 and .80, respectable; between .80 and .90, very good; much above .90, one should consider shortening the scale” (p. 95-96). According to Achenbach and Rescorla (2001), the Externalizing Scales, which include the aggressive and delinquent scales that will be utilized by the present study, the Cronbach’s alpha is .94. This would indicate that their internal consistencies are very good.

Given this information about the reliability of the original CBCL, it would appear that the correlations are strong to very strong. In addition, the internal consistency Cronbach’s alphas of the Externalizing Scales also are very good. This information about the reliability of the CBCL provides support for the research performed by Earls et al. (2005b, 2006b) and the present research study.

In addition to reliability, it is critical that the CBCL also be valid. The validity tests and their results are supplied below.

Validity. Validity indicates the degree to which a variable really measures what it is intended to measure (Hardy & Bryman, 2004). Achenbach and Edelbrock (1983) also assessed validity in the original CBCL. In this examination, they concentrated on content validity, construct validity and criterion-related validity.

Of the three types of validity evaluated, Achenbach and Edelbrock (1983) provided the least information about content validity. Content validity is defined as the degree to which a measure covers the range of meanings included within the concept (Maxfield & Babbie, 2001). The behavior problem scale includes 118 issues ranging

from “argues a lot” to “fears going to school” to “steals outside the home” (Achenbach & Edelbrock), areas of concern for parents and mental health professionals. Achenbach and Edelbrock found that clinically referred children received significantly higher scores ($p<.005$) than similar non-referred children on 116 behaviors. The clinically referred children received significantly lower scores ($p<.005$) than the non-referred children on all of the 20 social competence items (Achenbach & Edelbrock). These results show that the CBCL’s items relate to independent mental health concerns, thus providing evidence for the scale’s content validity.

Construct validity examines the theoretical inferences that could be made about the underlying construct (Hardy & Bryman, 2004). Achenbach and Edelbrock (1983) wrote that the CBCL could be seen as subgroupings of problems comparable to the subtests of general ability tests. They yielded significant Pearson correlations (r) with several ability tests. The examination of the Conners Learning Problem with School revealed a correlation of -.59. The correlation for the Conners Anxiety with Schizoid (or Anxious) was r =.64 and for Depressed was r = .54. The correlations of the Conners Psychosomatic with Somatic Complaints, the Conners Impulsive-Hyperactive with Hyperactive, and the Conners Conduct Problem with Aggressive were .60, .39, and .78, respectively. The final Conners scale, Antisocial with Delinquent, had a correlation of .61. In addition to the Conners scales, Achenbach and Edelbrock found a total correlation of .92 with the Quay-Peterson Revised Behavior Problem Checklist. These significant correlations with the Conners and Quay-Peterson scales produced evidence of the CBCL’s construct validity.

The final validity test was about criterion-related validity. According to Hardy and Bryman (2004), criterion-related validity evaluates a scale in terms of a criterion in which people are known to differ. As mentioned under content validity, Achenbach and Edelbrock (1983) compared clinically referred children and similar non-referred children. These children were matched using age, race, sex and socioeconomic status. There was significant discrimination between the two groups of children on 116 out of the 118 behavior problems and on all of the social competence items. As an example, Achenbach and Edelbrock revealed that the percentage of variance in the total score, which was accounted for by the children's clinical status, ranged from 34% for the 4 to 5-year old girls to 49% for the boys aged 6 to 11 ($p<.001$). The differences between the two groups of children based on their clinical status would show support for the CBCL's criterion-related validity.

The three validity tests of the original CBCL have produced significant results. As with the reliability, this information will provide credibility for the research performed by Earls et al. (2005b, 2006b) and to the present study.

Variables

From the hypotheses in the present study, the following 16 original variables, three dependent and thirteen independent, were drawn. These variables have been taken directly from the PHDCN CBCL. According to Earls, Brooks-Gunn, Raudenbush, and Sampson (2005a), the question used in Wave 1 for the variables in Cohort 6 is as follows:

> I am going to read a list of items that describe children and youth. For each item that describes [child's name] now or within the past 6 months, please say "2" if the item is very true or often true of [child's name]. Say "1" if the item is

> somewhat or sometimes true of [name]. If the item is not true of [child's name], say "0". Please answer all items as well as you can, even if some do not seem to apply to [name]. (p. 8)

Following these instructions, the variable name, for example, "Cruel to animals", was read and the parent's response was recorded. A major limitation with these questions is that it does not appear that the variable was further defined for the respondent. This could present a problem with the interpretation of the question, thus providing inconsistent results amongst the respondents. Another limitation is that there is not a listing of the question asked of the respondents in Cohort 12 of Wave 3 for each.

As a result of the question for 10 of the variables, bed wetting, animal cruelty, hyperactivity, alcohol/drug usage, poor school work, firesetting, destroys own things, physically attacks people, truancy, and vandalism, there are three categories for each one: "0" is "not true," "1" is "somewhat or sometimes true," and "2" is "very true or often true" (Earls et al., 2005a). These categories were collapsed for the present research, thus creating dichotomous variables. Because both category "1" and "2" indicate the child or adolescent's involvement in the given behavior, they were collapsed into a category "1." This indicated that the child or adolescent exhibited the behavior. Category "0" remained the same, which indicated that the child or adolescent did not exhibit the behavior.

Two of the independent variables, childhood delinquency and aggression, were scales. According to Earls et al. (2005a), these behavioral scales range from 0 to 26 and 0 to 38, respectfully. They were evaluated on their differences with delinquent and aggressive behavior scores at time two.

As mentioned under the hypothesis section, two of the dependent variables, adolescent delinquent behavior and adolescent aggressive behavior, were scales. The adolescent delinquent behavior scale ranged from 0 to 15 (Earls, Brooks-Gunn, Raudenbush, & Sampson, 2006a). The adolescent aggressive behavior scale ranged from 0 to 26 (Earls et al., 2006a). These two dependent variables allowed Ordinary Least Squares (OLS) to be utilized for analysis. This statistical method is discussed later.

Dependent Variables

Three dependent variables were tested in the present research. The hypothesis that tested each of the dependent variables is listed in addition to the question about the variable and its coding in the PHDCN. The questions and coding in the PHDCN Wave 3 are taken from Cohort 12 codebook. The dependent variables are listed in order of their appearance in the three hypotheses. Several are repeated because they were tested in multiple hypotheses.

Graduation Hypothesis testing (Hypotheses 1 and 2). Adolescent delinquent behavior was tested in Hypothesis 1. This variable was the product of the Delinquent Behavior Score, CBCL, which was coded as “DELINC3” (Earls et al., 2006a). Adolescent aggression was tested in Hypotheses 2. These data were acquired from the Aggressive Behavior Score, CBCL, which was coded as “AGGREC3” (Earls et al., 2006a).

Because the present research tested the Graduation Hypothesis and a related hypothesis, the data represent the opportunity to evaluate these with a sample of children as they mature into adolescents. According to Bartollas and Miller (1998), adolescence is defined as the period between the ages of 12 and 18. Childhood constitutes birth until age

11. Therefore, since Time 1 of the present study signified childhood, Wave 1 Cohort 6 will be used. Wave 3 Cohort 12 originally denoted Time 2, adolescence.

For the purposes of this study, the items in the CBCL delinquent scales provided the operationalization of delinquent behavior. These items are presented in descending Eigenvalue order. According to Achenbach and Edelbrock (1983), the CBCL 12 to 16 year old male delinquent scale lists 13 items as follows:

> Steals outside home; steals at home; bad friends; vandalism; lies, cheats; truant; sets fires; destroys others' things; alcohol, drugs; disobeys at school; runs away; destroys own things; and poor school work. (p. 203)

The CBCL 12 to 16 year old female delinquent scale encompasses slightly different items, which follow:

> Bad friends; lies, cheats; truant; poor schoolwork; alcohol, drugs; disobeys at school; runs away; impulsive; steals at home; steals outside of home; can't concentrate; disobeys at home; secretive; prefers older kids; and lacks guilt. (Achenbach & Edelbrock, p. 209)

The CBCL delinquent scales serve as the dependent variable in Hypothesis 1.

Many of the actions listed as items in the CBCL delinquent scale have been assessed in previous studies provided in Chapter II about the relationship between animal cruelty and other behaviors as well as in the developmental theory literature. In a similar manner to delinquent behavior, aggressive behavior was operationalized to reflect the items in the CBCL aggressive scale for each gender. Again, the items are presented in the order of descending Eigenvalues.

According to Achenbach and Edelbrock (1983), the following items construct the aggressive scale for the 12 to 16 year old males:

> Threatens people, temper, cruel to others, disobeys at home, swearing, screams, argues, attacks people, stubborn, teases, loud, jealous, moody, hyperactive, impulsive, fights, sulks, demands attention, nervous, suspicious, excess talk, and feels persecuted. (p. 203)

The aggressive scale items listed for the 12 to 16 year old females are comparable to the males. They are as follows:

> Temper, loud, stubborn, screams, teases, threatens people, argues, demands attention, cruel to others, disobeys at home, shows off, excess talk, moody, sulks, fights, brags, attacks people, jealous, feels persecuted, swears, suspicious, and feels unloved. (Achenbach & Edelbrock, p. 209)

The CBCL aggressive scales are the dependent variable in Hypothesis 2. As with the delinquent scale items, many of the actions listed in the aggressive scales are grounded in the previous research that was evaluated in Chapter II. Some of these actions found in the prior literature are threatening and attacking people, fighting, temper tantrums, and arguing (Donker et al., 2003; Loeber, 1982; Loeber & Schmaling, 1985).

Childhood firesetting (Hypothesis 3). The final dependent variable that was proposed to be tested in the present research, adolescent firesetting, was attempted to be analyzed in Hypothesis 3. This variable in the PHDCN that elicited this behavior, which was listed under question number CE44, was coded as “does not set fires” (0) and as “sets fires” (1) (Earls et al., 2006a).

Independent Variables

Thirteen independent variables were originally proposed to be assessed for their causal relationships with the given dependent variables in the present research. Similar to the dependent variables, the hypotheses that utilized each of the independent variables are listed in addition to the question about the variable and its coding in the PHDCN. The questions and coding in the PHDCN Wave 1 were taken from the Cohort 6 codebook. Like the dependent variables, the independent variables are listed in order of their appearance in the three hypotheses. Again, some are repeated because they are listed in multiple hypotheses, with several exceptions. Several independent variables were originally proposed to be tested in all three hypotheses, bed wetting, animal cruelty, delinquency, aggression, hyperactivity, alcohol/drug usage, and poor school work. As a result, they will be only listed once for the sake of brevity.

Graduation Hypothesis testing (Hypotheses 1 and 2). Gender (female = 0, male = 1) was examined in the first two hypotheses. It was obtained from the SEX variable (Earls, Brooks-Gunn, Raudenbush, & Sampson, 2005d). The remainder of the variables was taken from Earls et al. (2005a). Childhood bed wetting was listed in question CC108 and was coded as “does not wet the bed” (0) and as “wets the bed” (1). Childhood animal cruelty was listed in question CC15 and was coded as “not cruel to animals” (0) and as “cruel to animals” (1). Childhood delinquency was the product of the Delinquent Behavior Score, CBCL, which was coded as “DELIN_C.” Childhood aggression was acquired from the Aggressive Behavior Score, CBCL, which was coded as “AGGRE_C.” Childhood hyperactivity was listed in question CC10 and was coded as “can sit still/not restless/not hyperactive” (0) and as “can’t sit still/restless/hyperactive” (1). Childhood

alcohol/drug usage was listed in question CC105 and was coded as “does not use alcohol/drugs without medical purpose” (0) and as “uses alcohol/drugs without medical purpose” (1). Finally, childhood poor school work was listed in question CC61 and was coded as “not poor school work” (0) and as “poor school work” (1).

Childhood firesetting (Hypothesis 3). Hypothesis 3 included the same independent variables as Hypotheses 1 and 2; however, because it focused specifically on females, gender was not included. In addition, there were five new independent variables being tested. As with the majority of the other independent variables, they were taken from Earls et al. (2005a). Childhood firesetting was listed in question CC72 and was coded as “does not set fires” (0) and as “sets fires” (1). Childhood destruction of own things was listed in question CC20 and was coded as “does not destroy own things” (0) and as “destroys own things” (1). Childhood physical attacking people was listed in question CC57 and was coded as “does not physically attack people” (0) and as “physically attacks people” (1). Childhood truancy was listed in question CC101 and was coded as “is not truant/does not skip school” (0) and as “is truant/skips school” (1). The final variable was vandalism, which was listed in question CC106 and is coded as “does not vandalize” (0) and as “vandalizes” (1).

Human Subjects’ Protection

The present study was a secondary data analysis in which the data are presented anonymously with no unique identifiers of specific participants available. Furthermore, certain identifying information in the PHDCN is restricted from general dissemination (Earls et al., 2006b). The ID variables that link the data across the waves are restricted and only released after a Data Transfer Agreement Form and reasons for the request are

approved by the ICPSR (Earls et al.). Therefore, the present research did not appear to pose a risk to any of the participants.

Summary

The purpose of the proposed research was to provide a test of the Graduation Hypothesis utilizing data collected through a longitudinal study. This attempted to fill a gap in the literature, which has been suggested previously (Beirne, 2004). The three research questions and three hypotheses have provided a thorough assessment of these two areas.

There have been contradictory research findings on the relationship between animal cruelty and later delinquent or aggressive behavior in the past and the goal of the present research was to allow for an examination of the degree to which the Graduation Hypothesis can predict future behavior. Ordinary Least Squares and Binary logistic regression were proposed to test the Graduation Hypothesis. However, as with other research, they were not without limitations.

There were several limitations with the present study. Because it was a secondary data analysis, it was bound by the data that were elicited by the original researchers. Secondly, no definitions were given for each of the variables. As stated earlier, they could create different interpretations of the question, thus providing inconsistent results among the respondents. However, issues with recall, on the other hand, should not be a major issue because the respondents were only asked about behaviors during the past six months.

Finally, the PHDCN was conducted solely in Chicago, Illinois, thus creating a possible issue with generalizability. However, the original researchers considered this

problem. They focused on the seven racially/ethnically composed groupings and three socioeconomic levels in the neighborhood clusters in the PHDCN (Earls et al., 2005b). In their definition of the NCs, the geographic boundaries and knowledge of Chicago's neighborhoods also were taken into account (Earls et al.). As a result, they selected a sample that appears to be representative of Chicago's populous, which could be representative of other large cities within the United States.

Data Analysis

The data provided in both waves of the PHDCN study were analyzed quantitatively. The descriptive statistics provided an overall view of the percentages of the children and adolescents who exhibited the behaviors versus those who did not. The correlation matrix was examined to provide strength to the hypotheses. Next, the analysis of variance (ANOVA) unveiled the variance in the dependent variables by the independent variables. In addition, because the first two dependent variables were scales, OLS was used to analyze their relationships with the independent variables. The final dependent variable, adolescent firesetting, was collapsed and became dichotomous, signifying that the child or adolescent did or did not exhibit the behavior. Given that it was a binary dependent variable, binary logistic regression was proposed to scrutinize statistically its relationship with the independent variables.

According to Earls et al. (2006b), there were 4,850 participants in Wave 3 of the PHDCN study, which would be the total number of children and adolescents included for both waves in the present research. However, because the original focus was specifically on Cohort 6 of Wave 1 and Cohort 12 of Wave 3, the number of adolescents in the Wave 3 cohort encompassed the sample size. Thus, the original sample size for the present

research would have been 820. This would have created a ratio of 63 participants per each of the 13 independent variables (IVs). The recommended number of cases per independent variable is presented to determine if the present ratio is appropriate for the analyses.

Recommendations for the number of cases to the number of IVs ratio often vary from 15 to one (Stevens, 1992) up to 20 to one (Hair, Anderson, Tatham, & Black, 1998; Meyers, Gamst, & Guarino, 2005) to create a more reliable and valid study. In addition, Wright (1998) wrote that larger samples are needed to test hypotheses via logistic regression coefficients compared to linear regression. In this regard, Aldrich and Nelson (1984) suggested a minimum of 50 cases per independent variable. The given 63 participants to one independent variable ratio of the present research indicated that the number would be appropriate.

Descriptive Statistics

According to Hardy and Bryman (2004), descriptive statistics provide information about four features of a distribution. The features are as follows: a typical or most likely value in the distribution, the heterogeneity of the distribution, the symmetry of the distribution, and the peakedness of the distribution. The descriptive statistics used in the present research also explore the percentages of the children and adolescents who exhibit each of the independent and dependent variables compared to those who do not. The Statistical Package for the Social Sciences (SPSS) was used to reveal these descriptive statistics and percentages.

Correlation Matrix

The Correlation Matrix also was examined for the relationships listed in the earlier correlation section. This review assessed the independent variables for multicollinearity, meaning that there are strong correlations between them. Warner (2008) wrote that when the independent variables or predictors are highly correlated with each other, there may be a competition amongst them to explain much of the same variance. In addition, it is possible that these high correlations could result in having no significant individual slope coefficients (Warner). Additionally, according to Warner, the correlations between the independent and dependent variables provide a baseline. While statistically controlling for other variables, each independent variable in a regression will be evaluated against this baseline (Warner). This evaluation then determined whether the independent variable makes a difference in the relationship with the dependent variable. Due to these issues, it was important to include the correlation matrix in the present study. As with the previous descriptive statistics, SPSS was used to determine those correlations.

Analysis of Variance

In addition to the other examinations, the analysis of variance (ANOVA) was scrutinized. Miethe (2007) defined ANOVA as "A statistical procedure used with a quantitatively measured dependent variable and a nominal or ordinal independent variable" (p. 317). This procedure evaluates the variability and assesses the ". . . total amount of variance in the dependent variable, and how much of that variance is accounted for by the independent variables" (Miles & Shevlin, 2007, p. 33). Warner (2008) added that it is ". . . a statistical analysis that tests whether there are statistically

significant differences between group means on scores on a quantitative outcome variable across two or more groups" (p. 996). This analysis provided the significance level, *p*, which is shown as "Sig." in the output generated by SPSS. This *p* value tested the null hypothesis. In sum, as the *p* value becomes smaller, the evidence is stronger that at least one of the coefficients is not zero (Allison, 1999).

Ordinary Least Squares

As stated previously, two of the dependent variables, adolescent delinquent behavior and adolescent aggressive behavior, were continuous variables as they represent scales ranging from 0 to 26 and 0 to 15, respectively. Bachman and Paternoster (2004) suggest that continuous variables have values that can be quantified and are continuous in nature. These values can be compared in a numerically meaningful way. They also indicated that the Ordinary Least Squares (OLS) model is the most useful in the case of continuous dependent variables (Bachman & Paternoster). Because the dependent variables in Hypotheses 1 and 2 are continuous, OLS was utilized to test them.

Weinfurt (2006) and Warner (2008) have provided definitions for OLS. Weinfurt wrote that OLS is defined as "A method for estimating the parameters of a linear regression equation" (p. 357). Similarly, Warner defined OLS as follows:

> A statistic is the best OLS estimate if it minimizes the sum of squared prediction errors; for example, *M* is the best OLS estimate of the sample mean because it minimizes the sum of squared prediction errors, $\Sigma(X - M)^2$ that arises if we use *M* to predict the value of any score in the sample chosen at random. (p. 1,028)

The *M* in the above definition denotes the mean of the scores and will be discussed next. In addition to the above definitions, Hardy and Bryman (2004) suggested that the method

of OLS estimates measures of central tendency under the constraint that the errors sum to zero.

The mean (*M*) is the point of minimum variation within the distribution of the scores (Bachman & Paternoster, 2004). The variance is measured by the squared deviations from the mean, which produces a least-squares regression line (Bachman & Paternoster). Bachman and Paternoster have provided the equation that defines this line: $y = \alpha + \beta x$. Whereas:

> y is the score on the y variable, α is the y intercept, β is the slope of the regression line, and x is the score on the independent variable. (Bachman & Paternoster, p. 471)

Warner (2008) wrote that the intercept and slope coefficients provide the best possible predictions for the dependent variable, Y and that these coefficients can be obtained by using OLS.

Bachman and Paternoster (2004) also have presented the equation for OLS regression line: $y = a + bx + e$. This equation is similar to the above least-squares regression line; however, it also considers error. Therefore, *a* is the *y* intercept or constant and *b* is the OLS regression coefficient that reflects the linear relationship between the independent and dependent variable. The independent variable is connoted by *x* and *y* signifies the dependent variable. Finally, *e* is the error term that was not accounted for in the earlier equation.

Although OLS was the best model to test Hypotheses 1and 2, it was not without its limitations. Bachman and Paternoster (2004) have provided two such limitations. The OLS model has assumptions about the error term that are violated when the dependent

variable is dichotomous instead of continuous. Bachman and Paternoster further stated that the OLS model could produce predictions about the dichotomous dependent variable's probability that are less than zero and greater than one. A dichotomous dependent variable only has two possible outcomes and when they are coded as "0" and "1," the outcome could not fall outside of that range. As a result, because adolescent firesetting was coded "0" for no exhibited behavior and "1" for when the behavior was exhibited, OLS was not an appropriate model for Hypothesis 3.

Binary Logistic Regression

Binary logistic regression was proposed to test Hypothesis 3. The goal of logistic regression is to find the best fitting and most parsimonious and reasonable model to illustrate the relationship between the independent and dependent variables (Hosmer & Lemeshow, 1989). This allows for the estimation of a coefficient that will measure the effect of a particular independent variable on the binary dependent variable (Bachman & Paternoster, 2004). Binary logistic regression was chosen because the dependent variable in Hypothesis 3, adolescent firesetting, became dichotomous, which also is called a binary variable. This dependent variable indicated whether the adolescent exhibited firesetting behavior. Linear regression would not be an appropriate model because its measurement assumption, which states ". . . the dependent variable is continuous, unbounded, and measured on an interval or ratio scale," (Menard, 1995, p. 4) would be violated.

One of the purposes of binary logistic regression is to determine the possibility of a dependent or outcome variable occurring, in the case of the present research, an adolescent exhibiting a behavior. In the present research, "1" represents that an

adolescent exhibited firesetting behavior and “0” indicates that the behavior was not exhibited. This statistical model converts the data into probabilities (Miles & Shevlin, 2001). The result provides the values for the probability of the commission of the behavior. Warner (2008) has provided an equation to predict the probability for each child or adolescent to exhibit the behavior. The equation is as follows:

$$\hat{p}_i = B_0 + B_1X_1 + B_2X_2 + ... + B_kX_k \text{ (Warner).}$$

Whereas, $\hat{p}$ is the probability of exhibiting the behavior, $\hat{p}_i$ is the probability that person i will exhibit the behavior, B_0 is the intercept, and the B_i values are the regression coefficients that are applied to raw scores on the independent variables.

Miles and Shevlin (2001) wrote that because “1” and “0” represent the probability of the behavior occurring, it is not possible to predict a value that would be less than zero or greater than one. This limitation can be accounted for by converting the probabilities into odds (Miles & Shevlin). The odds ratio would equal the probability of a behavior happening divided by the probability of the behavior not happening (Miles & Shevlin). The odds have no fixed maximum value; however, they have a minimum value of zero (Menard, 1995). Menard further stated that to change the odds back to probability, the following equation can be used:

$$P(Y=1) = \frac{e^{\alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k}}{1 + e^{\alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k}}.$$

Whereas, in relation to the present research, P(Y=1) is the probability that the adolescent firesetting behavior is exhibited (Menard). Next, α is the intercept that represents the value of the dependent variable (Y) when the independent variable (X) is zero (Menard).

Finally, β is the slope that signifies the change in Y associated with a one-unit increase or decrease in X (Menard).

Like other forms of regression, binary logistic regression has several assumptions; however, they are not as restrictive as those in linear regression. The first assumption is that the "outcome variable is dichotomous," which is usually coded "1" and "0" (Warner, 2008). Warner wrote that the second assumption is that the "scores on the outcome variable must be statistically independent of each other" (p. 932). Warner listed the third assumption as "the model must be correctly specified; that is, it should include all relevant predictors, and it should not include any irrelevant predictors" (p. 932). Finally, Warner stated that the fourth assumption is as follows: "The categories on the outcome variable are assumed exhaustive and mutually exclusive; that is, each person in the study is known to be a member of one group or the other but not both" (p. 932). It is important that these assumptions not be violated during the analysis. If this occurs, the conclusions resulting from the analysis "will not have a sound basis and will be incorrect" (Miles & Shevlin, 2001, p. 62).

Finally, Menard (1995) wrote that the evaluation of the logistic regression model has three parts. "First, how well does the overall model work?" (Menard, p. 17). There must be a relationship between the independent variables and the dependent variable. If this relationship exists, it should be assessed on its strength. This also includes goodness of fit. To evaluate this first step, Bachman and Paternoster (2004) suggest that the null hypothesis (H_o), which states that the independent variables in the model equal zero, be tested. Second, ". . . how important is each of the independent variables?" (Menard, p. 17). It is important to know the contribution that each independent variable makes in

predicting the dependent variable (Menard). Thirdly, “Do the assumptions of the model appear to be satisfied?” (Menard, p. 17). This would indicate that the four assumptions listed earlier have not been violated.

In summary, binary logistic regression was the best model to test Hypothesis 3 of the present research. This model was the most appropriate to analyze the dichotomous dependent variable. In addition, if the assumptions were satisfied, this will provide further strength for the present research.

Strengths and Weaknesses of the Research Design

Strengths of the Research Design

This present study had several strengths in its research design. According to Blumstein (2005), a longitudinal study allows for analysis of an individual’s developmental processes. It also provides a means for a detailed examination of the connections between the onset, course and desistance of behavior. However, it may not account for ambiguous temporal precedence. Because the respondents were only asked about behaviors during the previous six months, issues with recall should not be a major issue. In addition, the original survey’s instrumentation remained relatively the same throughout the PHDCN study and should not be a threat. Additionally, the participants were randomly selected, which should address selection bias and regression artifacts. It also appeared that OLS and Binary Logistic Regression were the appropriate statistical methods for the hypotheses, which should address issues with threats to statistical conclusion validity. Finally, because the respondents were not subjected to testing for the original study, this should not be an issue. Although the present research design had a number of strengths, it also had some inherent weaknesses.

Weaknesses of the Research Design

This present research had several areas of weakness that were difficult to address. Some threats to internal validity may have been an issue. For example, history may be a factor. It is unknown what events may have occurred during the six years between the two waves that may have affected the participants' behavior. In addition, maturation may be an issue because females may be more mature than the males at age 12; therefore, their behavior may be affected by the maturation process. Additionally, the attrition rate is relatively low, 160 participants were not in the original sample in Wave 3, which may or may not be a factor. Additive and interactive effects of threats to internal validity also may be an issue depending on the mentioned threats. As stated previously, because this is a secondary data analysis, the research was bound by the data originally collected and there was no control over factors such as construct validity. However, as mentioned earlier, the original authors of the Child Behavior Checklist have apparently addressed this issue.

Two more areas of weakness were of concern for the present study. Location is the first and lack of definitions is the second. Because the data in the original research were collected within Chicago, this may create a problem with external validity. However, the original researchers addressed this issue by selecting a sample that appears to be representative of Chicago's populous, which could be representative of other large cities within the United States. Secondly, no definitions were given for each of the variables. As stated earlier, this could create an issue with different interpretations of the questions, thus providing inconsistent results among the respondents. Although the

present research had several weaknesses in its design, it also had numerous strengths that could provide a sound assessment of the Graduation Hypothesis.

CHAPTER IV: ANALYSIS AND RESULTS

> Every child, if it is to become an adult in its own right, has to escape from dependency: and it does so by a gradually increasing demonstration, both to others and to itself, of its power to master the environment sufficiently to obtain satisfaction for its needs. (Storr, 1968, p. 47)

In order to explore the degree to which the Graduation Hypothesis predicts the progression from animal cruelty and other actions to delinquent and aggressive behavior, data from Waves 1 and 3 of the Project of Housing Development in Chicago Neighborhoods (PHDCN) longitudinal study were obtained. As described in Chapter III, Cohort 6 in Wave 1 and Cohort 12 in Wave 3 were the focus of this analysis. However, once the data were received, it was discovered that the 12-year-old participants in Wave 3, who were in Cohort 6 in Wave 1, were actually listed under Cohort 6 in the data. By using the same identification and cohort numbers, this created a mechanism for the original researchers to identify the same children throughout the length of the study.

As a result of the Wave 3 cohort change, the final sample size for this analysis is 729, not 820 as listed in Chapter III. This new sample size still provides a sufficient number of cases (56) per each of the 13 independent variables (IVs). In addition, the question numbers in the survey detailed in Chapter III will not change because they are the same for both “Cohort 6” and “Cohort 12” in Wave 3. Finally, an analysis of Hypothesis 3 could not be performed. It was discovered that only five females in Wave 1 and three females in Wave 3 were listed as fire setters. This sample size is too small to conduct the binary logistic regression as discussed in Chapter III; therefore, no further

analysis has been performed on Hypothesis 3. Consequently, this chapter focuses only on Hypotheses 1 and 2.

In this chapter, results from the statistical analysis are outlined. First changes to the original models of Hypotheses 1 and 2 are discussed. Second, the descriptive data and frequencies are presented. These statistics also are compared by ethnicity and gender. Next, the bivariate correlations among the variables in the models are offered. This chapter concludes with the results of the multivariate regression analysis obtained through Ordinary Least Squares (OLS).

Changes to Original Models

In Chapter III, there were a total of eight independent variables listed for each of the first two hypotheses. They were gender, childhood animal cruelty, childhood hyperactivity, childhood bed wetting, childhood delinquency, childhood aggression, childhood alcohol/drug usage, and childhood poor school work. However, in order to include some familial factors that could account for each of the dependent variables, two new independent variables have been entered into the models, “PC’s relationship to subject” and “familial dysfunction.” Another variable, “ethnicity (Hispanic precedence), subject” was discovered upon receipt of the data and was added to the models. These additional variables will be discussed in the same fashion as the original ones in Chapter III. Although this would create a total of 11 independent variables, the sample size is still sufficient for analysis. The revised number of cases to independent variables ratio is 66.27 per IV, which complies with the recommendations presented in Chapter III (Stevens, 1992; Hair, et al., 1998; Meyers, et al., 2005).

Additional Independent Variables

The additional independent variables were listed in the PHDCN Master File (Earls, et al., 2005d), mentioned in Chapter III for gender, and another questionnaire that was administered to the participants at the time of the study, the PHDCN: Family Mental Health and Legal History (Earls, Brooks-Gunn, Raudenbush, & Sampson, 2005c. A third questionnaire, PHDCN: Family Legal Update for Wave 3 was considered; however, it did not include data for Cohort 6 and was excluded from this analysis. These added variables are the same for both hypotheses.

At the beginning of the analysis, six new independent variables were added to the original models; however, they were subsequently reduced to three variables through factor analysis. The first variable, which identifies the relationship that the child's primary caregiver has with the child, is "PC's relationship to subject." This variable is listed as PC_RELAT (Earls, et al., 2005d). It has been coded to include numerous relationships. The female categories are as follows: "1" for biological mom; "2" for foster mother; "3" for female cousin; "4" for step-mother; "5" for grandmother; "7" for adoptive mom; "8" for aunt; and "9" for other female. The male categories follow: "11" for biological dad; "14" for step-father; "18" for uncle; and "19" for other male. However, when the preliminary frequencies were assessed, only "biological mom" met/exceeded the recommended 10% to 15% of the sample (88.2%). This recommendation allows for enough variation within the sample and if this is not met, the variable moves toward becoming a constant instead of a variable. The added total percentages of the other categories accounted for the remaining 11.8%. To comply with

the recommendation for variation, this variable has been re-coded as “0” for others and “1” for biological mom.

The next variable, “ethnicity (Hispanic precedence), subject,” has been added to the models. It has been obtained from ETHN_SP (Earls, et al., 2005d). This variable was coded by the original researches as follows: “0” for “Hispanic,” “1” for “Asian,” “2” for “Pacific Islander,” “3” for “Black,” “4” for “White,” “5” for “Native American,” and “6” for “other.” As discussed later, Hispanic, Black, and White will become the ethnicities of interest for the regression models. As a result, Hispanic will be recoded “0” for no and “1” for yes, Black will be recoded “0” for no and “1” for yes, and White will be recoded “0” for no and “1” for yes. The final four additional variables are similar in focus and will be discussed together.

The four remaining independent variables concentrate on issues affecting the family including alcohol and drug usage and criminality, which are referred to as the “familial variables” in this present study, are all taken from Earls et al. (2005c). They are all coded “0” for no and “1” for yes. The first independent variable is “any in family with drinking problem?” It has been obtained from the FM1 variable. The second variable is “any in family with drug-use problem?” It is listed as question FM2. The third variable is “any in family with frequent legal problems?” It is listed under question FM4. The final variable in this grouping is “any in family with criminal record?” It was obtained from question FM10.

When preliminary frequencies and descriptive statistics were conducted on the familial variables, none met the previous recommendation for variation. Accordingly, a

principal component factor analysis using Varimax rotation was conducted on the four variables to assess whether they would hold together as one or more constructs.

Factor Analysis of Familial Variables

According to Floyd and Widaman (1995), factor analysis can be used as a subserving explanation for an exploratory approach. They wrote that this usage

> …is to identify the underlying dimensions of a domain of functioning, as assessed by a particular measuring instrument…designed to assess a domain of functioning is factor-analyzed to identify separable dimensions, representing theoretical constructs, within the domain (p. 286).

As a result, in the case of the four familial variables, principal components analysis was utilized because the components are then "…estimated to represent the variances of the observed variables in as economical fashion as possible" (Floyd & Widaman, p. 287). In other words, the information is condensed so that a smaller number of variables can account for the variation (DeVellis, 2003). DeVellis further added that the factor analysis also assists in the determination of how many latent variables are underlying in a set of items.

The results of the factor analysis of the familial variables are listed in Table 1. The principal components analysis resulted in one factor, which has been named Family Dysfunction (FD). The determination on the number of factors is based on DeVellis' (2003) criteria that there are substantial loadings of greater than .65 on the same factor. As shown in Table 1, all four of the original familial variables had loadings of .655 and higher, thus producing one component. In addition, the Cronbach's Alpha was .734, which is strong (Hardy & Bryman, 2004), as discussed in Chapter III.

Table 1

Factor Analysis for Familial Variables

Component 1 (Familial Dysfunction)	Items	Factor Loading
	Any in family w/criminal record?	.813
	Any in family with freq legal problems?	.777
	Any in family with drug-use problem?	.745
	Any in family with drinking problems?	.655

Rotation Method: Varimax

Once the Familial Dysfunction component was identified, it was found to have a range from "0" to "4" because each of the original items was coded "0" and "1" and all of the "1's" were then added together. However, when the frequency statistics were run on the five categories, only "0" and "1" exceeded the recommendation of 15% of cases to provide for sufficient variance. There were very few cases in the "2" category, 93 (13.1%), 47 (6.6%) cases in the "3" category, and 40 (5.6%) in the "4" category. Subsequently, this component was recoded "0" for no and "1" for yes to create a binary variable similar to the majority of the other independent variables. This dichotomized variable also prevents possible problems with regression. This final variable was named Family Dysfunction binary (FDD).

The changes in the independent variables have resulted in a total of 11 independent variables to be examined via frequencies and descriptive statistics. These variables are as follows: gender, ethnicity, PC relationship, familial dysfunction, and the childhood behaviors of hyperactivity, animal cruelty, poor school work, alcohol/drug usage, bed wetting, delinquency, and aggression. This provides a case to independent ratio of 66.27:1, which still exceeds the previous recommendations.

Frequencies and Descriptive Statistics

The frequencies for the categorical variables are presented in Table 2 and the descriptive statistics for the continuous variables are offered in Table 3. When the data were received, it was discovered that the sample was split almost evenly between females and males. Of the total sample of 729, there are 369 (50.6%) females and 360 (49.5%) males. This has allowed for both of the hypotheses to be split by gender for a more comprehensive assessment. This would mean that there will be a case to IV ratio of 33.55:1 for the females and 32.73:1 for the males. These ratios still meet the recommendations listed in Chapter III. The frequencies and descriptive statistics for the females are listed in Tables 4 and 5, respectively. Finally, Tables 6 and 7 show the frequencies and descriptive statistics for the males.

In addition to the split models by gender, a new variable, "ethnicity (Hispanic precedence), subject," will allow for a more in-depth examination of the models. According to the preliminary frequency statistics (see Table 2), 345 (47.3%) of the children in the sample identified as "Hispanic," 250 (34.3%) identified as "Black," and 105 (14.4%) identified as "White." Other ethnicities, "Asian," "Pacific Island," "Native American," and "other" were recorded for the children; however, their numbers were very minute, 12 (1.6%), 3 (0.4%), 6 (0.8%), and 7 (1.0%), respectively. As a result, split models were only conducted with the Hispanic, Black, and White populations in this sample. Finally, similar to the PC's relationship to the subject variable, ethnicity was dummy-coded to create dichotomous variables for the Hispanic, Black, and White populations. Hispanic was recoded "1" for Hispanic and "0" for all others. Likewise, Black was recoded "1" for Black and "0" for all others. In addition, White was recoded

"1" for White and "0" for all others. This recoding will be utilized during the bivariate correlations and the OLS multivariate regression analysis that is discussed later.

Table 2

Frequency Statistics for Categorical Variables of the Entire Sample (N=729)

Variable	N	%
Gender of subject		
Female	369	50.6
Male	360	49.4
Ethnicity (Hispanic precedence), subject*		
Hispanic	345	47.4
Black	250	34.3
White	105	14.4
Cannot sit still/restless/hyperactive		
Not true	258	35.5
True	468	64.5
Cruel to animals		
Not true	225	94.5
True	13	5.5
Poor school work		
Not true	487	82.1
True	106	17.9
Uses alcohol/drugs w/out medical purpose		
Not true	592	99.2
True	5	0.8
Wets the bed		
Not true	519	86.8
True	79	13.2
PC mom or not		
Other relative	86	11.8
Biological mom	642	88.2
Family Dysfunction binary		
No	402	57.0
Yes	303	43.0

*The percentages listed for ethnicity (Hispanic precedence), subject, do not add up to 100% because the smaller populations were removed from the analysis.

The Hispanic, Black, and White models also will be split by gender. Tables 8 and 9 demonstrate the frequencies and descriptive statistics of the entire Hispanic population. Tables 10 and 11 provide the frequencies and descriptive statistics of the 183 (53%)

Hispanic females and Tables 12, and 13 provide the frequencies and descriptive statistics of the 162 (47%) Hispanic males. Tables 14 and 15 demonstrate the frequencies and descriptive statistics of the entire Black population. Tables 16 and 17 provide the frequencies and descriptive statistics of the 126 (50.4%) Black females and Tables 18, and 19 provide the frequencies and descriptive statistics of the 124 (49.6%) Black males. Tables 20 and 21 demonstrate the frequencies and descriptive statistics of the entire White population. Tables 22 and 23 provide the frequencies and descriptive statistics of the 49 (46.7%) White females and Tables 24, and 25 provide the frequencies and descriptive statistics of the 56 (53.3%) White males.

According to the frequency statistics for the categorical independent variables, neither “cruel to animals” nor “uses alcohol/drugs w/out medical purpose” has provided substantial variation as discussed previously. The SPSS output has shown that 225 (94.5%) of the respondents who answered the question about whether the child was “cruel to animals” replied “not true.” Only 13 children (5.5%) answered that they have committed animal cruelty. Likewise, 592 (99.2%) of the participants who answered whether the child “uses alcohol/drugs w/out medical purpose” responded “not true.” Therefore, they are being removed from the models.

Additionally, “PC mom or not” barely meets the variance recommendation, however, research has shown that the biological mother is often the primary caregiver of children (see: Bickle & Peterson, 1991; Daly, 1987a, 1987b, 1989; Steffensmeier, Kramer, & Streifel, 1993), as such, this variable also will remain in the final models. Finally, the variable “wets the bed” also has a borderline variance (86.8 % for “not true” and 13.2% for “true”) and will remain in the models. Ultimately, because “cruel to

animals" and "uses alcohol/drugs w/out medical purpose" are being removed from the models, they will not be discussed further.

Due to the removal of the childhood animal cruelty and childhood alcohol/drug usage variables, 9 variables remain. The revised number of independent variables provides a new case to independent variable ratio of 81:1 within the entire sample. Although the commission of childhood animal cruelty was a main variable of interest in Hypotheses 1 and 2, analyses have been performed through full models on the remaining variables to determine what, if any, of the listed childhood behaviors are significantly related to adolescent delinquency and aggression in this exploratory research. In addition, the Hypothesis Table in Appendix P has been changed to provide the information for all of the independent variables, including the ones excluded from further analysis.

Table 3

Descriptive Statistics for Continuous Variables of the Entire Sample (N=729)

Variable	Minimum	Maximum	Mean	Standard Deviation
Delinquent behavior score, CBCL (IV)	0	26	1.93	2.470
Aggressive behavior score, CBCL (IV)	0	38	10.74	7.401
Delinquent behavior score, CBCL (DV)	0	12	1.72	1.902
Aggressive behavior score, CBCL (DV)	0	26	5.81	4.867

Table 4

Frequency Statistics for Categorical Variables of Females (N=369)

Variable	N	%
Ethnicity (Hispanic precedence), subject*		
Hispanic	183	49.7
Black	126	34.2
White	49	13.3
Cannot sit still/restless/hyperactive		
Not true	145	39.4
True	223	60.6
Poor school work		
Not true	251	83.7
True	49	16.3
Wets the bed		
Not true	274	89.8
True	31	10.2
PC mom or not		
Other relative	50	13.6
Biological mom	319	86.4
Family Dysfunction binary		
No	201	56.3
Yes	156	43.7

*The percentages listed for ethnicity (Hispanic precedence), subject, do not add up to 100% because the smaller populations were removed from the analysis.

Table 5

Descriptive Statistics for Continuous Variables of Females (N=369)

Variable	Minimum	Maximum	Mean	Standard Deviation
Delinquent behavior score, CBCL (IV)	0	26	1.93	2.822
Aggressive behavior score, CBCL (IV)	0	38	10.52	7.883
Delinquent behavior score, CBCL (DV)	0	11	1.42	1.687
Aggressive behavior score, CBCL (DV)	0	25	5.39	4.668

Table 6

Frequency Statistics for Categorical Variables of Males (N=360)

Variable	N	%
Ethnicity (Hispanic precedence), subject*		
Hispanic	162	45.0
Black	124	34.4
White	56	15.6
Cannot sit still/restless/hyperactive		
Not true	113	31.6
True	245	68.4
Poor school work		
Not true	236	80.5
True	57	15.8
Wets the bed		
Not true	245	83.6
True	48	16.4
PC mom or not		
Other relative	36	10.0
Biological mom	323	89.7
Family Dysfunction binary		
No	201	57.8
Yes	147	42.2

*The percentages listed for ethnicity (Hispanic precedence), subject, do not add up to 100% because the smaller populations were removed from the analysis.

Table 7

Descriptive Statistics for Continuous Variables of Males (N=360)

Variable	Minimum	Maximum	Mean	Standard Deviation
Delinquent behavior score, CBCL (IV)	0	12	1.93	2.045
Aggressive behavior score, CBCL (IV)	0	37	10.97	6.869
Delinquent behavior score, CBCL (DV)	0	12	2.03	2.058
Aggressive behavior score, CBCL (DV)	0	26	6.25	5.032

Table 8

Frequency Statistics for Categorical Variables of Hispanics (N=345)

Variable	N	%
Gender of subject		
Female	183	53.0
Male	162	47.0
Cannot sit still/restless/hyperactive		
Not true	139	40.4
True	205	59.6
Poor school work		
Not true	214	77.0
True	64	23.0
Wets the bed		
Not true	253	90.4
True	27	9.6
PC mom or not		
Other relative	34	9.9
Biological mom	311	90.1
Family Dysfunction binary		
No	216	64.9
Yes	117	35.1

Table 9

Descriptive Statistics for Continuous Variables of Hispanics (N=345)

Variable	Minimum	Maximum	Mean	Standard Deviation
Delinquent behavior score, CBCL (IV)	0	26	1.71	2.729
Aggressive behavior score, CBCL (IV)	0	38	10.69	7.307
Delinquent behavior score, CBCL (DV)	0	8	1.38	1.665
Aggressive behavior score, CBCL (DV)	0	24	5.28	4.583

Table 10

Frequency Statistics for Categorical Variables of Hispanic Females (N=183)

Variable	N	%
Cannot sit still/restless/hyperactive		
Not true	86	47.0
True	97	53.0
Poor school work		
Not true	113	77.4
True	33	22.6
Wets the bed		
Not true	136	91.9
True	12	8.1
PC mom or not		
Other relative	17	9.3
Biological mom	166	90.7
Family Dysfunction binary		
No	116	65.9
Yes	60	34.1

Table 11

Descriptive Statistics for Continuous Variables of Hispanic Females (N=183)

Variable	Minimum	Maximum	Mean	Standard Deviation
Delinquent behavior score, CBCL (IV)	0	26	1.73	3.307
Aggressive behavior score, CBCL (IV)	0	38	10.60	8.307
Delinquent behavior score, CBCL (DV)	0	7	1.50	1.304
Aggressive behavior score, CBCL (DV)	0	20	4.87	4.336

Table 12

Frequency Statistics for Categorical Variables of Hispanic Males (N=162)

Variable	N	%
Cannot sit still/restless/hyperactive		
Not true	53	32.9
True	108	61.7
Poor school work		
Not true	101	76.5
True	31	23.5
Wets the bed		
Not true	117	88.6
True	15	9.3
PC mom or not		
Other relative	17	10.5
Biological mom	145	89.5
Family Dysfunction binary		
No	100	63.7
Yes	57	36.3

Table 13

Descriptive Statistics for Continuous Variables of Hispanic Males (N=162)

Variable	Minimum	Maximum	Mean	Standard Deviation
Delinquent behavior score, CBCL (IV)	0	12	1.68	1.895
Aggressive behavior score, CBCL (IV)	0	33	10.78	6.022
Delinquent behavior score, CBCL (DV)	0	8	1.75	1.935
Aggressive behavior score, CBCL (DV)	0	24	5.74	4.819

Table 14

Frequency Statistics for Categorical Variables of Blacks (N=250)

Variable	N	%
Gender of subject		
Female	126	50.4
Male	124	49.6
Cannot sit still/restless/hyperactive		
Not true	62	25.0
True	186	75.0
Poor school work		
Not true	178	84.4
True	33	15.6
Wets the bed		
Not true	176	83.0
True	36	17.0
PC mom or not		
Other relative	40	16.1
Biological mom	209	83.9
Family Dysfunction binary		
No	109	45.4
Yes	131	54.6

Table 15

Descriptive Statistics for Continuous Variables of Blacks (N=250)

Variable	Minimum	Maximum	Mean	Standard Deviation
Delinquent behavior score, CBCL (IV)	0	14	2.34	2.262
Aggressive behavior score, CBCL (IV)	0	37	11.51	7.423
Delinquent behavior score, CBCL (DV)	0	12	2.31	2.055
Aggressive behavior score, CBCL (DV)	0	26	6.93	5.087

Table 16

Frequency Statistics for Categorical Variables of Black Females (N=126)

Variable	N	%
Cannot sit still/restless/hyperactive		
Not true	33	26.4
True	92	73.6
Poor school work		
Not true	94	88.7
True	12	11.3
Wets the bed		
Not true	93	86.9
True	14	13.1
PC mom or not		
Other relative	26	20.6
Biological mom	100	79.4
Family Dysfunction binary		
No	56	45.9
Yes	66	54.1

Table 17

Descriptive Statistics for Continuous Variables of Black Females (N=126)

Variable	Minimum	Maximum	Mean	Standard Deviation
Delinquent behavior score, CBCL (IV)	0	14	2.24	2.273
Aggressive behavior score, CBCL (IV)	0	35	10.75	7.176
Delinquent behavior score, CBCL (DV)	0	9	1.98	1.893
Aggressive behavior score, CBCL (DV)	0	25	6.15	4.653

Table 18

Frequency Statistics for Categorical Variables of Black Males (N=124)

Variable	N	%
Cannot sit still/restless/hyperactive		
Not true	29	23.6
True	94	76.4
Poor school work		
Not true	84	80.0
True	21	20.0
Wets the bed		
Not true	83	79.0
True	22	21.0
PC mom or not		
Other relative	14	11.4
Biological mom	109	88.6
Family Dysfunction binary		
No	53	44.9
Yes	65	55.1

Table 19

Descriptive Statistics for Continuous Variables of Black Males (N=124)

Variable	Minimum	Maximum	Mean	Standard Deviation
Delinquent behavior score, CBCL (IV)	0	12	2.44	2.257
Aggressive behavior score, CBCL (IV)	0	37	12.30	7.621
Delinquent behavior score, CBCL (DV)	0	12	2.65	2.165
Aggressive behavior score, CBCL (DV)	0	26	7.72	5.401

Table 20

Frequency Statistics for Categorical Variables of Whites (N=105)

Variable	N	%
Gender of subject		
Female	49	46.7
Male	56	53.3
Cannot sit still/restless/hyperactive		
Not true	47	44.8
True	58	55.2
Poor school work		
Not true	76	91.6
True	7	8.4
Wets the bed		
Not true	73	86.9
True	11	13.1
PC mom or not		
Other relative	10	9.5
Biological mom	95	90.5
Family Dysfunction binary		
No	58	56.3
Yes	45	43.7

Table 21

Descriptive Statistics for Continuous Variables of Whites (N=105)

Variable	Minimum	Maximum	Mean	Standard Deviation
Delinquent behavior score, CBCL (IV)	0	11	1.54	1.948
Aggressive behavior score, CBCL (IV)	0	32	9.18	7.088
Delinquent behavior score, CBCL (DV)	0	7	1.37	1.636
Aggressive behavior score, CBCL (DV)	0	23	4.86	4.495

Table 22

Frequency Statistics for Categorical Variables of White Females (N=49)

Variable	N	%
Cannot sit still/restless/hyperactive		
Not true	22	44.9
True	27	55.1
Poor school work		
Not true	37	92.5
True	3	7.5
Wets the bed		
Not true	37	90.2
True	4	9.8
PC mom or not		
Other relative	5	10.2
Biological mom	44	89.8
Family Dysfunction binary		
No	22	45.8
Yes	26	54.2

Table 23

Descriptive Statistics for Continuous Variables of White Females (N=49)

Variable	Minimum	Maximum	Mean	Standard Deviation
Delinquent behavior score, CBCL (IV)	0	11	1.73	2.302
Aggressive behavior score, CBCL (IV)	1	32	10.05	8.081
Delinquent behavior score, CBCL (DV)	0	6	1.24	1.601
Aggressive behavior score, CBCL (DV)	0	23	5.31	5.335

Table 24

Frequency Statistics for Categorical Variables of White Males (N=56)

Variable	N	%
Cannot sit still/restless/hyperactive		
Not true	25	44.6
True	31	55.4
Poor school work		
Not true	39	90.7
True	4	9.3
Wets the bed		
Not true	36	83.7
True	7	16.3
PC mom or not		
Other relative	5	8.9
Biological mom	51	91.1
Family Dysfunction binary		
No	36	65.5
Yes	19	34.5

Table 25

Descriptive Statistics for Continuous Variables of White Males (N=56)

Variable	Minimum	Maximum	Mean	Standard Deviation
Delinquent behavior score, CBCL (IV)	0	7	1.35	1.541
Aggressive behavior score, CBCL (IV)	0	24	8.35	5.972
Delinquent behavior score, CBCL (DV)	0	7	1.48	1.673
Aggressive behavior score, CBCL (DV)	0	14	4.46	3.608

As shown in Tables 2 through 25, the total sample has been split into 12 subgroupings, which are separated by gender and ethnicity. The frequency and descriptive statics of the independent variable gender are discussed first. The remaining

categorical variables, cannot sit still/restless/hyperactive; poor school work; wets the bed; PC mom or not; family dysfunction binary follow. The continuous variables, childhood delinquency, childhood aggression, adolescent delinquency, and adolescent aggression, are given under each sub-sample grouping. This information is provided for the entire sample, which will be divided by gender, followed by ethnic comparisons that also are further divided by gender.

Entire Sample

Table 2 provides the frequency statistics of the entire sample used in this study. In total, 468 (64.5%) of the children were listed as hyperactive. One-hundred-six (17.9%) of the children indicated doing poorly in school. Bed wetting behavior was reported by 79 (13.2%) children. As mentioned earlier, 88.2% (642) of the children's preliminary caregivers were their biological mothers. Finally, 303 (43.0%) of the respondents stated that someone in their family had any of the problems listed under the family dysfunction variable.

Table 3 presents the descriptive statistics for the continuous variables of the entire sample. The range in scores for the childhood delinquency scale was from 0 to 26, with a mean of 1.93 and a standard deviation of 2.470. The range in scores for the childhood aggression variable was from 0 to 38 with a mean of 10.74 and a standard deviation of 7.401. Adolescent delinquency ranged from 0 to 12 with a mean of 1.72 and a standard deviation of 1.902. Finally, adolescent aggression scores ranged from 0 to 26 with a mean of 5.81 and a standard deviation of 4.867.

Gender of Subject

As shown in Tables 2, 8, 14, and 20, the gender composition is almost the same in each specified sample. For example, in the entire sample of 729 children, 369 (50.6%) are females and 360 (49.4%) are males. The gender makeup of the Hispanic population, which includes 345 children, is 183 (53.0%) females and 162 (47.0%) males. Likewise, there are 126 (50.4%) females and 124 (49.6%) males within the 250 children in the Black sample. Finally, females account for 46.7% (49) and males represent the remaining 53.3% (56) of the 105 children in the White populous. Interestingly, of the total sample of female children in this study, 49.7% are Hispanic, 34.2% are Black, and 13.3% are White. Similarly, of the males in the entire sample, 45.0% are Hispanic, 34.4% are Black, and 15.6% are White.

Gender Comparisons

Before the genders are cross-compared with ethnicity, they will be discussed as they reflect the entire sample in this study, which includes all three of the ethnic groups (see Tables 4 and 6). The boys in the sample were more likely than the girls to be hyperactive with 68.4% of the boys (245) and 60.6% of the girls (223) answering true to that question. Boys were also more likely to wet the bed (16.4%) and have their primary caregiver be their biological mother (89.7%) compared to the girls (10.2% and 86.4%, respectively). However, girls (43.7%) were more likely than the boys (42.2%) to indicate family dysfunction.

In regard to the four continuous variables, childhood delinquency, childhood aggression, adolescent delinquency, and adolescent aggression, the boys had higher mean scores than the girls on the latter three (see Tables 5 and 7). They had mean scores of

10.97, 2.03, and 6.25, respectively, and the girls had mean scores of 10.52, 1.42, and 5.39, respectively. Both genders had the same mean score for childhood delinquency, 1.93. However, the higher standard deviations for these variables were split between the genders. The girls had higher standard deviations for both childhood delinquency and aggression (2.822 and 7.883, respectively) compared to the boys who had 2.045 and 6.869, respectively. The boys had higher standard deviations for adolescent delinquency (2.058) and aggression (5.032) compared to the girls (1.687 and 4.668, respectively).

Ethnicity of Subjects

As mentioned earlier, 47.3% (345) of the children in this sample identified as Hispanic, 34.3% (250) as Black, and 14.4% (105) as White. As such, their frequency of behaviors will be first compared by ethnic identification, followed by ethnicity and gender.

Ethnic Group Comparisons

Although the Hispanic respondents account for nearly half of the sample in this research, Hispanic children do not demonstrate the highest percentage of children who exhibit the behaviors for all of the variables when compared to the Black and White populations (see Tables 8, 14, and 20). There were a higher percentage of Black children (75.0%) who were listed as hyperactive compared to Hispanic (59.6%) and White children (55.2%). In addition, children who identified as Black had the highest percentages of bed wetting and family dysfunction, 17.0% and 54.6%, respectively, whereas 9.6% of Hispanic children and 13.1% of White children indicated bed wetting behavior. Additionally, 35.1% of Hispanic children and 43.7% of White children revealed family dysfunction. However, within their population, 23.0% of Hispanic

children indicated doing poorly in school, which was a higher percentage than the Black (15.6%) and White (8.4%) children. This finding could be attributed to a language barrier issue. Finally, White children had the highest percentage (90.5%) of having their biological mother being their primary caregiver, which was fairly similar to the Hispanic population (90.1%) and slightly higher than the Black children (83.9%).

When the four categorical variables were compared by ethnicity (see Tables 9, 15, and 21), the children in the Black sample had the highest mean for each variable compared to the other two populations. Their mean scores for childhood delinquency, childhood aggression, adolescent delinquency, and adolescent aggression were 2.34, 11.51, 2.31, and 6.93, respectively. In addition, the standard deviations for the last three variables (7.423, 2.055, and 5.087, respectively) were the largest for the Black children, thus indicating larger variability in the scores (Miethe, 2007). However, the Hispanic children had the highest standard deviation for childhood delinquency, 2.729.

Based on ethnic comparisons of the variables, the children who identify as Black in this sample accounted for the majority of the highest means and standard deviations. However, when they also were compared by gender, the results were a little more mixed.

Ethnic and Gender Comparisons

When the ethnic groups were further divided by gender, they displayed a similar trend. Comparisons of the females and males follow.

Females. Black females depicted the highest percentage of hyperactivity (73.6%) compared to the Hispanic (53.0%) and White (55.1%) girls. As seen in Table 10, 22.6% of the Hispanic females reported doing poorly in school compared to 11.3% of the Black girls and 7.5% of the White girls. Reflective of the frequency statistics of the whole

Black sample, the Black girls had a higher percentage (13.1%) of bed wetting, while 8.1% of the Hispanic girls and 7.5% of the White girls indicated this behavior. Hispanic females had a slightly higher percentage (90.7%) of primary caregivers who were their biological mothers than the White girls (90.5%) and higher than the Black girls (79.4%). Finally, in contrast to the ethnic group comparisons, a minimally higher percentage (54.2%) of the White girls revealed family dysfunction over 54.1% of the Black girls and 34.1% of the Hispanic girls.

Although the percentages for the categorical variables for the females compared with the full ethnic samples varied, the results of the continuous variables were very close to the larger samples. Black females had the highest mean scores for childhood delinquency (2.24), childhood aggression (10.75), adolescent delinquency (1.98), and adolescent aggression (6.15). These scores echo the high mean scores for the whole Black sample. The standard deviation for childhood delinquency is again the highest for the Hispanic females (3.307) and the Black females have the largest standard deviation for adolescent aggression (1.893); however, this is where the similarities between the full ethnic samples and female subsamples end. Hispanic females also have the highest standard deviation for childhood aggression (8.307). Lastly, White females have the largest standard deviation for adolescent aggression (5.335).

Males. The percentages for the males in each grouping for the categorical variables reproduce those of the full ethnic samples. First, the Hispanic males had the highest percentage of doing poorly in school (23.5%) compared to 20.0% of the Black boys and 9.3% of the White boys. Second, the Black males had the highest percentages for hyperactivity (76.4%), bed wetting (21.0%), and family dysfunction (55.1%). These

percentages compare to 61.7%, 9.3%, and 36.3%, respectively, of the Hispanic boys and 55.4%, 16.3%, and 34.5%, respectively, of the White males. Finally, White males had the highest percentage of primary caregivers being their biological mothers (91.1%), which is a little higher than the Hispanic boys (89.5%) and 88.6% of the Black males.

As with the full ethnic samples, the Black males also replicate the highest mean scores for each of the continuous variables with 2.44 for childhood delinquency, 12.30 for childhood aggression, 2.65 for adolescent delinquency, and 7.72 for adolescent aggression. In addition, unlike the standard deviations for the full ethnic samples, the Black males have the highest standard deviation for all four variables. The standard deviations are 2.257, 7.621, 2.621, and 5.401, respectively.

Variables Removed from Further Analysis

As discussed earlier, if a variable does not have a minimum of 10% to 15% of the cases listed in each category, there is not enough variation within that variable. As a result, two variables will be removed from the further analysis of specific samples in addition to the ones described previously. Poor school work was removed from the White sample, along with the White females and males. The other variable, bed wetting was removed from further analysis of the Hispanic females and males, but not from the full Hispanic sample. These two removed variables will not be included in the bivariate correlations of the specified sub-samples.

Bivariate Correlations

The bivariate correlations tables in Appendices Q through CC provide the bivariate correlations between the independent and dependent variables for all 12 of the sub-samples. The correlations were scrutinized to distinguish the significant relations

amongst the variables and to pinpoint any issues with multicollinearity amid the independent variables. In the White total sample and the White female sample, childhood delinquency and childhood aggression demonstrated that multicollinearity is a salient concern (p = .831 and .886, respectfully). Lewis-Beck (1980) suggested that coefficients of .8 or larger can create serious estimation problems. They indicated that "…parameter estimates become unreliable" (p. 58) and that partial slopes may differ substantially from the slope in the whole population. In addition, they advised that high multicollinearity can produce large slope estimate variances, thus leading to large standard errors. However, they presented several methods to address this issue.

To deal with issues with multicollinearity, Lewis-Beck (1980) proposed adding more cases to the sample to make it larger. Because the sizes of the samples in question are fixed, this cannot be accomplished. Another suggestion is to split the two independent variables that are causing the problem with multicollinearity. As a result, if the regression models were run for both the White total sample and the White female sample, they would be split so that childhood delinquency and childhood aggression will not be together. This should prevent the issues with multicollinearity that could bias the results. However, as discussed later, only the full regression models are included in this study. The split regression models have been excluded from this analysis.

Another instance where the coefficient was over .8 was in the White female sample, where the two dependent variables, adolescent delinquency and adolescent aggression had a coefficient of .840. These two dependent variables already are split in the regression models and as in the case with the previously mentioned independent variables, this should rectify this problem.

One final issue with multicollinearity should be mentioned. Again in the White female sample, the independent variable of childhood aggression has a high coefficient with the dependent variable of adolescent delinquency ($p = .808$). However, because these are not both independent variables, no further action will be taken.

The remaining correlations will be portrayed in a similar manner to the frequency and descriptive statistics. The discussion begins with the comparison of the total samples. These include the entire sample, the Hispanic sample, the Black sample, and the White sample. Each of these samples includes both genders. This section concludes with the comparison of the genders within each of the total samples.

Total Samples

When the total sample correlations between the variables were examined, several significant relationships were identified. The variables will be discussed in the order that they were listed (see Appendices Q, T, X, and AA).

Gender of Subject

The relationships between gender of the subject and several other variables were statistically significant. The correlation between gender and cannot sit still/restless/hyperactive was statistically significant in both the entire ($r = .082$, $p < .05$) and the Hispanic samples ($r = .143$, $p < .01$). These positive coefficients indicate that males in both of the samples were more likely to be hyperactive than the females. In addition, gender had a significant coefficient with bed wetting ($r = .092$, $p < .05$) within the entire sample, indicating that the males in the entire sample were more likely than the females to wet their beds.

Gender of the subject also was significantly related to adolescent delinquency in the entire sample ($r = .161$, $p < .01$), the Hispanic sample ($r = .208$, $p < .01$), and the Black sample ($r = .162$, $p < .05$), depicting that males were more likely than females to engage in delinquency at age 12 within these three samples. Adolescent aggression also provided a statistically significant relationship with gender within the entire sample ($r = .89$, $p <.05$) and the Black sample ($r = .155$, $p < .05$). Like adolescent delinquency, these coefficients portrayed that the males in the two samples were more likely than the females to be aggressive at age 12. Within the White sample, family dysfunction binary had a significantly negative relationship to gender ($r = -.197$, $p < .05$), which illustrated that White females were more likely than the males to report problems in the family such as drinking, drugs, and criminal records. Finally, gender had a significant positive coefficient within the Black sample with PC mom or not ($r = .126$, $p < .05$), meaning that the Black males were more likely to have their mothers as their primary caregiver than the females.

Cannot Sit Still/Restless/Hyperactive

In addition to gender, hyperactivity had several other significant relationships. Within both the entire sample ($r = .145$, $p < .01$) and the Black sample ($r = .193$, $p < .01$), it was significantly related to poor school work. For both samples, hyperactive children were more likely to function poorly in school. There also were significant coefficients within these two samples with bed wetting. Hyperactive children in the entire sample ($r = .117$, $p < .01$) and the Black sample ($r = .148$, $p < .05$) were more likely to wet their beds than non-hyperactive children.

Hyperactivity also was significantly related to childhood delinquency and aggression in all of the total samples. Hyperactive children were more likely to engage in delinquent acts during childhood than non-hyperactive children in the entire sample ($r = .197$, $p < .01$), the Hispanic sample ($r = 120$, $p < .05$), the Black sample ($r = .261$, $p < .01$), and the White sample ($r = .339$, $p < .01$). They were also more likely to be aggressive during childhood than non-hyperactive children ($r = .349$, $p < .01$; $r = .328$, $p < .01$; $r = .353$, $p < .01$; and $r = .469$, $p < .01$, respectively).

The relationship with adolescent delinquency and aggression followed a similar trend to the childhood relationships. Hyperactive children were significantly more likely than non-hyperactive children to be delinquent at age 12 in the entire sample ($r = .221$, $p < .01$), the Hispanic sample ($r = .192$, $p < .01$), and the White sample ($r = .405$, $p < .01$). They were also more likely to be aggressive at age 12 in the entire sample ($r = .265$, $p < .01$), the Hispanic sample ($r = .221$, $p < .01$), the Black sample ($r = .221$, $p < .01$), and the White sample ($r = .438$, $p < .01$).

Poor School Work

Several significant relationships with poor school work were found within the entire sample, the Hispanic sample, and the Black sample. As mentioned earlier, there was not enough variance within this variable for the White sample, so no further analyses were completed with the White sample for poor school work. Children who performed poorly in school were more likely to commit delinquent acts during childhood in the entire sample ($r = .248$, $p < .01$), the Hispanic sample ($r = .207$, $p < .01$), and the Black sample ($r = .299$, $p < .01$). Likewise, they were more likely to be aggressive during childhood ($r = .273$, $p < .01$; .266, $p < .01$; and $r = .213$, $p < .01$, respectively). These

children were also more likely than children who did well in school to be delinquent at age 12 in the entire sample ($r = .114$, $p < .01$) and be aggressive at age 12 in the entire sample ($r = .122$, $p < .01$) and the Hispanic sample ($r = .140$, $p < .05$). There were no other significant relationships with poor school work.

Bed Wetting

In addition to the previously mentioned relationships, bed wetting behavior showed significant coefficients with several other variables. Children who were reported to wet their beds were more likely to engage in delinquent behavior during their childhood than those who did not commit enuresis. This was the case for the children in the entire sample ($r = .253$, $p < .01$), the Hispanic sample ($r = .386$, $p < .01$), and the Black sample ($r = .199$, $p < .01$). Children in the entire and the Hispanic samples who wet their beds were also more likely to be aggressive during childhood ($r = .164$, $p < .01$ and $r = .276$, $p < .01$, respectively), be delinquent at age 12 ($r = .082$, $p < .05$ and $r = .145$, $p < .05$, respectively), and aggressive at age 12 ($r = .089$, $p < .05$ and $r = .143$, $p < .05$, respectively). Finally, children in the entire sample who wet their beds were more likely to report familial dysfunction ($r = .094$, $p < .05$) than those who did not.

Childhood Delinquency

Childhood delinquency had a few additional significant relationships that were not listed earlier. Children who were delinquent were significantly more likely to be aggressive than children who were not delinquent in the entire sample ($r = .637$, $p < .01$), the Hispanic sample ($r = .592$, $p < .01$), and the Black sample ($r = .647$, $p < .01$). They also were more likely to engage in delinquency at age 12 in all three of the samples ($r = .422$, $p < .01$; $r = .314$, $p < .01$; and $r = .439$, $p < .01$, respectively) and in the White

sample ($r = .704$, $p < .01$). Although the coefficient for the childhood delinquency and childhood aggression in the White sample is approaching multicollinearity, it will be addressed when the model is split as described earlier. Additionally, delinquent children were more likely to be aggressive at age 12 in the entire sample ($r = .356$, $p < .01$), the Hispanic sample ($r = .208$, $p < .01$), the Black sample ($r = .400$, $p < .01$), and the White sample ($r = .679$, $p < .01$). Finally, delinquent children in the entire sample were more likely to report family dysfunction ($r = .144$, $p < .01$).

Childhood Aggression

Childhood aggression had a similar pattern of significant coefficients as childhood delinquency. Children who were aggressive in the entire sample ($r = .428$, $p < .01$), the Hispanic sample ($r = .377$, $p < .01$), the Black sample ($r = .391$, $p < .01$), and the White sample ($r = .596$, $p < .01$) were more likely than non-aggressive children to be delinquent at age 12. They also were more likely to be aggressive at age 12 ($r = .523$, $p < .01$; $r = .453$, $p < .01$; $r = .530$, $p < .01$; and $r = .645$, $p < .01$, respectively). Aggressive children were more likely to report familial dysfunction in all four samples ($r = .220$, $p < .01$; $r = .180$, $p < .01$; $r = .213$, $p < .01$; and $r = .259$, $p < .05$, respectively). Additionally, aggressive children in the entire sample were more likely to have their mothers be their primary caregivers ($r = .090$, $p < .05$).

Adolescent Delinquency

The dependent variable in Hypothesis 1, adolescent delinquency, was significantly related to adolescent aggression in all four total samples. Adolescents in the entire sample who were delinquent at age 12 were more likely to also be aggressive ($r = .709$, $p < .01$). The Hispanic delinquent adolescents were more likely than non-delinquent

12-year-olds to also be aggressive ($r = .652$, $p < .01$). This is the same for the adolescents in the Black sample ($r = .719$, $p < .01$) and the White sample ($r = .704$, $p < .01$). These two dependent variables will not be together in the regression models; therefore, their coefficients that are approaching multicollinearity should not be an issue in the further analysis. Additionally, delinquent adolescents were more likely to report family dysfunction when they were 6-years-old in the entire sample ($r = .188$, $p < .01$), the Black sample ($r = .186$, $p < .01$), and the White sample ($r = .245$, $p < .05$).

Adolescent Aggression

In addition to the prior relationships, children who were aggressive at age 12 were more likely to report familial dysfunction in all four total samples. Aggressive adolescents in the entire sample were more likely to indicate this dysfunction ($r = .232$, $p < .01$) than non-aggressive 12-year-olds. This was the same in the Hispanic sample ($r = .187$, $p < .01$), the Black sample ($r = .223$, $p < .01$), and the White sample ($r = .213$, $p < .05$). The Black aggressive adolescents also were more likely to have their primary caregivers be their biological mothers ($r = .138$, $p < .05$).

Family Dysfunction

Family dysfunction is the final variable to be discussed in this section on the total sample correlations. One more significant relationship was noted with this variable. In the Hispanic sample, children who reported familial dysfunction were more likely to have their biological mothers be their primary caregivers ($r = .112$, $p < .05$) than children who did not indicate those issues.

Gender-Based Samples

The significant relationships within each of the gender-based samples will be provided in a similar manner to the total samples. Females (see Appendices R, U, Y, and BB) will be presented first, followed by the males (see Appendices S, V, Z, and CC).

Females

The samples based on the four female-only samples somewhat reflected the relationships in the total samples. These correlations also will be offered in the same order as the total samples.

Cannot sit still/restless/hyperactive. The females in the entire sample had more significant relationships between childhood hyperactivity and other variables compared to the smaller ethnicity-based female samples. For example, only the hyperactive girls in the entire sample were significantly more likely to perform poorly in school ($r = .133$, $p < .05$) than the non-hyperactive girls. However, hyperactive females in the entire sample ($r = .138$, $p < .05$), in the Black sample ($r = .215$, $p < .05$), and the White sample ($r = .323$, $p < .05$) were more likely to also be delinquent during childhood than non-hyperactive females. The females in the entire sample ($r = .361$, $p < .01$), the Hispanic females ($r = .328$, $p < .01$), the Black females ($r = .389$, $p < .01$), and the White females ($r = .431$, $p < .01$) who were hyperactive were more likely to be aggressive during childhood compared to the non-hyperactive girls.

The hyperactive females in the entire sample, the Hispanic sample, and the White sample also were more likely to engage in delinquency at age 12 ($r = .230$, $p < .01$; $r = .200$, $p < .01$; and $r = .502$, $p < .01$, respectively). This was also true within the relationship with aggressive behavior at age 12. The hyperactive females in the entire

sample ($r = .249$, $p < .01$), the Hispanic sample ($r = .213$, $p < .01$), and the White sample ($r = .433$, $p < .01$) were more likely to be aggressive at age 12.

Poor school work. There were a couple significant coefficients for poor school work within the female-based samples. The majority of the significant relationships with females who performed poorly in school were with childhood delinquency. Females in the entire sample ($r = .252$, $p < .01$), the Hispanic females ($r = .253$, $p < .01$), and the Black females ($r = .251$, $p < .01$) who faired poorly in school were all more likely than the girls who did well in school to be delinquent during their childhoods. Childhood aggression was another significant relationship for girls who did not do well in school. Females in the entire sample ($r = .302$, $p < .01$) and the Hispanic females ($r = .328$, $p < .01$) who did poorly in school also were more likely to be aggressive during their childhoods.

Bed wetting. Bed wetting behavior was similar in significant relationships to poor school work because it was only significantly related to childhood delinquency and aggression. However, this was only true for the females in the entire sample. Females in the entire sample who wet their beds were more likely to be delinquent ($r = .262$, $p < .01$) and aggressive ($r = .201$, $p < .01$) during childhood than the girls who did not report this behavior.

Childhood delinquency. In addition to previously mentioned significant relationships between childhood delinquency and other variables, there were others found in the four female-based samples. Females who were delinquent during childhood were more likely to also be aggressive during the same time in the entire sample ($r = .647$, $p < .01$), the Hispanic sample ($r = .627$, $p < .01$), and the Black sample ($r = .640$, $p < .01$).

The girls in the White sample were as well ($r = .886$, $p < .01$); however, as discussed earlier, the two variables showed multicollinearity and will be separated for further analysis. Delinquent female children in the first three samples also were more likely to engage in delinquent behavior at age 12 ($r = .426$, $p < .01$; $r = .411$, $p < .01$; and $r = .355$, $p < .01$, respectively) than non-delinquent girls. The delinquent White girls demonstrated the same relationship ($r = .808$, $p < .01$). Likewise, the delinquent girls in all four samples, the entire sample ($r = .319$, $p < .01$), the Hispanic sample ($r = .217$, $p < .01$), the Black sample ($r = .315$, $p < .01$), and the White sample ($r = .722$, $p < .01$), were more likely to be aggressive at age 12. In addition, delinquent girls in the entire sample were more likely to report familial dysfunction ($r = .170$, $p < .01$).

Childhood aggression. The females in the four gender-based samples also presented a similar trend as childhood delinquency with further significant relationships between childhood aggression and other variables. The aggressive girls in the entire sample ($r = .443$, $p < .01$), the Hispanic sample ($r = .447$, $p < .01$), the Black sample ($r = .355$, $p < .01$), and the White sample ($r = .731$, $p < .01$) were more likely to engage in delinquent behavior at age 12 than non-aggressive girls. This was reflective of the girls who also were aggressive at age 12 ($r = .513$, $p < .01$; $r = .465$, $p < .01$; $r = .517$, $p < .01$; and $r = .658$, $p < .01$, respectively). Additionally, aggressive girls in the entire sample ($r = .218$, $p < .01$) and in the Hispanic sample ($r = .255$, $p < .01$) were more likely to report family dysfunction. Finally, aggressive girls in the entire sample were more likely to have their biological mother as their primary caregiver ($r = .123$, $p < .05$).

Adolescent delinquency. There were several final significant relationships with adolescent delinquency. Females across the four gender-based samples who were

delinquent at age 12 were more likely to also be aggressive at age 12. This is shown in the significant coefficients of the entire sample ($r = .707$, $p < .01$), the Hispanic sample ($r = .635$, $p < .01$), the Black sample ($r = .715$, $p < .01$), and the White sample ($r = .840$, $p < .01$). Furthermore, delinquent adolescent females in the entire sample and the Hispanic sample were more likely to report familial dysfunction when they were 6-years-old ($r = .216$, $p < .01$; $r = .207$, $p < .01$, respectively) than non-delinquent adolescent females.

Adolescent aggression. The final variable with another significant relationship within the female-based samples was adolescent aggression. Females in the entire sample, the Hispanic sample, and the Black sample who were aggressive at age 12 also were more likely to report familial dysfunction when they were 6-years-old. These three relationships showed significant coefficients ($r = .289$, $p < .01$; $r = .260$, $p < .01$; and $r = .306$, $p < .01$, respectively).

Males

The significant relationships among the four male-based samples were akin to those found within the female-based samples. These relationships will be presented in the same order as the females.

Cannot sit still/restless/hyperactive. Hyperactive males were more likely to display similar behaviors to the females in the four samples, except for bed wetting. Hyperactive males in the entire sample ($r = .166$, $p < .01$) and the Black sample ($r = .249$, $p < .05$) were more likely to commit enuresis. This was not a significant relationship for any of the female-based samples. However, like the girls in the entire sample, the hyperactive boys in this group were more likely to perform poorly in school ($r = .153$, $p < .01$).

Again, comparable to the girls, the hyperactive boys in all four gender-based samples had significant relationships to childhood delinquency and aggression. These hyperactive boys were more likely to be delinquent and aggressive during childhood in the entire sample ($r = .289$, $p < .01$ and $r = .334$, $p < .01$, respectively), the Hispanic sample ($r = .298$, $p < .01$ and $r = .338$, $p < .01$, respectively), the Black sample ($r = .309$, $p < .01$ and $r = .322$, $p < .01$, respectively), and the White sample ($r = .367$, $p < .01$ and $r = .521$, $p < .01$, respectively).

Regarding to the relationships between hyperactivity and adolescent delinquency and aggression, the boys portrayed a fairly parallel set of significant coefficients to the females. Hyperactive males were more likely to be delinquent during adolescence in the entire sample ($r = .198$, $p < .01$) and the White sample ($r = .326$, $p < .05$). They also were more likely to be aggressive at age 12 in the entire sample ($r = .272$, $p < .01$), the Hispanic sample ($r = .210$, $p < .01$), the Black sample ($r = .271$, $p < .01$), and the White sample ($r = .468$, $p < .01$).

Poor school work. The relationships between poor school work and other variables in the male-based samples are fairly different than with the female-only samples. Boys who performed poorly in school were also more likely to be delinquent during childhood in both the entire sample ($r = .253$, $p < .01$) and the Black sample ($r = .337$, $p < .01$). They were also more likely to be aggressive during childhood in the entire sample ($r = .241$, $p < .01$), the Hispanic sample ($r = .181$, $p < .05$), and the Black sample ($r = .222$, $p < .01$). In the entire sample, they were additionally more likely to be delinquent at age 12 ($r = .156$, $p < .01$). Finally, they were more likely to be aggressive at age 12 in the entire sample ($r = .177$, $p < .01$) and the Hispanic sample ($r = .174$, $p < .05$).

Bed wetting. The few significant relationships for bed wetting in the male-only samples were similar to those of the females. Like the girls, the boys in the entire sample who wet their beds were more likely to be delinquent ($r = .263$, $p < .01$) and aggressive ($r = .128$, $p < .05$) during childhood. In addition, the Hispanic boys and the Black boys who committed enuresis were more likely to be delinquent during childhood ($r = .313$, $p < .01$ and $r = .265$, $p < .01$, respectively).

Childhood delinquency. The relationships between childhood delinquency and other variables were almost identical between the male and female samples. Only one difference was noted, it was not significantly related to family dysfunction in the entire sample. Otherwise, all four male-only samples had the same significant relationships as the females. Boys who were delinquent during childhood in all four samples, the entire sample ($r = .629$, $p < .01$), the Hispanic sample ($r = .509$, $p < .01$), the Black sample ($r = .653$, $p < .01$), and the White sample ($r = .721$, $p < .01$), were more likely to be aggressive during childhood. These boys in all four groups also were more likely to be delinquent at age 12 ($r = .465$, $p < .01$; $r = .289$, $p < .01$; $r = .515$, $p < .01$; and $r = .636$, $p < .01$, respectively). Finally, these delinquent boys were more likely to be aggressive at age 12 ($r = .424$, $p < .01$; $r = .224$, $p < .01$; $r = .475$, $p < .01$; and $r = .572$, $p < .01$, respectively).

Childhood aggression. Childhood aggression in boys also was found to be significantly related to adolescent delinquency and aggression across all four groups. The aggressive boys in the entire sample ($r = .430$, $p < .01$), the Hispanic sample ($r = .364$, $p < .01$), the Black sample ($r = .401$, $p < .01$), and the White sample ($r = .486$, $p < .01$) were more likely to be delinquent at age 12 than non-aggressive boys. These aggressive boys also were more likely to be aggressive at age 12 ($r = .539$, $p < .01$; $r = .462$, $p < .01$; $r =$

.528, $p < .01$; and $r = .603$, $p < .01$, respectively). Finally, aggressive boys in the entire sample ($r = .224$, $p < .01$) and the Black sample ($r = .253$, $p < .05$) were more likely to report familial dysfunction.

Adolescent delinquency. Like the females, there were several final significant relationships with adolescent delinquency within the male-only samples. Twelve-year-old delinquent males across the four gender-based samples were more likely to also be aggressive at that age. Males in the entire sample ($r = .708$, $p < .01$), the Hispanic sample ($r = .671$, $p < .01$), the Black sample ($r = .710$, $p < .01$), and the White sample ($r = .601$, $p < .01$) were more likely than the non-delinquent 12-year-olds to be aggressive. Adolescent delinquency was also found to be significantly related to familial dysfunction. Delinquent adolescent males in the entire sample ($r = .175$, $p < .01$), the Black sample ($r = .197$, $p < .05$), and the White sample ($r = .381$, $p < .01$) were more likely to report familial dysfunction when they were 6-years-old compared to the non-delinquent adolescent males.

Family dysfunction. The last variable with further significant relationships within the male-based samples was family dysfunction. Males, like the females, in the entire sample, who reported familial dysfunction at age 6 were more likely to be aggressive at age 12 ($r = .182$, $p < .01$). Finally, the Hispanic boys who indicated dysfunction within their families were more likely to have their biological mothers as their primary caregivers ($r = .178$, $p < .05$) than those who did not reveal that familial issue.

Multivariate Analyses

Multivariate analyses were conducted to more accurately establish the relationships between gender, ethnicity, hyperactivity, poor school work, bed wetting,

childhood delinquency, childhood aggression, familial dysfunction, and primary caregiver with adolescent delinquency and aggression. Ordinary Least Squares (OLS) models were utilized to examine the effects of the independent variables on both adolescent delinquency and aggression. The two models that include the outliers for both hypotheses are listed in Appendices DD and EE. It is important to note that because the three ethnicities of interest are Hispanic, Black and White, the other ethnicities have been removed from all regression models. As a result, the sample size for the regression models that include the outliers was 700. Additionally, the variable "Ethnicity" has been replaced by Hispanic, Black, and White, to allow for an analysis of these three specific ethnicities. To provide for a comparison group, Blacks then were removed from the regression models. The final sample size for Hypothesis 1 after the outliers were removed was 651, which provided 65.1 cases per independent variable. The final sample for Hypothesis 2 included 652 children, allowing for 65.2 cases per independent variable. Both ratios of case to independent variable are sufficient for the analyses.

Although attention was paid to the 12 sub-samples throughout the discussion of the frequency and descriptive statistics as well as the bivariate correlations, the full OLS regression models revealed what is statistically significant and it is not necessary to continue with the split models. Therefore, only two OLS models are presented, one for each hypothesis. The analysis of Hypothesis 1 will be offered first, followed by Hypothesis 2.

Hypothesis 1

Hypothesis 1 predicted that children who commit animal cruelty along with other behaviors will progress into adolescent delinquent behavior. However, due to the lack of

variation within the childhood animal cruelty and childhood drug and alcohol usage variables, they were excluded from the analysis. As a result, gender, ethnicity, hyperactivity, poor school work, bed wetting, childhood delinquency, childhood aggression, family dysfunction, and the primary caregiver's relationship to the child were the independent variables that remained. At the bivariate level, all of these variables, with the exception of PC relationship, were significantly correlated to adolescent delinquency. As shown in Table 26, gender, hyperactivity, childhood delinquency, childhood aggression, and familial dysfunction continued to be statistically significant when controlling for other pertinent variables. All of the coefficients were positive ($b = .239$, $p < .01$; $b = .269$, $p < .05$; $b = .198$, $p < .001$; $b = .034$, $p < .01$; and $b = .363$, $p < .01$, respectively) demonstrating that male hyperactive children who are delinquent, aggressive, and reported familial dysfunction had a higher tendency to be delinquent at age 12.

These coefficients portray the effect that the variables have on the adolescent delinquency scale scores. For example, on average, male children scored .239 more points on the delinquency scale at age 12 than the females. Hyperactive children generally scored .269 points higher on the adolescent delinquency scale score than non-hyperactive children. For each point higher that a child scored on the delinquency scale, his/her delinquency score at age 12 increased by .198 points. In addition, for each point scored on the childhood aggression scale, the child's adolescent delinquency scale was raised by .034. Finally, if a child reported familial dysfunction, his/her delinquency scale score at age 12 grew by .363 points.

Table 26

OLS Regression Results for Adolescent Delinquency within the Entire Sample with Specific Ethnicities and without Outliers (N = 651[3])

Variable	B	SE	Beta	T
Gender of subject	**.239**	**.102**	**.087**	**2.338***
Hispanic	**-.406**	**.116**	**-.149**	**-3.489****
White	-.183	.158	-.048	-1.157
Cannot sit still/restless/ hyperactive	**.269**	**.116**	**.094**	**2.323***
Poor school work	.184	.142	.050	1.296
Wets the bed	-.131	.160	-.032	-.819
Delinquent behavior score, CBCL	**.198**	**.031**	**.312**	**6.428*****
Aggressive behavior score, CBCL	**.034**	**.010**	**.171**	**3.381****
Family Dysfunction Binary	**.363**	**.107**	**.132**	**3.386****
PC Mom or not	.031	.155	.008	.202
F	23.637***			
R^2	.325			

Note: * is p < .05; ** is p < .01; and *** is p <.001

This regression model also yielded two ethnically-related findings. The adolescent delinquency scale for the Hispanics decreased by .406 points, which was statistically

[3] 49 outlier cases were excluded from the analysis

significant at the $p < .001$ level, compared to the Blacks, while controlling for the Whites. The Whites' adolescent delinquency scale also decreased by .183 points compared to the Blacks, while controlling for the Hispanics. This would indicate that both the Hispanics and Whites scored lower on the adolescent delinquency scale than the Blacks. Coupled with the rest of the findings, these results would appear to provide some support for the first hypothesis.

Hypothesis 2

Similar to Hypothesis 1, Hypothesis 2 predicted that children who commit animal cruelty and other behaviors are aggressive at age 12. The final independent variables listed for Hypothesis 1 are the same in Hypothesis 2. When the bivariate correlations were reviewed, again all of the independent variables, except PC relationship, were significantly related to adolescent aggression. As presented in Table 27, only hyperactivity ($b = .676$, $p < .05$), childhood aggression ($b = .300$, $p < .001$), and familial dysfunction ($b = 1.110$, $p < .001$) were found to remain statistically significant when controlling for the other relevant variables. These positive coefficients indicate that hyperactive and aggressive children facing issues with familial dysfunction scored higher on the adolescent aggression scale.

Specifically, these coefficients show how the variables impact the aggression scale score when the children became 12-years-old. Hyperactive children, on average, scored .676 points higher on the aggression scale at age 12 than non-hyperactive children. Likewise, for every point that the 6-year-olds scored on the aggression scale, they increased their score on the aggression scale at age 12 by .300 points. Finally, children

who reported familial dysfunction at age 6 increased their adolescent aggression scale score by 1.110 compared to children without those problems.

Table 27

OLS Regression Results for Adolescent Aggression within the Entire Sample with Specific Ethnicities and without Outliers (N = 652[4])

Variable	B	SE	Beta	T
Gender of subject	.183	.275	.023	.665
Hispanic	-.450	.312	-.056	-1.442
White	-.373	.418	-.034	-.892
Cannot sit still/restless/ hyperactive	**.676**	**.308**	**.081**	**2.192***
Poor school work	.347	.386	.032	.897
Wets the bed	-.493	.427	-.041	-1.156
Delinquent behavior score, CBCL	.071	.075	.043	.944
Aggressive behavior score, CBCL	**.300**	**.027**	**.538**	**11.234*****
Family Dysfunction Binary	**1.110**	**.288**	**.137**	**3.851*****
PC Mom or not	.062	.418	.005	.147
F	37.348***			
R^2	.432			

Note: * is p < .05; ** is p < .01; and *** is p <.001

[4] 48 outlier cases were excluded from the analysis

Similar to Hypothesis 1, this regression model also yielded two ethnically-related findings; however, neither was statistically significant. The adolescent aggression scale for the Hispanics decreased by .450 points compared to the Blacks, while controlling for the Whites. The Whites' adolescent aggression scale also decreased by .373 points compared to the Blacks, while controlling for the Hispanics. This would indicate that both the Hispanics and Whites scored lower on the adolescent aggression scale than the Blacks. Like Hypothesis 1, these results provide some support for Hypothesis 2.

Summary

The assessment of these data has provided partial analysis for the hypotheses and research questions proposed in Chapter III. Only 13 children answered "true" when asked about committing animal cruelty and 5 answered that they used alcohol/drugs, thus causing these two variables to be excluded from scrutiny. Because animal cruelty was a variable that was removed from the regression models, Research Question 1, "Do children who engage in animal cruelty progress onto delinquent and aggressive behavior?" could not be answered. In addition, due to the limited number of females who committed firesetting in waves 1 and 3 of the PHDCN, an inspection of Hypothesis 3, "Female children who commit animal cruelty and firesetting will progress into adolescent firesetting" could not be performed. Additionally, Research Question 2, "Do children who set fires progress onto delinquent and aggressive behavior during adolescence?" could not be answered adequately. However, Hypotheses 1 and 2 have provided some insight into Research Question 3.

In the examination of adolescent delinquency, it appeared that childhood delinquency, childhood aggression, familial dysfunction, and gender had the greatest

amount of explanatory power in the model. In addition, childhood hyperactivity also was significant. These findings seem to be consistent with prior research on developmental theories as discussed in Chapter II (see: Broidy et al., 2003; Donker et al., 2003; Huesmann et al., 1984; Kokko et al., 2006; Loeber, 1982; Loeber & Dishion, 1983; Loeber & Schmaling, 1985; Moffitt, 1993; Nagin & Tremblay, 1999; Sampson & Laub, 1990, 1992).

The investigation process of Hypothesis 1 exposed that there are significant gender differences related to adolescent delinquency. This disclosure partially answered Research Question 3, "What are the gender differences, if any, in the relationship between animal cruelty and future delinquent and aggressive behavior?" Through the OLS regression procedure, it was found that males were significantly more likely than the females to receive higher scores on the adolescent delinquency scale. This finding was similar to previous research presented in Chapter II. In addition, although animal cruelty was removed from the analysis, it is interesting to note that of the 13 children, who admitted to committing animal cruelty, 7 were females and 6 were males.

The inspection of adolescent aggression revealed that childhood aggression, familial dysfunction, and childhood hyperactivity also had the greatest amount of explanatory power in that model. These results appear to reflect previous literature detailed in Chapter II (see: Broidy et al., 2003; Kokko et al., 2006; Nagin & Tremblay, 1999). Additionally, it was uncovered that there was some difference, albeit non-significant, between the genders, with the males being more likely to score higher on the adolescent aggression scale than the females. This discovery is consistent with the prior

research portrayed in Chapter II (see: Huesmann et al., 1984; Tallichet & Hensley, 2004). This information did provide a slightly more in-depth answer to Research Question 3.

The variables in both models accounted for some of the variance in the dependent variables. The independent variables in the first model accounted for 32.5% of the variance in adolescent delinquency; however, they left 67.5% unexplained. Regarding adolescent aggression, they accounted 43.2% of the variance, leaving 56.8% unexplained. Although the independent variables have reduced the prediction errors in the models by 32.5% and 43.2%, respectively, the results have shown that the majority of the prediction error has not been reduced. However, these models accounted for a greater amount of the variance than the original models which included the outliers. The R^2 in the original model for Hypothesis 1 was .269 and for Hypothesis 2 was .298 (see: Appendices DD and EE), showing increased strength of the models when the outliers were excluded.

CHAPTER V: DISCUSSION AND CONCLUSIONS

> The principal language of children is their behavior. There are times when that language is subtle yet eloquent, when the shades of meaning are lost on outsiders. (Kutner, 1992, p. 100)

This chapter presents the relevant results of this study. First it begins with a discussion of the three research questions and the conclusions that could be elicited from the data. Next, a comparison between the findings of this study and the previous literature is provided. The possible policy implications for children and adolescents who exhibit the behaviors addressed by this present research follow. Next, the strengths and limitations of this study are offered. This chapter concludes with a brief summary and suggestions for future research.

Research Questions and Associated Findings

As mentioned in Chapter IV, neither Research Question 1, "Do children who engage in animal cruelty progress onto delinquent and aggressive behavior?" nor Research Question 2, "Do children who set fires progress onto delinquent and aggressive behavior?" could be addressed due to the removal of the childhood animal cruelty variable and the lack of female fire setters in the sample, respectively. However, the testing of Hypotheses 1 and 2 did provide some insight into Research Question 3, "What are the gender differences, if any, in the relationship between childhood animal cruelty and future delinquent and aggressive behavior?"

The results of Hypothesis 1, "Children who commit animal cruelty and other behaviors will progress into adolescent behavior," indicate that males are significantly more likely to score higher on the adolescent delinquency scale than the females in the

sample. Likewise, the findings from the analysis of Hypothesis 2, "Children who commit animal cruelty and other behaviors will progress into adolescent aggressive behavior," show that males in the sample were more likely to score higher on the adolescent aggression scale than the females. These outcomes have demonstrated that there are gender differences related to adolescent delinquency and aggression. However, these findings do not fully answer Research Question 3 because the childhood animal cruelty variable was removed from the analysis due to a lack of children who exhibited this behavior. Wilson and Norris (2003) suggested that animal cruelty is often under-reported, which could have been a factor in the PHDCN. Although the results do not fully answer the research questions, they do provide a basis for comparison with prior research.

Comparison of Findings and Previous Literature

Childhood Animal Cruelty

As mentioned earlier, there were not an adequate number of children in the present sample who committed animal cruelty to allow for an analysis of that behavior and its relationship with other behaviors including adolescent delinquency and aggression. However, there were several previous studies that provided information on this correlation (see: Arluke et al., 1999; Ascione, 1993, 2001; Becker et al., 2004; Beirne, 1995, 1999; Dadds et al., 2006; Felthous, 1981; Felthous & Kellert, 1987; Flynn, 2000; Goodney-Lea, 2005; Heath et al., 1984; Heller et al., 1984; Hellman & Blackman, 1966; Henry, 2004; Hensley et al., 2006; Kellert & Felthous, 1985; Merz-Perez et al., 2001; Santtila & Haapasalo, 1997; Sauder, 2000; Slavkin, 2001; Strandberg, 1999; Tapia, 1971; Thomas & Beirne, 2002; Wax & Haddox, 1974). The existing literature found relationships between childhood animal cruelty and other behaviors such as delinquency,

aggression, firesetting, and violence, but they were primarily 'ex post facto' self-report studies. In addition, the majority of the studies focused on specific at risk samples such as inmates (see: Kellert & Felthous; Merz-Perez; Santtila & Haapasalo; Heller et al.), known fire setters (see: Slavkin; Tapia), and children with psychological problems (see: Wax & Haddox), who appear to be more likely than the general public to commit animal cruelty. Because the sample for the present study consisted of children and their primary caregivers who lived in a major American city, not the targeted populations mentioned, this may be a factor that affected the low number of respondents who reported the commission of childhood animal cruelty. This issue could be addressed by future research, which is presented later.

While the preliminary hypotheses regarding animal cruelty, delinquency, and aggression could not be tested fully with these data, the findings were supportive of the classical developmental research regarding juvenile delinquency and aggression (see: Broidy et al., 2003; Donker et al., 2003; Huesmann et al., 1984; Kokko et al., 2006; Loeber, 1982; Loeber & Dishion, 1983; Loeber & Schmaling, 1985; Moffitt, 1993; Nagin & Tremblay, 1999; Sampson & Laub, 1990, 1992). The results that substantiate the previous literature on adolescent delinquency will be presented first, followed by those for adolescent aggression.

Adolescent Delinquency

As discussed in the previous chapters, several researchers have sought to explain adolescent delinquency based on past behavior. For example, Loeber and Schmaling (1985) discovered that children who demonstrated both overt and covert antisocial behavior at an early age were more likely to face police involvement due to the

commission of delinquent acts as juveniles. Research conducted by Donker et al. (2003) yielded similar results. Additionally, Nagin and Tremblay (1999) along with Broidy et al. (2003) found that children who displayed physical aggression were at a higher risk to engage in delinquency during adolescence than those who did not exhibit this behavior.

The present study found support for the conclusions derived by researchers such as Loeber and Schmaling (1985), Donker et al. (2003), Nagin and Tremblay (1999), and Broidy et al. (2003). The analyses in the current study revealed that childhood delinquency, childhood aggression, and gender were among the variables that had the greatest amount of explanatory power in the adolescent delinquency model. Therefore, results found in this present research provide a confirmation of the classical developmental theory literature in regard to adolescent delinquency.

Adolescent Aggression

Similar to the research on adolescent delinquency, the results of the present study have been supportive of the previous literature on adolescent aggression. The present findings have shown that childhood aggression, familial dysfunction, and childhood hyperactivity had the greatest impact on adolescent aggression. These findings reflect the results presented by researchers such as Broidy et al. (2003) and Kokko et al. (2006). In addition, in the current study gender was related, although non-significantly, to adolescent aggression, which echoes research conducted by Huesmann et al. (1984) and Tallichet and Hensley (2004). These previous studies also concluded that males were more aggressive than females, as found in the present research.

In addition to confirming the previous literature provided in Chapter II, the present study found support for results discovered by Obeidallah-Davis (2002). Like the

current research, Obeidallah-Davis utilized the data from the Project on Housing Development in Chicago Neighborhoods (PHDCN); however, the 9, 12, and 15-year-old cohorts were the center of that study, not the 6-year-old cohort included in this dissertation. Obeidallah-Davis found that boys were more likely to be aggressive during the latter part of the PHDCN study than the girls and that the Black children were more likely to be aggressive than the White children. As mentioned earlier, the current study concurs with the gender-based differences found in Obeidallah-Davis' research. Additionally, the bivariate correlations provided in Chapter IV showed that the correlation between adolescent aggression and the Black ethnic group was higher than that with the White ethnic group.

Policy Implications

As presented in Chapter II, research has shown a recent rise in certain violent juvenile arrest rates (OJJDP, 2007; Zahn et al., 2008). According to the OJJDP, between 2004 and 2006, the overall rate of juvenile violent offense arrests rose 12%. This equated to 100,700 violent juvenile arrests in 2006. The offenses that were on the increase were murder, non-negligent manslaughter, forcible rape, robbery, and aggravated assault (OJJDP). For example, in a comparison of gender-based offenses, the aggravated assault arrest rates for girls grew more rapidly than the males from 1980 to 2003 (Zahn et al.).

In the previous literature, there were a number of childhood behaviors that have been shown to be related to adolescent delinquency and aggression. Studies have revealed that childhood behaviors such as delinquency, aggression, and hyperactivity have been correlated with actions during adolescence. Gender also has been found to influence an adolescent's level of aggression.

The present research has affirmed the findings of the prior literature. In addition to those behaviors previously mentioned, familial dysfunction, which includes alcohol and drug usage, as well as legal and criminal records, was shown to increase an adolescent's scores on the delinquency and aggression scales in this current sample.

Consequently, the results of both the past and current research suggest that various programs that aim to prevent delinquency and aggression should be explored. Welsh and Farrington (2007) suggested that early intervention programs that engage individual, family, school, and community prevention could curtail the future delinquent and aggressive behavior. Additionally, Sauder (2000) advocated intervention at an early age because childhood behavior had more of an impact on future violence than adolescent behavior and may be easier to remedy and manage.

Farrington and Welsh (2002) further expanded on family-based prevention programs. Of the six categories of programs in their review, they found that four categories were effective in reducing delinquency, aggression, and childhood antisocial behavior. These programs incorporated home visitation; parent education plus daycare/preschool; school-based child training plus parent training; and multi-systemic therapy. The home visitation programs addressed areas such as parenting, family planning, social support, and social environment. Programs that focused on parental education plus daycare/preschool concentrated on issues including parenting, cognitive development, socioeconomic status, education, and family environment. School-based child and parent training programs attended to parenting and academic training as well as behavioral and social-cognitive functioning, self-control, and problem-solving skills.

Finally, the multi-systemic therapy programs entailed both intrapersonal and systemic issues.

School-based prevention programs were evaluated by Gottfredson, Wilson, and Najaka (2002). They revealed three types of intervention programs that were efficient with preventing crime and antisocial behavior/aggression. Those programs focused on school and discipline management, establishing norms or expectations for behavior, and self-control or social competency instruction using cognitive-behavioral or behavioral instructional methods. Three additional kinds of intervention programs were effective in the prevention of antisocial behavior/aggression. These included programs that integrated the reorganization of grades or classes; cognitive behavioral, behavioral modeling or behavioral modification; and mentoring, tutoring, and work study.

The community-based prevention programs were found not to be as effective (Welsh & Hoshi, 2002). However, Welsh and Hoshi considered several programs to be promising and in need of further evaluation. These programs were the ones that centered on gang-member intervention, community-based mentoring, and afterschool recreation.

According to the given delinquency and aggression prevention research, it would appear that the family and school-based programs may be a couple of the best approaches to reduce these behaviors. Involvement in these programs could ultimately reduce the increasing violent juvenile arrest rates.

Strengths and Limitations of the Present Study

As with other research, this current study had strengths and limitations within its design and analysis. The strengths will be presented first, followed by the limitations.

Strengths

As presented in Chapter III, there were several strengths with the research design of this present study. The data utilized in this research were derived from a longitudinal study as recommended by Beirne (2004). According to Blumstein (2005), this research design yields to analysis of an individual's developmental processes. In addition, the respondents in the original study only needed to reflect on behaviors during the previous six months, thus addressing issues with recall. Moreover, the instrumentation of the original study was relatively the same throughout the waves and should not be a threat. Additionally, the participants in the original study were randomly selected, attending to selection bias and regression artifacts. Threats to statistical conclusion validity were managed by the usage of the appropriate statistical methods, OLS and Binary Logistic Regression, for the hypotheses. Finally, because the respondents in the original study were not subjected to testing, this should not be an issue. Although the present study had several strengths, it also had a number of intrinsic weaknesses.

Limitations

This present study had several limitations that were difficult to rectify. There were some threats to internal validity that may have been an issue. History could be a factor because it is unknown what events may have affected the participants' behavior during the six years between the two waves. Maturation also could be an issue because 12-year-old females may be more mature than the males; therefore, their adolescent behavior might be affected by the maturation process. Additionally, the attrition rate on the corrected original sample is relatively low, losing 244 participants in Wave 3; however, this could be a factor. Dependent on the mentioned threats, additive and interactive

effects of threats to internal validity also might be an issue. As noted earlier, because the present research is a secondary data analysis, it was bound by the data originally collected. As such, factors such as construct validity could not be controlled. However, as mentioned in Chapter III, the original authors of the Child Behavior Checklist have apparently addressed issues with construct validity.

Two additional limitations affected the present study. First, as discussed in Chapter III, the original data were collected in one location, thus possibly creating a problem with external validity. The original researchers sought to address this issue by selecting a sample that appears to be representative of Chicago's populous that could be representative of other large cities within the United States. The lack of variable definitions is the second limitation. As stated in Chapter III, this could create an issue with inconsistent results among the respondents.

In addition to these limitations, the statistical analysis unveiled another weakness within this present study. The quantitative analysis could not be performed on two of the major variables, childhood animal cruelty and female firesetting, which were included in the three hypotheses and three research questions. This was due to the insufficient number of children who committed animal cruelty and firesetting within the sample selected. There were 13 children who committed animal cruelty and a total of 8 females in both waves of the original study who were fire setters. As stated earlier, secondary data analysis was the method employed in this research, thus the study was bound by the numbers of the respondents for each category. In addition, due to the procedure incorporated with accessing the data, it was not possible to foresee the specific number of children exhibiting certain behaviors at the time of the prospectus defense.

Summary

Although the present study could not fully assess the hypotheses and research questions as originally proposed, it has added to the existing literature that focuses on the developmental processes of adolescent delinquency and aggression. Through the analysis of the data from a recent longitudinal study, several classical findings have been confirmed. Gender, Hispanic ethnicity, hyperactivity, childhood delinquency and aggression, and familial dysfunction were shown to have a significant impact on adolescent delinquency. The level of aggression manifested by an adolescent in the sample was significantly affected by hyperactivity, childhood aggression, and familial dysfunction. In addition, this is the first known research that has spotlighted the delinquent and aggressive developmental issues of the children in Cohort 6 of the PHDCN.

However, due to the limited number of children who committed animal cruelty and females who were fire setters in the selected PHDCN data, several questions remained in regards to the relationship between these behaviors and adolescent delinquency and aggression. One of the main focal points of this present study was whether children who committed animal cruelty progressed onto adolescent delinquency and aggression as proposed by the Graduation Hypothesis. The data did not allow for an assessment of this apparent relationship, thus the impact of childhood animal cruelty on adolescent delinquency and aggression remains based on the mixed results of the previous literature. In addition, female firesetting behavior could not be examined, thus no further information could be elicited. Finally, although gender differences could be explored related to delinquency and aggression, it could not be accomplished for the

occurrence of animal cruelty. These unanswered questions could be addressed by future research.

Suggestions for Future Research

The main focus of this research is important and should be advanced for several reasons. Generally, childhood animal cruelty has been neglected in the area of criminology; however, there have been studies that have shown its relationship with other behaviors including delinquency, aggression, firesetting, and interpersonal violence. Nevertheless, the existing literature has often revealed mixed results. In addition, the previous research has focused primarily on offender populations such as known serial killers, which are not representative of the general public. Additionally, little known research has been conducted on females and their commission of animal cruelty and firesetting. Finally, no research on this topic has been identified based on longitudinal studies.

To resolve these issues and unanswered questions, future researchers should consider conducting longitudinal studies to address the areas of childhood animal cruelty and female firesetting. First, it is important that animal cruelty is properly defined for the respondents, including examples of behaviors that are encompassed in the act. Second, an attempt should be made to conduct research on children and adolescents who are not involved with the criminal justice or mental health systems. This will allow for a more generalizable overview of the issue of youthful animal cruelty. In addition, the results of this proposed research could be compared with the existing literature and possibly shed some light on the status of this behavior. Finally, longitudinal studies should be performed to assess the correlation, if any, of females who exhibit firesetting tendencies

during childhood and adolescent delinquency and aggression. This present research sought to provide these answers; however, this is still an area that needs further exploration.

REFERENCES

Achenbach, T. M. (1966). The classification of children's psychiatric symptoms: A factor-analytic study. *Psychological Monographs, 80* (Whole No. 615).

Achenbach, T. M. & Edelbrock, C. (1983). *Manual for the child behavior checklist and revised child behavior profile.* United States of America: Queen City Printers, Inc.

Achenbach, T. M. & Rescorla, L. A. (2001). *Manual for ASEBA school-age forms and profiles.* Burlington, VT: University of Vermont, Research Center for Children, Youth and Families.

Akers, R. L. & Sellers, C. S. (2004). *Criminological theories: Introduction, evaluation, and application* (4th ed.). Los Angeles, CA: Roxbury Publishing Company.

Aldrich, J. H. & Nelson, F. D. (1984). *Linear probability, logit, and probit models.* Beverly Hills, CA: Sage.

Allison, P. D. (1999). *Multiple regression: A primer.* Thousand Oaks, CA: Pine Forge Press.

American Psychological Association. (2001). *Publication manual of the American Psychological Association* (5th ed.). Washington, DC: American Psychological Association.

Arluke, A., Levin, J., Luke, C., & Ascione, F. (1999). The relationship of animal abuse to violence and other forms of antisocial behavior. *Journal of Interpersonal Violence*, *14*(9), 963-975.

Ascione, F. R. (1993). Children who are cruel to animals: A review of research and implications for developmental psychopathology. *Anthrozoös, 6*(4), 226-247.

Ascione, F. R. (1999). The abuse of animals and human interpersonal violence: Making the connection. In F. R. Ascione & P. Arkow (Eds.), *Child abuse, domestic violence, and animal Abuse: Linking the circles of compassion for prevention and intervention* (pp. 50-61). West Lafayette, IN: Purdue University Press.

Ascione, F. R. (2001). Animal abuse and youth violence. *Juvenile Justice Bulletin,* September, 1-15.

Ascione, F. R. & Arkow, P. (Eds.). (1999). *Child abuse, domestic violence, and animal abuse: Linking the circles of compassion for prevention and intervention.* West Lafayette, IN: Purdue University Press.

Ascione, F. R., Weber, C. V., & Wood, D. S. (1997). The abuse of animals and domestic violence: A national survey of shelters for women who are battered. *Society & Animals, 5*(3), 205-218.

Bachman, E. & Paternoster, R. (2004). *Statistics for criminal justice* (2nd ed.). Boston, MA: McGraw Hill.

Bandura, A. (1973). *Aggression: A social learning analysis.* Englewood Cliffs, NJ: Prentice-Hall, Inc.

Bartol, C. R. & Bartol, A. M. (1989). *Juvenile delinquency: A systems approach.* Englewood Cliffs, NJ: Prentice Hall.

Bartollas, C. & Miller, S. J. (1998). *Juvenile justice in America* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

Becker, F. & French, L. (2004). Making the links: Child abuse, animal cruelty and domestic violence. *Child Abuse Review, 13,* 399-414.

Becker, K. D., Stuewig, J., Herrera, V. M., & McCloskey, L. A. (2004). A study of firesetting and animal cruelty in children: Family influences and adolescent outcomes. *Journal of the American Academy of Child and Adolescent Psychiatry, 43*(7), 905-912.

Beirne, P. (1995). The use and abuse of animals in criminology: A brief history and current review. *Social Justice, 22*(1), 5-32.

Beirne, P. (1999). For a nonspeciesist criminology: Animal abuse as an object of study. *Criminology, 37*(1), 117-147.

Beirne, P. (2004). From animal abuse to interhuman violence? A critical review of the progression thesis. *Society and Animals, 12*(1), 39-65.

Bickle, G. S. & Peterson, R. D. (1991). The impact on gender-based family roles in criminal sentencing. *Social Problems, 38*(3), 372-394.

Blalock, H. M., Jr. (1979). *Social statistics.* New York, NY: McGraw-Hill Book Company.

Blumstein, A. (2005). Final thoughts: An overview of the symposium and some next steps. *The ANNALS of the American Academy of Political and Social Science, 602*, 304-307.

Broidy, L. M., Tremblay, R. E., Brame, B., Fergusson, D., Horwood, J. L., Laird, R., et al. (2003). Developmental trajectories of childhood disruptive behaviors and adolescent delinquency: A six-site, cross-national study. *Developmental Psychology, 39*(2), 222-245.

Bulc, G. (2002). Kill the cat killers: Moral panic and juvenile crime in Slovenia. *Journal of Communication Inquiry, 26*(3), 300-325.

Cahill, S. E. (2002). Beastly bodies in human hands, heads, and hearts: Reflections on animal abuse as dirty play. *Symbolic Interaction, 25*(4), 431-435.

Dadds, M. R., Whiting, C., & Hawes, D. J. (2006). Associations among cruelty to animals, family conflict, and psychopathic traits in childhood. *Journal of Interpersonal Violence, 21*(3), 411-429.

Daly, K. (1987a). Structure and practice of familial-based justice in a criminal court. *Law & Society Review, 21*(2), 267-290.

Daly, K. (1987b). Discrimination in the criminal courts: Family, gender, and the problem of equal treatment. *Social Forces, 66*(1), 152-175.

Daly, K. (1989). Neither conflict for labeling nor paternalism will suffice: Intersections of race, ethnicity, gender, and family in criminal court decisions. *Crime and Delinquency, 35*, 136-168.

DeVellis, R. F. (2003). *Scale development: Theory and applications.* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Donker, A. G., Smeenk, W. H., van der Laan, P. H., & Verhulst, F. C. (2003). Individual stability of antisocial behavior from childhood to adulthood: Testing the stability postulate of Moffitt's developmental theory. *Criminology, 41*(3), 593-609.

Earls, F. J., Brooks-Gunn, J., Raudenbush, S. W., & Sampson, R. J. (2005a). *Project on Human Development in Chicago Neighborhoods (PHDCN): Child Behavior Checklist, Wave 1, 1994-1997: Codebook for Cohort 6 [Computer file]. ICPSR 13582-v1.* Boston, MA: Harvard Medical School [producer], 2002. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2005-07-22.

Earls, F. J., Brooks-Gunn, J., Raudenbush, S. W., & Sampson, R. J. (2005b). *Project on Human Development in Chicago Neighborhoods (PHDCN): Child Behavior Checklist, Wave 1, 1994-1997: Description [Computer file]. ICPSR 13582-v1*. Boston, MA: Harvard Medical School [producer], 2002. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2005-07-22.

Earls, F. J., Brooks-Gunn, J., Raudenbush, S. W., & Sampson, R. J. (2005c). *Project on Human Development in Chicago Neighborhoods (PHDCN): Family Mental Health and Legal History, Wave 1, 1994-1997: Description [Computer file]. ICPSR 13591-v1*. Boston, MA: Harvard Medical School [producer], 2002. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2005-07-22.

Earls, F. J., Brooks-Gunn, J., Raudenbush, S. W., & Sampson, R. J. (2005d). *Project on Human Development in Chicago Neighborhoods (PHDCN): Child Behavior Checklist, Wave 3, 2000-2002: Master File [Computer file]. ICPSR 13580-v1*. Boston, MA: Harvard Medical School [producer], 2002. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2005-07-18.

Earls, F. J., Brooks-Gunn, J., Raudenbush, S. W., & Sampson, R. J. (2006a). *Project on Human Development in Chicago Neighborhoods (PHDCN): Child Behavior Checklist, Wave 3, 2000-2002: Codebook for Cohort 12 [Computer file]. ICPSR 13679-v1*. Boston, MA: Harvard Medical School [producer], 2002. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2006-10-11.

Earls, F. J., Brooks-Gunn, J., Raudenbush, S. W., & Sampson, R. J. (2006b). *Project on Human Development in Chicago Neighborhoods (PHDCN): Child Behavior Checklist, Wave 3, 2000-2002: Description [Computer file]. ICPSR 13679-v1*. Boston, MA: Harvard Medical School [producer], 2002. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2006-10-11.

Farrington, D. P. & Welsh, B. C. (2002). Family-based crime prevention. In L. W. Sherman, D. P. Farrington, B. C. Welsh, & D. L. MacKenzie (Eds.), *Evidence-based crime prevention.* (pp. 22-55). New York, NY: Routledge.

Felthous, A. R. (1981). Childhood cruelty to cats, dogs, and other animals. *The Bulletin of American Academy of Psychiatry and the Law, 9*(1), 48-53.

Felthous, A. R. & Kellert, S. R. (1987). Childhood cruelty to animals and later aggression against people: A review. *American Journal of Psychiatry, 144*(6), 710-717.

Felthous, A. R. & Yudowitz, B. (1977). Approaching a comparative typology of assaultive female offenders. *Psychiatry, 40*, 270-276.

Fleming, W. M., Jory, B., & Burton, D. L. (2002). Characteristics of juvenile offenders admitting to sexual activity with nonhuman animals. *Society and Animals, 10*(1), 31-45.

Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment*, 7(3), 286-299.

Flynn, C. P. (2000). Why family professionals can no longer ignore violence toward animals. *Family Relations, 49*(1), 87-95.

Gerbasi, K. C. (2004). Gender and nonhuman animal cruelty convictions: Data from Pet-Abuse.com. *Society and Animals, 12*(4), 359-365.

Gifts, S. H. (2003). *Law dictionary* (5th ed.). Hauppauge, NY: Baron's Educational Services, Inc.

Gilligan, J. (1996). *Violence: Our deadly epidemic and its causes.* New York, NY: Putnam Publishing Group.

Glueck, S. & Glueck, E. (1950). *Unraveling juvenile delinquency.* New York, NY: The Commonwealth Fund.

Goodney-Lea, S. R. (2005). *Guns, explosives, and puppy dog tails: The social function of animal cruelty.* Unpublished doctoral dissertation, Indiana University.

Gottfredson, D. C., Wilson, D. B. & Najaka, S. S. (2002). School-based crime prevention. In L. W. Sherman, D. P. Farrington, B. C. Welsh, & D. L. MacKenzie (Eds.), *Evidence-based crime prevention.* (pp. 56-164). New York, NY: Routledge.

Gottfredson, M. & Hirschi, T. (1989). A propensity-event theory of crime. In W. S. Laufer & F. Adler (Eds.), *Advances in criminological theory* (vol. 1). (pp. 57-67). New Brunswick, NJ: Transaction.

Haggard, E. A. (1958). *Intraclass correlation and the analysis of variance.* New York, NY: The Dryden Press, Inc.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5th ed.). Upper Saddle River, NJ: Prentice Hall.

Hardy, M. & Bryman, A. (Eds.). (2004). *Handbook of data analysis.* Thousand Oaks, CA: Sage Publications.

Heath, G. A., Hardesty, V. A., & Goldfine, P. E. (1984). Firesetting, enuresis, and animal cruelty. *Journal of Child and Adolescent Psychotherapy, 1,* 97-100.

Heller, M. S., Ehrlich, S. M., & Lester, D. (1984). Childhood cruelty to animals, firesetting, and enuresis as correlates of competence to stand trial. *The Journal of General Psychology, 110,* 151-153.

Hellman, D. S. & Blackman, N. (1966). Enuresis, firesetting and cruelty to animals: A triad predictive of adult crime. *American Journal of Psychiatry, 122,* 1431-1435.

Henry, B. C. (2004). The relationship between animal cruelty, delinquency, and attitudes toward the treatment of animals. *Society and Animals, 12*(3), 185-207.

Hensley, C., Tallichet, S. E., & Singer, S. D. (2006). Exploring the possible link between childhood adolescent bestiality and interpersonal violence. *Journal of Interpersonal Violence, 21*(7), 910-923.

Hensley, C. & Tewksbury, R. (Eds.). (2003). *Sexual deviance: A reader.* Boulder, CO: Lynne Rienner Publishers, Inc.

Hirschi, T. (1969). *Causes of delinquency.* Berkeley, CA: University of California Press.

Hosmer, D. W. & Lemeshow, S. (1989). *Applied logistic regression.* New York, NY: John Wiley & Sons, Inc.

Huesmann, L. R., Eron, L. D., Leftowitz, M. M., & Walder, L. O. (1984). Stability of aggression over time and generations. *Developmental Psychology, 20*(6), 1120-1134.

Jersild, A. T. (1954). Emotional development. In L. Carmichael (Ed.), *Manual of child psychology* (2nd ed.) (pp. 833-917). New York, NY: John Wiley & Sons, Inc.

Kant, I. (1963) *Lectures on ethics* (L. Infield, Trans.). New York: Harper Torchbooks. (Original work published 1930).

Kellert, S. R. & Felthous, A. R. (1985). Childhood cruelty toward animals among criminals and noncriminals. *Human Relations, 38,* 1113-1129.

Kokko, K., Tremblay, R. E., Lacourse, E., Nagin, D. S., & Vitaro, F. (2006). Trajectories of prosocial behavior and physical aggression in middle childhood: Links to adolescent school dropout and physical violence. *Journal of Research on Adolescence, 16*(3), 403-428.

Kutner, L. (1992). *Parent and child: Getting through to each other.* New York, NY: Avon Books.

Laub, J. H. & Sampson, R. J. (1993). Turning points in the life course: Why change matters to the study of crime. *Criminology, 31*(3), 301-325.

Lewis-Beck, M. S. (1980). *Applied regression: An introduction.* Newbury Park, CA: Sage Publications, Inc.

Loeber, R. (1982). The stability of antisocial and delinquent child behavior: A review. *Child Development, 53,* 1431-1446.

Loeber, R. & Dishion, T. (1983). Early predictors of male delinquency: A review. *Psychological Bulletin, 94*(1), 68-99.

Loeber, R. & Schmaling, K. B. (1985). Empirical evidence for overt and covert patterns of antisocial conduct problems: A metaanalysis. *Journal of Abnormal Child Psychology, 13*(2), 337-352.

Maxfield, M. G. & Babbie, E. (2001). *Research methods for criminal justice and criminology* (3rd ed.). Belmont, CA: Wadsworth/Thomson Learning.

Menard, S. (1995). *Applied logistic regression analysis.* Thousand Oaks, CA: Sage Publications.

Merz-Perez, L., Heide, K. M., & Silverman, I. J. (2001). Childhood cruelty to animals and subsequent violence against humans. *International Journal of Offender Therapy and Comparative* Criminology, *45*(5), 556-573.

Meyers, L., Gamst, G., & Guarino, A. (2005). *Applied multivariate research: Design and interpretation.* Thousand Oaks, CA: Sage Publications.

Miethe, T. D. (2007). *Simple statistics: Applications in criminology and criminal justice.* Los Angeles, CA: Roxbury Publishing Company.

Miles, J. & Shevlin, M. (2001). *Applying regression and correlation: A guide for students and researchers.* Thousand Oaks, CA: Sage Publications.

Miller, C. (2001). Childhood animal cruelty and interpersonal violence. *Clinical Psychology Review*, *21*(5), 735-749.

Miller, K. S. & Knutson, J. F. (1997). Reports of severe physical punishment and exposure to animal cruelty by inmates convicted of felonies and by university students. *Child Abuse and Neglect*, *21*(1), 59-82.

Moffitt, T. E. (1990). Juvenile delinquency and attention deficit disorder: Boys' developmental trajectories from age 3 to age 15. *Child Development, 61,* 893-910.

Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review, 100*(4), 674-701.

Nagin, D. & Tremblay, R. E. (1999). Trajectories of boys' physical aggression, opposition, and hyperactivity on the path to physically violent and nonviolent juvenile delinquency. *Child Development, 70*(5), 1181-1196.

Obeidallah-Davis, D. (2002). *Data from the Project on Human Development in Chicago Neighborhoods (PHDCN): A prospective study of serious delinquency in adolescent girls* (Report No. NCJ 184349). Cambridge, MA: Abt Associates.

Office of Juvenile Justice and Delinquency Prevention. (2007). *Statistical briefing book.* Retrieved June 25, 2008 from http://ojjdp.ncjrs.org/ojstatbb/crime/JAR_Display.asp?ID=qa05201

O'Grady, K. E., Kinlock, T. W., & Hanlon, T. E. (2007). Prediction of violence history in substance-abusing inmates. *The Prison Journal, 87*(4), 416-433.

Pet-Abuse.com. (2008). *Cruelty database.* Retrieved on March 17, 2008 from http://www.pet-abuse.com

Piper, H. (2003). The linkage of animal abuse with interpersonal violence: A sheep in wolf's clothing? *Journal of Social Work, 3*(2), 161-178.

Piper, H. & Myers, S. (2006). Forging the links: (De) Constructing chains of behaviours. A reply to making the links: Child abuse, animal cruelty and domestic violence, *Child Abuse Review 13*, 399-414.

Rigdon, J. D. & Tapia, F. (1977). Children who are cruel to animals—A follow-up study. *Journal of Operational Psychiatry, 8*(1), 27-36.

Robins, L. N. (1978). Sturdy childhood predictors of adult antisocial behaviour: Replications from longitudinal studies. *Psychological Medicine, 8*, 611-622.

Robins, L. N. & Ratcliff, K. S. (1979). Risk factors in the continuation of childhood antisocial behavior into adulthood. *International Journal of Mental Health, 7*, 96-116.

Robins, L. N. & Wish, E. (1977). Childhood deviance as a developmental process in a study of 223 urban black men from birth to 18. *Social Forces, 56*(2), 448-473.

Sampson, R. J. & Laub, J. H. (1990). Crime and deviance over the life course: The salience of adult social bonds. *American Sociological Review, 55*, 609-627.

Sampson, R. J. & Laub, J. H. (1992). Crime and deviance in the life course. *Annual Review of Sociology, 18,* 63-84.

Sampson, R. J. & Laub, J. H. (1993). *Crime in the making: Pathways and turning points through life.* Cambridge, MA: Harvard University Press.

Santtila, P. & Haapasalo, J. (1997). Neurological and psychological risk factors among young homicidal, violent, and nonviolent offenders in Finland. *Homicide Studies, 1*(3), 234-253.

Sauder, J. G. (2000). Enacting and enforcing felony animal cruelty laws to prevent violence against humans. *Animal Law, 6,* 1-21.

Simons, R. L., Wu, C., Conger, R. D., & Lorenz, F. O. (1994). Two routes to delinquency: Differences between early and late starters in the impact of parenting and deviant peers. *Criminology, 32*(2), 247-271.

Slavkin, M. L. (2001). Enuresis, firesetting, and cruelty to animals: Does the ego triad show predictive validity? *Adolescence, 36*(143), 461-466.

Steffensmeier, D., Kramer, J., & Streifel, C. (1993). Gender and imprisonment decisions. *Criminology, 31*(3), 411-446.

Stevens, J. (1992). *Applied multivariate statistics for the social sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Storr, A. (1968). *Human aggression.* New York, NY: Bantam Books.

Strandberg, K. W. (1999). Intervention: Early warning signs. *Alternatives to Incarceration: The Publication for Probation and Parole Professionals, 5*(3), 512-516.

Suen, H. K. & Ary, D. (1989). *Analyzing quantitative behavioral observation data.* Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Tallichet, S. E. & Hensley, C. (2004). Exploring the link between recurrent acts of childhood and adolescent animal cruelty and subsequent violent crime. *Criminal Justice Review, 29*(2), 304-316.

Tapia, F. (1971). Children Who Are Cruel to Animals. *Child Psychiatry and Human Development, 2*(2), 70-77.

Thomas, S. C. & Beirne, P. (2002). Humane education and humanistic philosophy: Toward a new curriculum. *Journal of Humanistic Counseling, Education and Development, 41*, 190-199.

Thornberry, T. P. (Ed.). (2005). *Developmental theories of crime and delinquency.* New Brunswick, NJ: Transaction Publishers.

Vold, G. B, Bernard, T. J. & Snipes, J. B. (2002). *Theoretical criminology* (5th ed.). New York, NY: Oxford University Press.

Warner, R. M. (2008). *Applied statistics: From bivariate through multivariate techniques.* Los Angeles, CA: Sage Publications.

Wax, D. E. & Haddox, V. G. (1974). Enuresis, firesetting, and animal cruelty: A useful danger signal in predicting vulnerability of adolescent males to assaultive behavior. *Child Psychiatry and Human Development, 4*(3), 151-156.

Weinfurt, K. P. (2006). Repeated measures analyses: ANOVA, MANOVA, and HLM. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding more multivariate statistics* (pp. 317-361). Washington, DC: American Psychological Association.

Welsh, B. C. & Farrington, D. P. (2007). Save children from a life of a crime. *Criminology and Public Policy, 46*(4), 871-880.

Welsh, B. C. & Hoshi, A. (2002). Communities and crime prevention. In L. W. Sherman, D. P. Farrington, B. C. Welsh, & D. L. MacKenzie (Eds.), *Evidence-based crime prevention.* (pp. 165-197). New York, NY: Routledge.

White, J. L., Moffitt, T. E., Earls, F., Robins, L. & Silva, P. A. (1990). How early can we tell?: Predictors of childhood conduct disorder and adolescent delinquency. *Criminology, 28*(4), 507-533.

Wilson, P. & Norris, G. (2003). Relationship between criminal behavior and mental illness in youth adults: Conduct disorder, cruelty to animals and young adult serious violence. *Psychiatry, Psychology and Law, 10*(1), 239-243.

Williams, F. P., III. & McShane, M. D. (2004). *Criminological theory* (4th ed.). Upper Saddle River, NJ: Pearson Education, Inc.

Wright, J. & Hensley, C. (2003). From animal cruelty to serial murder: Applying the graduation hypothesis. *International Journal of Offender Therapy and Comparative Criminology, 47*(1), 71-88.

Wright, R. E. (1998). Logistic regression. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding multivariate statistics* (5th ed.). (pp. 217-244). Washington, DC: American Psychological Association.

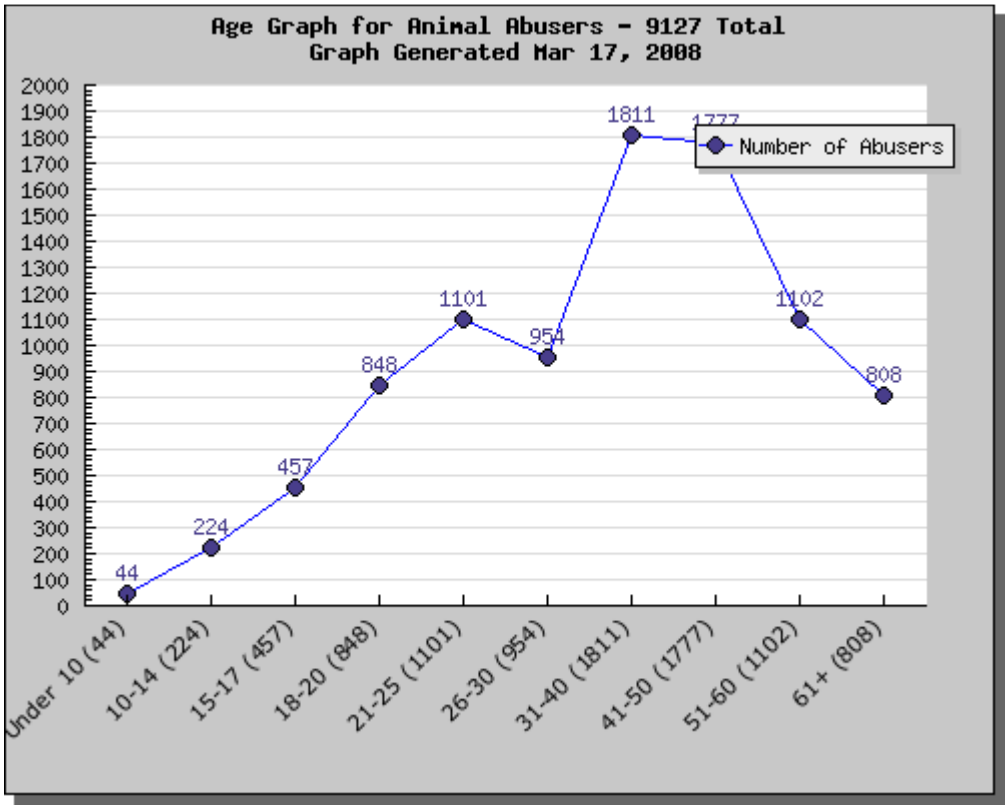
Yarnell, H. (1940). Firesetting in children. *American Journal of Orthopsychiatry, 10*, 272-287.

Zahn, M. A., Brumbaugh, S., Steffensmeier, D., Feld, B. C., Morash, M., Chesney-Lind, M., et al. (2008). *Violence by teenage girls: Trends and context.* Retrieved August 13, 2008 from http://www.ncjrs.gov/pdffiles1/ojjdp/218905.pdf

Zilney, L. A. (2003). *Ideology, community and demography: Explaining the link of violence against human and nonhuman animals*. Unpublished doctoral dissertation, University of Tennessee, Knoxville, Knoxville, Tennessee.

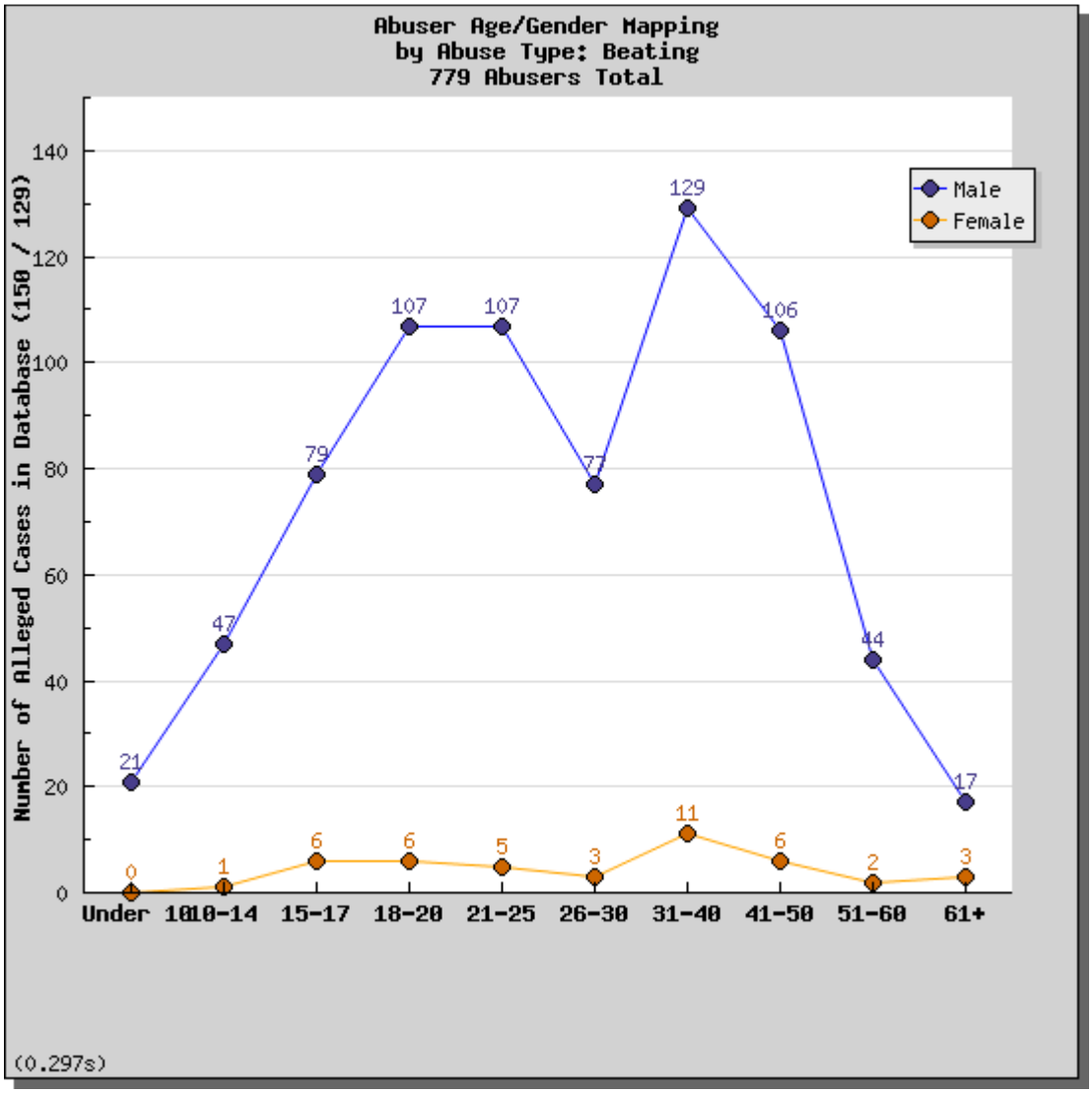
APPENDICES

Appendix A: Age Graph for Animal Abusers



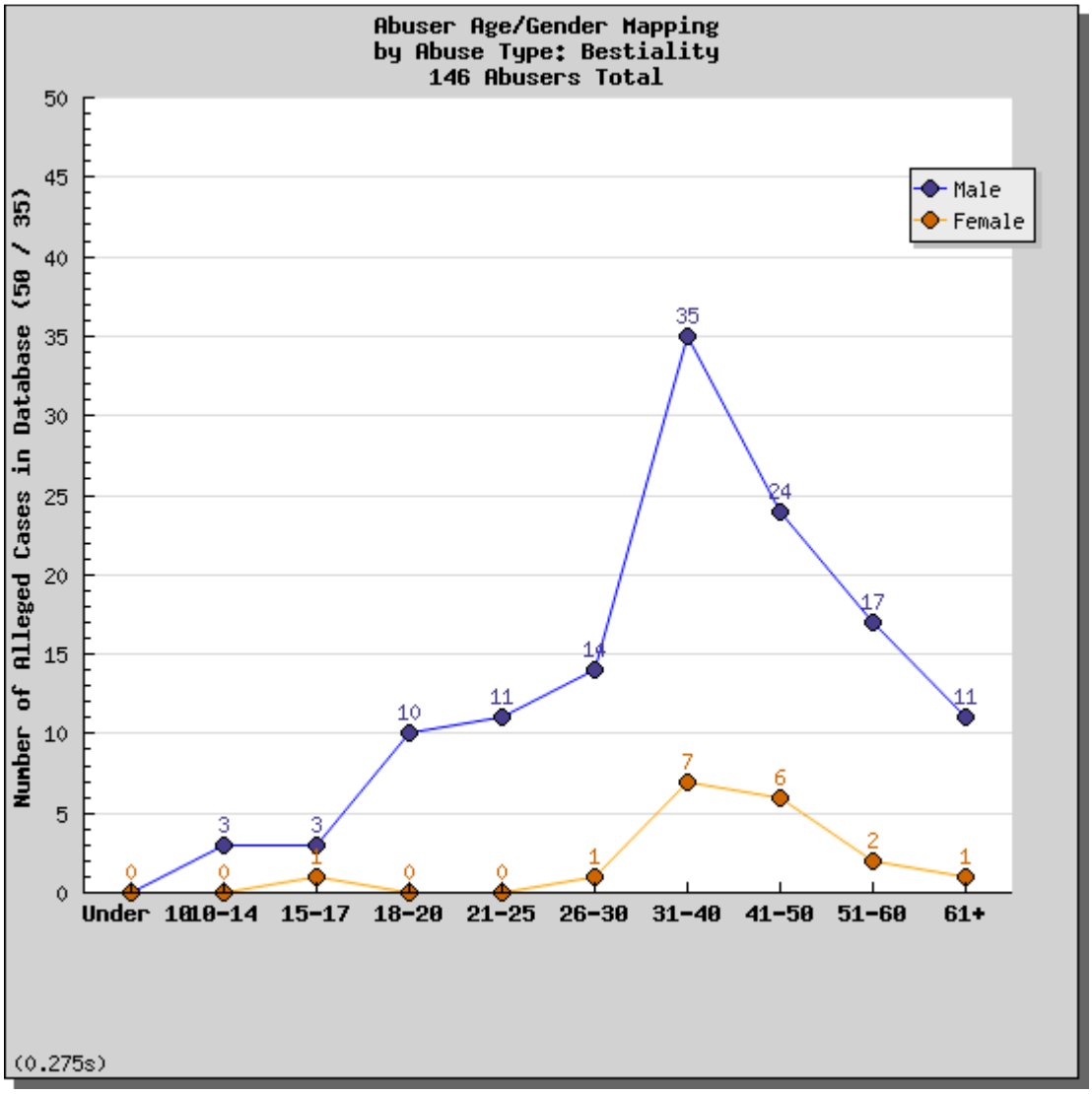
Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/ages.php.

Appendix B: Beating



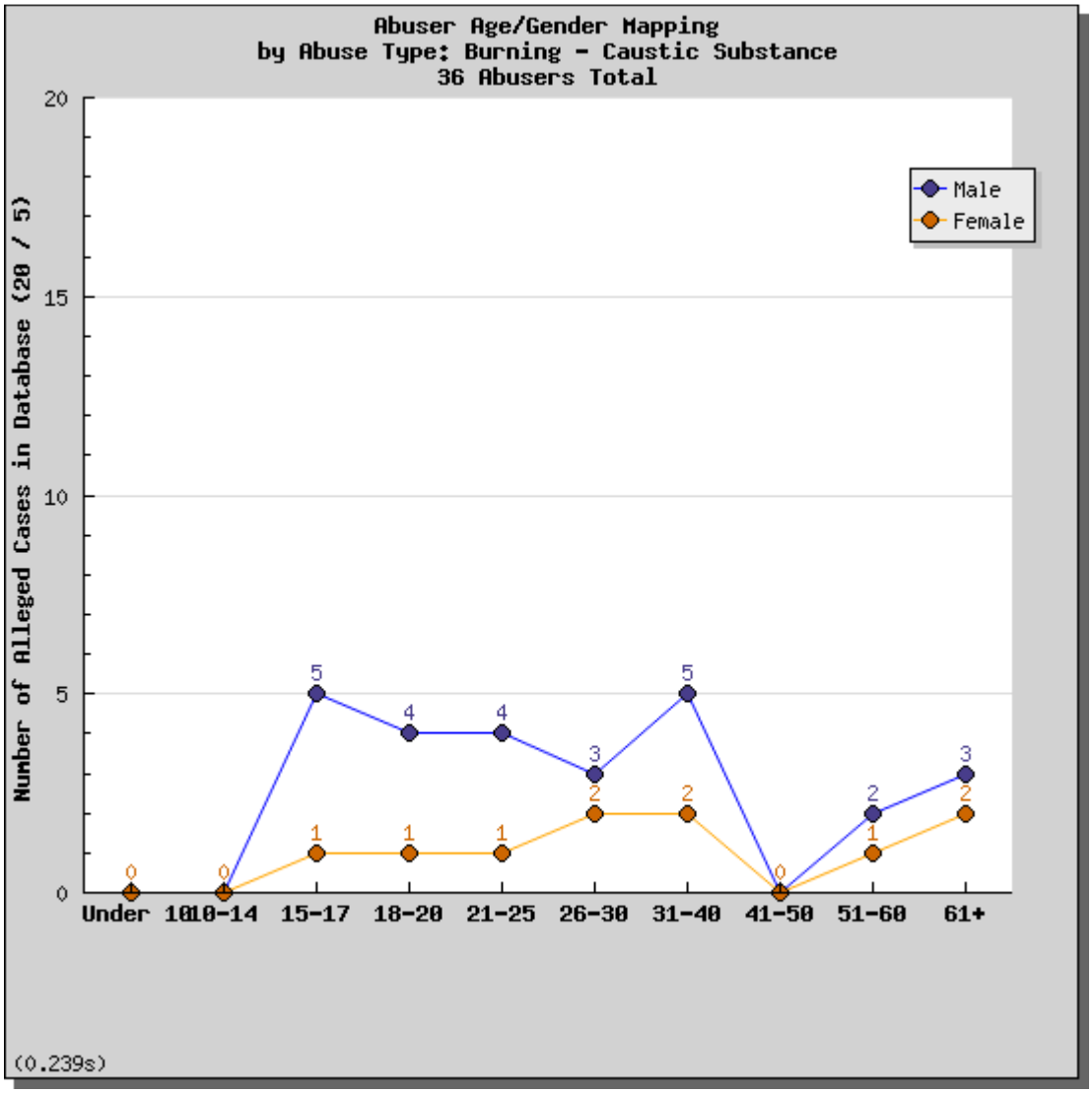
Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=3

Appendix C: Bestiality



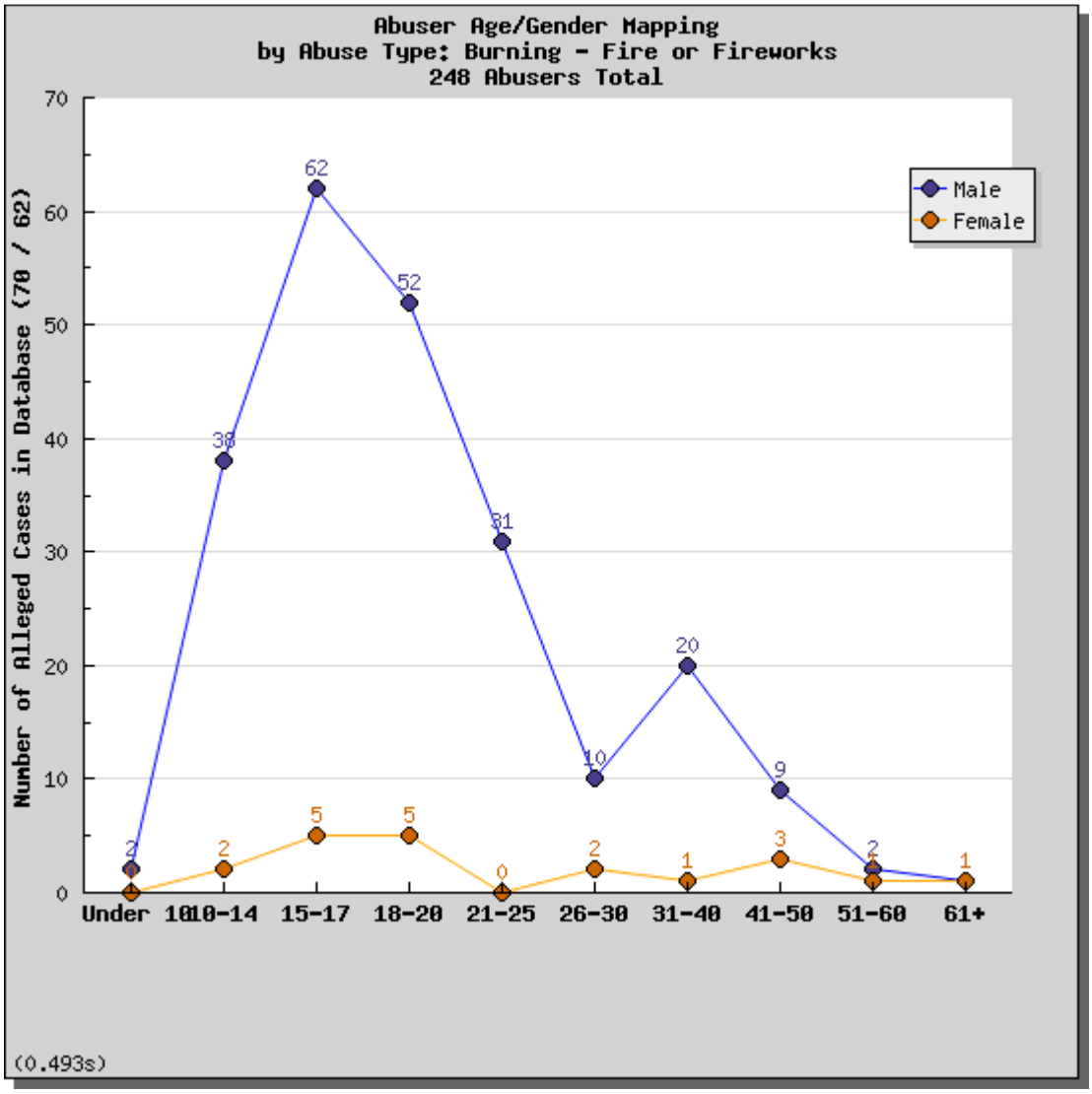
Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=10

Appendix D: Burning-Caustic Substance



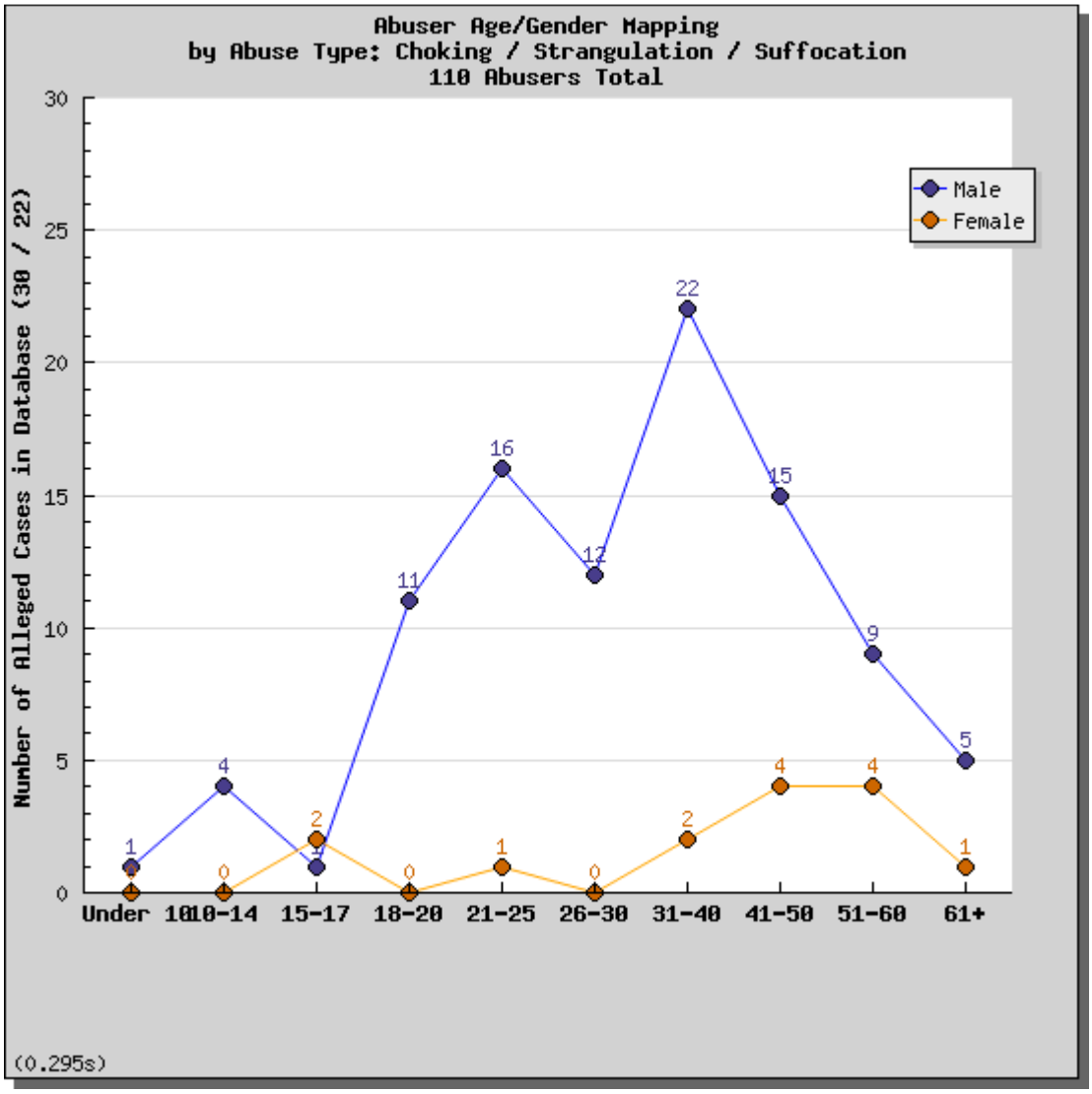
Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=22

Appendix E: Burning-Fire or Fireworks



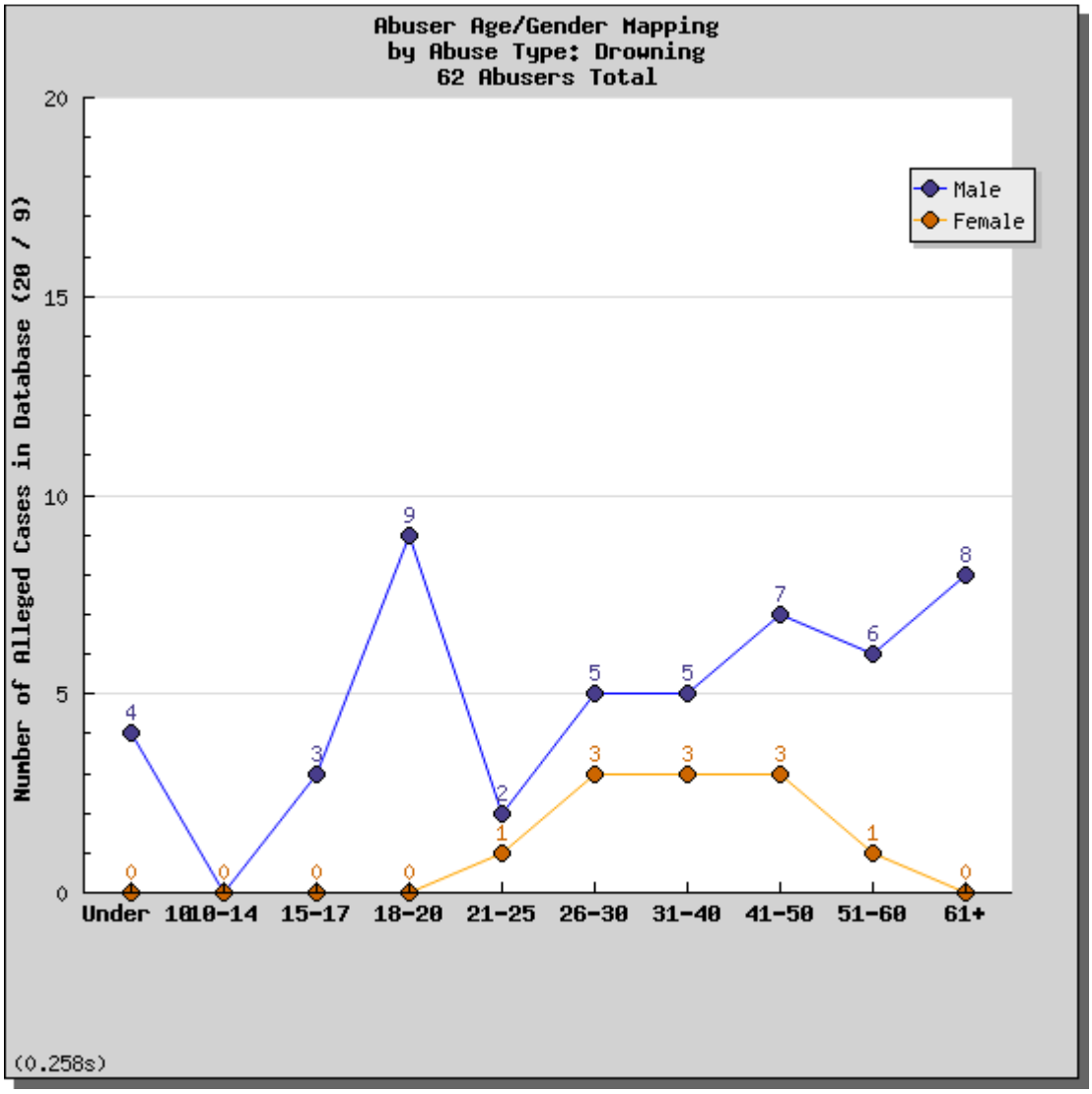
Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=14

Appendix F: Choking/Strangulation/Suffocation



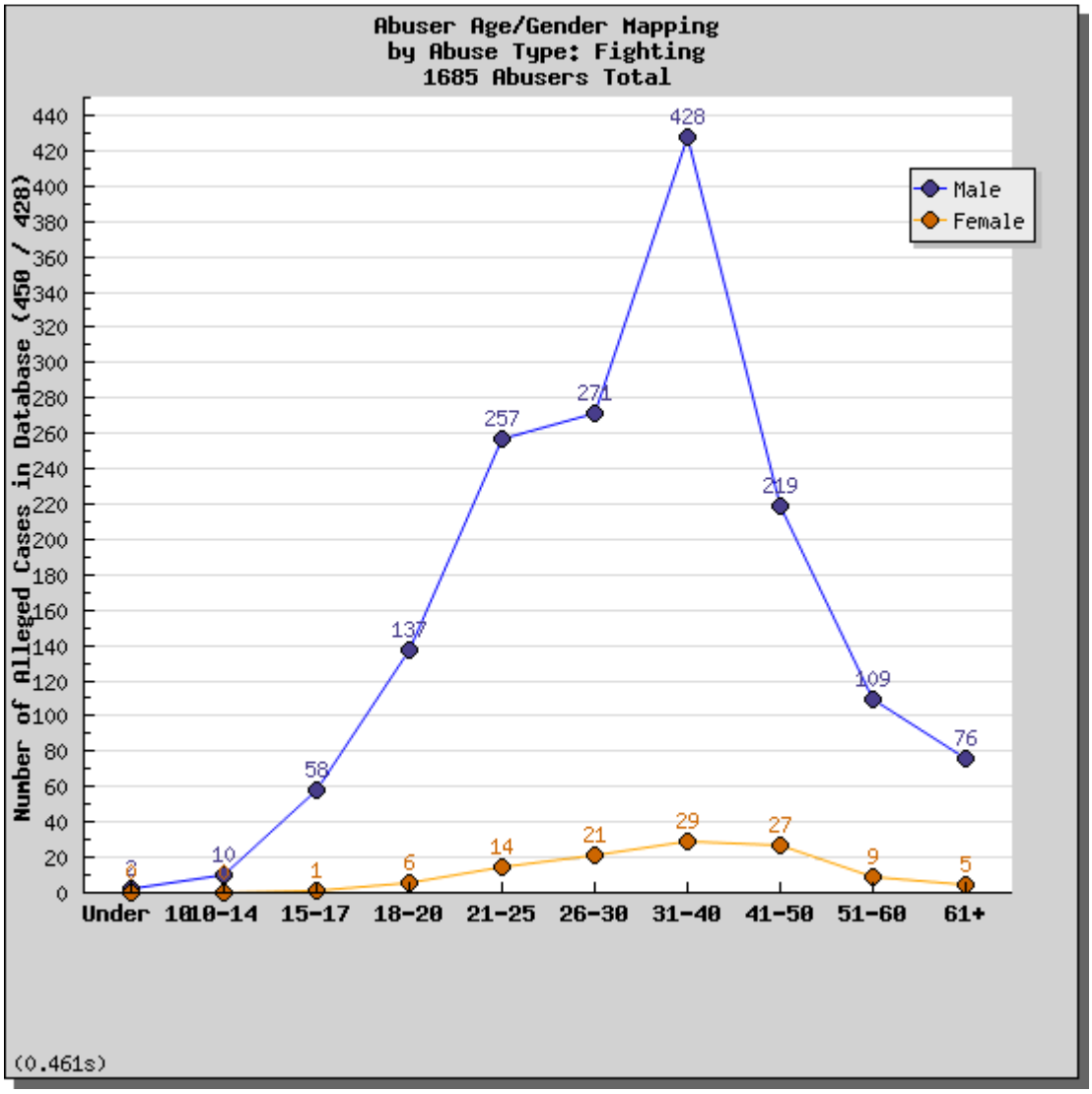
Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=19

Appendix G: Drowning

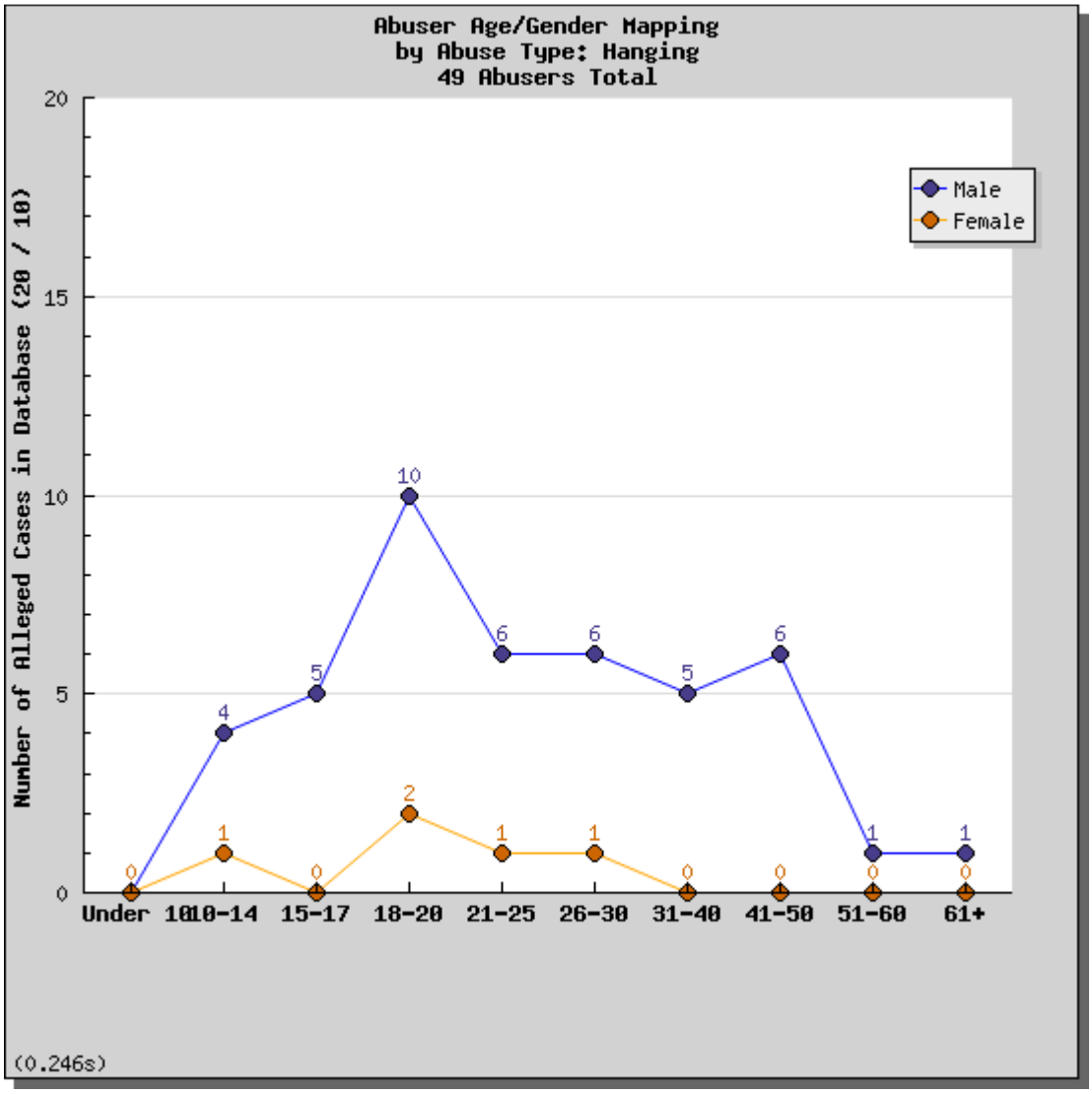


Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=4

Appendix H: Fighting

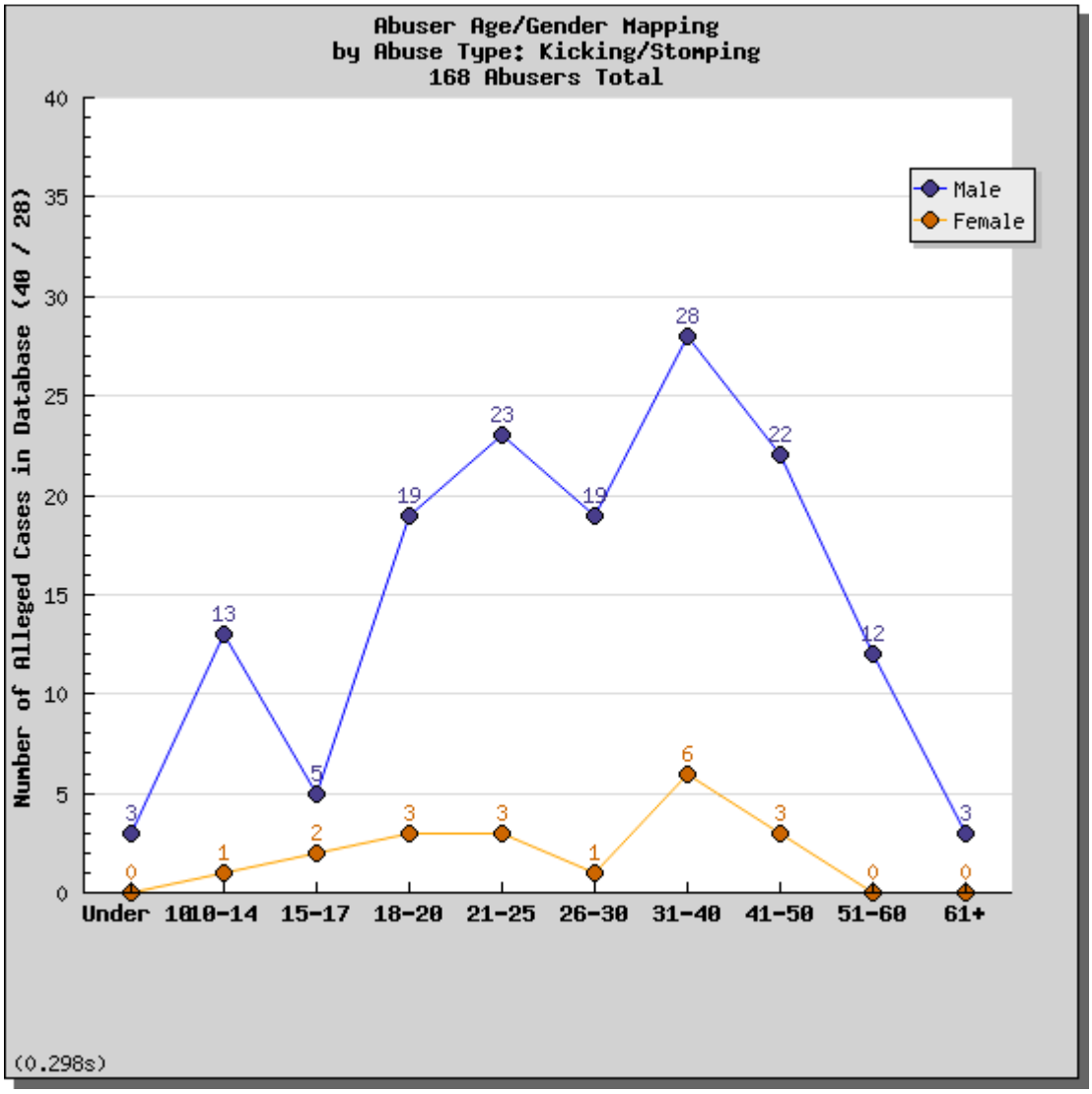


Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=7



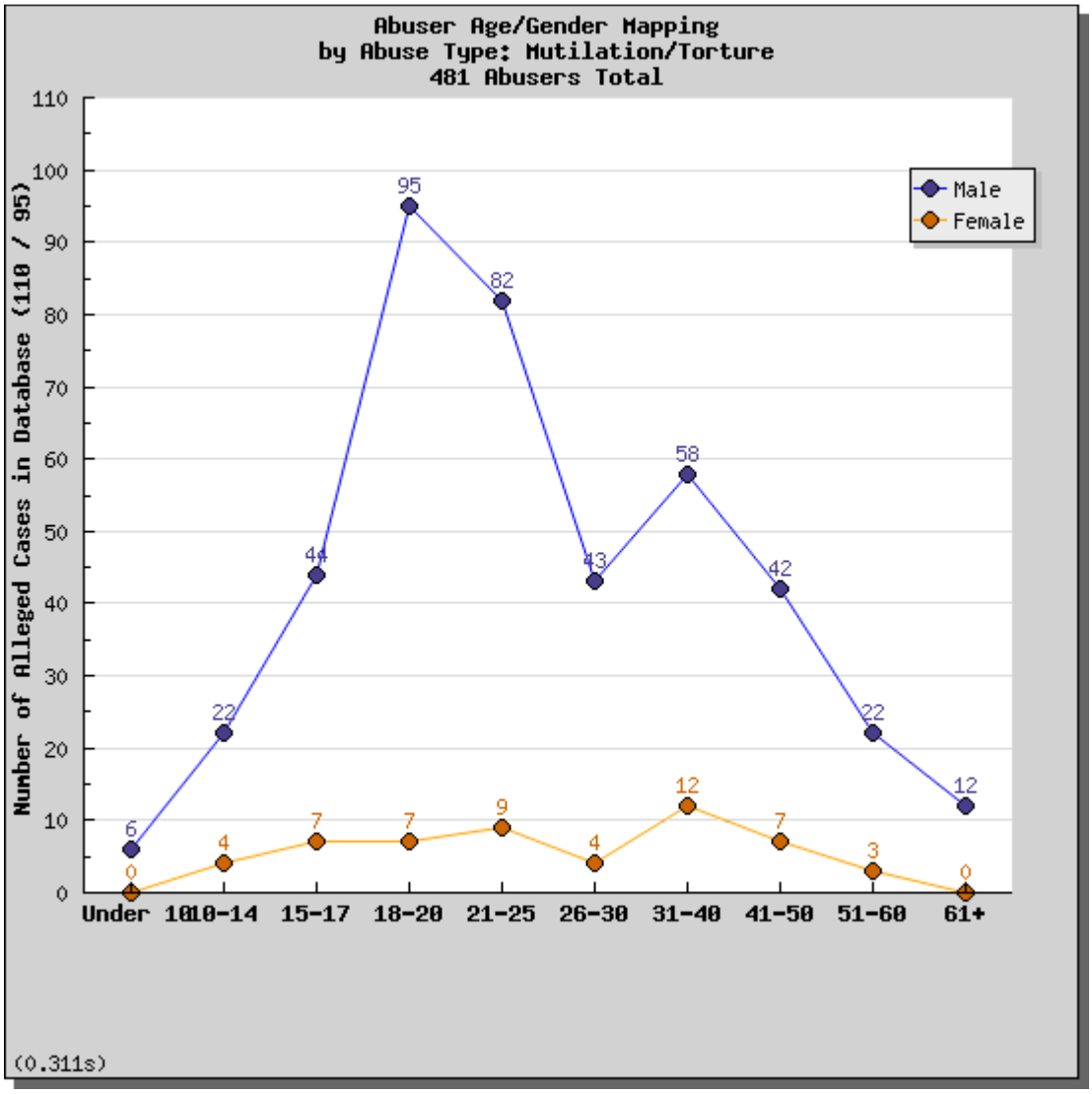
Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=23

Appendix J: Kicking/Stomping



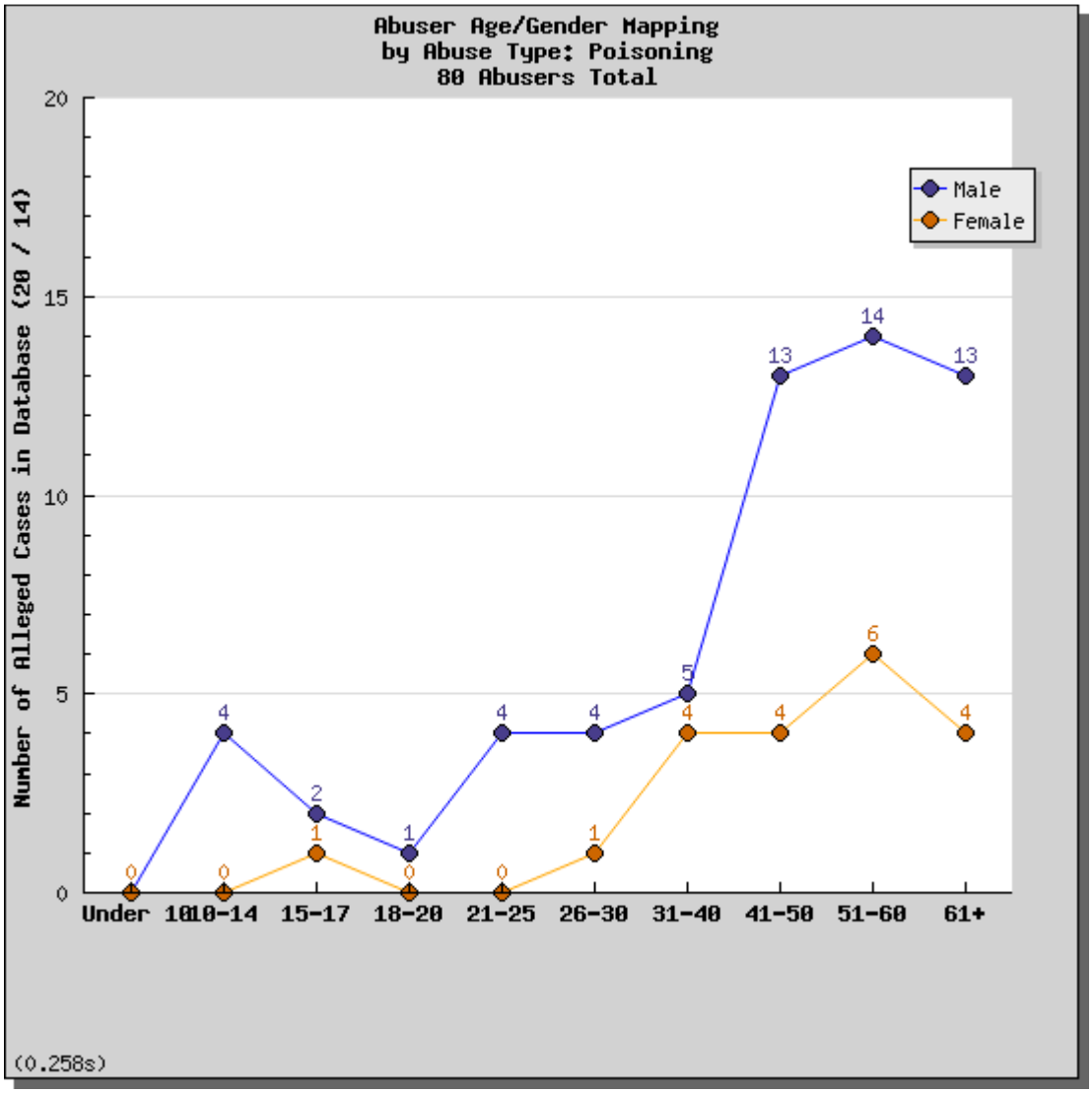
Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=21

Appendix K: Mutilation/Torture



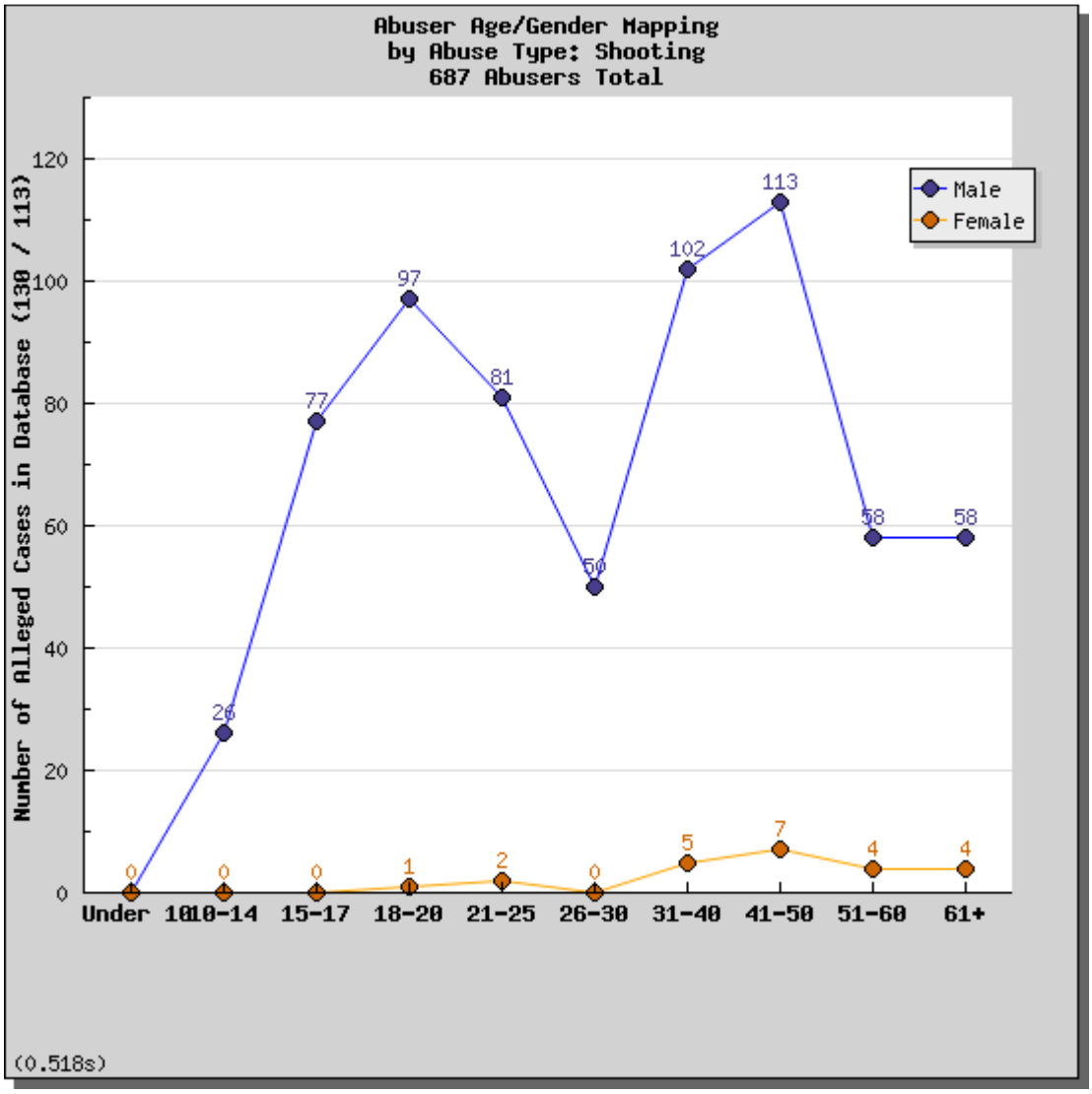
Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=2

Appendix L: Poisoning



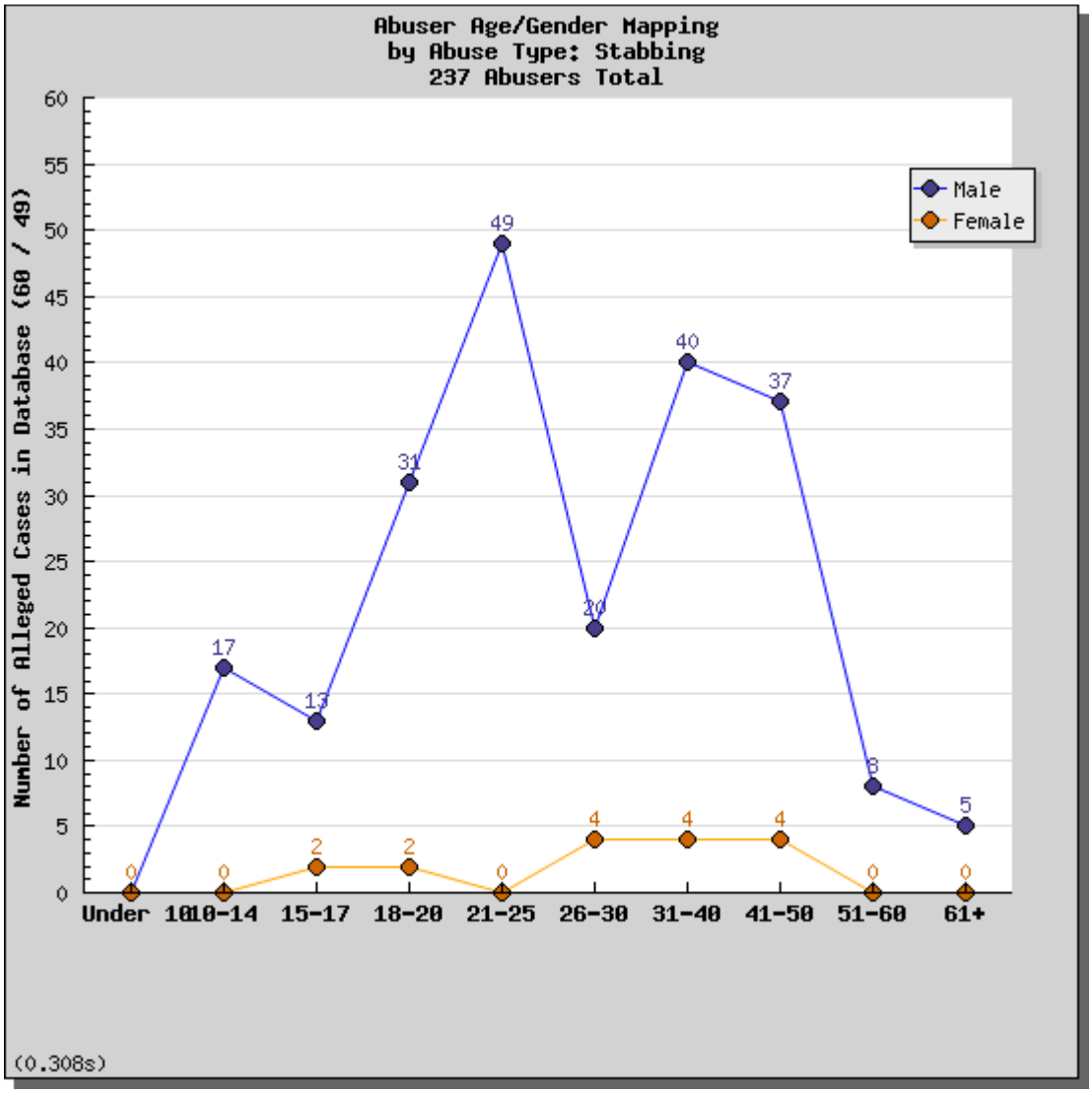
Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=8

Appendix M: Shooting



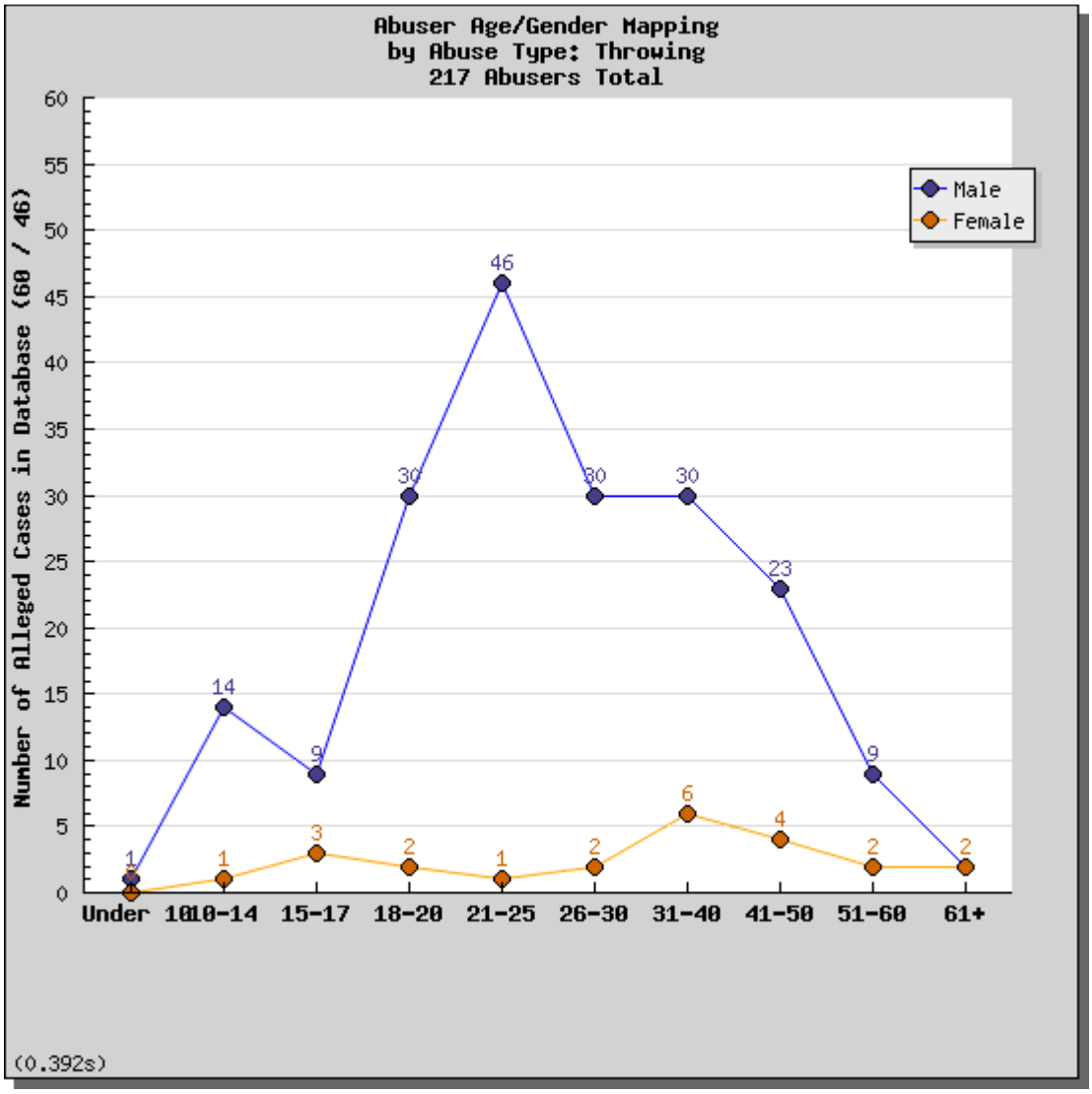
Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=6

Appendix N: Stabbing



Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=20

Appendix O: Throwing



Retrieved March 17, 2008 from http://www.pet-abuse.com/pages/cruelty_database/statistics/age_gender_by_type.php?type_id=17

Appendix P: Hypothesis Table[5]

HYPOTHESIS	CONCEPTS TESTED	VARIABLE SPECIFICATION	QUESTION WITHIN SURVEY
1. Children who commit animal cruelty and other behaviors will progress into adolescent delinquent behavior.	Graduation Hypothesis Childhood animal cruelty Childhood bed wetting Childhood delinquency Childhood aggression Childhood hyperactivity Childhood alcohol/drug usage Childhood poor school work Adolescent delinquency	IV Gender IV Childhood animal cruelty IV Childhood bed wetting IV Childhood delinquency IV Childhood aggression IV Childhood Hyperactivity IV Childhood alcohol/drug usage IV Childhood poor school work IV Primary caregiver's relationship to subject IV Ethnicity IV Familial dysfunction DV Adolescent delinquency	Gender W1: SEX Animal cruelty W1: CC15 Bed wetting W1: CC108 Delinquent Behavior Score, CBCL W1: DELIN_C W3: DELINC3 Aggressive Behavior Score, CBCL W1: AGGRE_C Hyperactivity W1: CC10 Alcohol/drug usage W1: CC105 Poor school work W1: CC61 PC's relationship with subject W1: PC_RELATE Ethnicity W1: ETHN_SP Familial Dysfunction W1: FM1, FM2, FM4, and FM10

[5] "W1" denotes Wave 1 Cohort 6 and "W3" denotes Wave 3 Cohort 6 of the PHDCN CBCL.

HYPOTHESIS	CONCEPTS TESTED	VARIABLE SPECIFICATION	QUESTION WITHIN SURVEY
2. Children who commit animal cruelty and other behaviors will progress into adolescent aggressive behavior.	Graduation Hypothesis Childhood animal cruelty Childhood bed wetting Childhood delinquency Childhood aggression Childhood hyperactivity Childhood alcohol/drug usage Childhood poor school work Adolescent aggression	IV Gender IV Childhood animal cruelty IV Childhood bed wetting IV Childhood delinquency IV Childhood aggression IV Childhood Hyperactivity IV Childhood alcohol/drug usage IV Childhood poor school work IV Primary caregiver's relationship to subject IV Ethnicity IV Familial dysfunction DV Adolescent aggression	Gender W1: SEX Animal cruelty W1: CC15 Bed wetting W1: CC108 Delinquent Behavior Score, CBCL W1: DELIN_C Aggressive Behavior Score, CBCL W1: AGGRE_C W3: AGGREC3 Hyperactivity W1: CC10 Alcohol/drug usage W1: CC105 Poor school work W1: CC61 PC's relationship with subject W1: PC_RELATE Ethnicity W1: ETHN_SP Familial Dysfunction W1: FM1, FM2, FM4, and FM10

HYPOTHESIS	CONCEPTS TESTED	VARIABLE SPECIFICATION	QUESTION WITHIN SURVEY
3. Female children who commit animal cruelty and firesetting will progress into adolescent firesetting.	Graduation Hypothesis Childhood animal cruelty Childhood firesetting Adolescent firesetting	IV Childhood animal cruelty IV Childhood firesetting IV Childhood bed wetting IV Childhood delinquency IV Childhood aggression IV Childhood Hyperactivity IV Childhood alcohol/drug usage IV Childhood poor school work IV Destroys own things IV Physically attacks people IV Truancy IV Vandalism DV Adolescent firesetting	Animal cruelty W1: CC15 Sets fires W1: CC72 W3: CE44 Bed wetting W1: CC108 Delinquent Behavior Score, CBCL W1: DELIN_C Aggressive Behavior Score, CBCL W1: AGGRE_C Hyperactivity W1: CC10 Alcohol/drug usage W1: CC105 Poor school work W1: CC61 Destroys own things W1: CC20 Physically attacks people W1: CC57 Truancy W1: CC101 Vandalism W1: CC106

Appendix Q: Bivariate Correlation Matrix for the Entire Sample

Variable	1	2	3	4	5	6	7	8	9	10	11
(1) Gender of subject	1.00 (729)										
(2) Hispanic	-.047 (728)	1.00 (728)									
(3) Black	.002 (728)	-.686** (728)	1.00 (728)								
(4) White	.032 (728)	-.390** (728)	-.297** (728)	1.00 (728)							
(5) Cannot sit still/restless/ hyperactive	.082* (726)	-.098** (725)	.157** (725)	-.080* (725)	1.00 (726)						
(6) Poor school work	.041 (593)	-.126** (592)	-.044 (592)	-.100* (592)	.145** (593)	1.00 (593)					
(7) Wets the bed	.092* (598)	-.100* (597)	.082* (597)	-.002 (597)	.117** (598)	.040 (593)	1.00 (598)				
(8) Delinquent behavior score, CBCL (IV)	.000 (598)	-.086* (597)	.122** (597)	-.065 (597)	.197** (598)	.248** (593)	.253** (598)	1.00 (598)			
(9) Aggressive behavior score, CBCL (IV)	.030 (598)	-.009 (597)	.076 (597)	-.086* (597)	.349** (598)	.273** (593)	.164** (598)	.637** (598)	1.00 (598)		
(10) Delinq. behavior score, CBCL (DV)	.161** (728)	-.169** (727)	.226** (727)	-.075* (727)	.221** (725)	.114** (593)	.082* (598)	.422** (598)	.428** (598)	1.00 (728)	
(11) Aggress. behavior score, CBCL (DV)	.089* (728)	-.104** (727)	.166** (727)	-.081* (727)	.265** (725)	.122** (593)	.089* (598)	.356** (598)	.523** (598)	.709** (728)	1.00 (728)

** Correlation is significant at the 0.01 level

*Correlation is significant at the 0.05 level

Variable	1	2	3	4	5	6	7	8	9	10	11
(12) Family Dysfunction binary	-.015 (705)	-.151** (704)	.168** (704)	-.005 (704)	.069 (703)	-.039 (571)	.094* (576)	.144** (576)	.220** (576)	.188** (704)	.232** (704)
(13) PC mom or not	.055 (728)	.058 (727)	-.095* (727)	.029 (727)	-.038 (725)	-.026 (592)	.008 (597)	.051 (597)	.090 (597)	.038 (727)	.052 (727)

Variable	12	13
(12) Family Dysfunction binary	1.00 (705)	
(13) PC mom or not	-.021 (705)	1.00 (728)

** Correlation is significant at the 0.01 level

*Correlation is significant at the 0.05 level

Appendix R: Bivariate Correlation Matrix for the Females in the Entire Sample

Variable	2	3	4	5	6	7	8	9	10	11
(2) Hispanic	1.00 (368)									
(3) Black	-.718** (368)	1.00 (368)								
(4) White	-.390** (368)	-.283** (368)	1.00 (368)							
(5) Cannot sit still/restless/ hyperactive	-.158** (367)	.189** (367)	-.046 (367)	1.00 (368)						
(6) Poor school work	.164** (299)	-.101 (299)	-.094 (299)	.133* (300)	1.00 (300)					
(7) Wets the bed	-.067 (304)	.070 (304)	-.006 (304)	.054 (305)	.003 (300)	1.00 (305)				
(8) Delinquent behavior score, CBCL (IV)	-.071 (304)	.081 (304)	-.028 (304)	.138* (305)	.252** (300)	.262** (305)	1.00 (305)			
(9) Aggressive behavior score, CBCL (IV)	.007 (304)	.019 (304)	-.025 (304)	.361** (305)	.302** (300)	.201** (305)	.647** (305)	1.00 (305)		
(10) Delinq. behavior score, CBCL (DV)	-.213** (368)	.243** (368)	-.040 (368)	.230** (368)	.047 (300)	.048 (305)	.426** (305)	.443** (305)	1.00 (369)	
(11) Aggress. behavior score, CBCL (DV)	-.108* (368)	.119* (368)	-.006 (368)	.249** (368)	.051 (300)	.077 (305)	.319** (305)	.513** (305)	.707** (369)	1.00 (369)

** Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level

Variable	2	3	4	5	6	7	8	9	10	11
(12) Family Dysfunction binary	-.194** (356)	.150** (356)	.082 (356)	.097 (356)	-.010 (288)	.097 (293)	.170** (293)	.218** (293)	.216** (357)	.289** (357)
(13) PC mom or not	.125* (368)	-.148** (368)	.039 (368)	-.044 (368)	-.030 (300)	.040 (305)	.075 (305)	.123* (305)	.032 (369)	.024 (369)

Variable	12	13
(12) Family Dysfunction binary	1.00 (357)	
(13) PC mom or not	-.083 (357)	1.00 (369)

** Correlation is significant at the 0.01 level

*Correlation is significant at the 0.05 level

Appendix S: Bivariate Correlation Matrix for the Males in the Entire Sample

Variable	2	3	4	5	6	7	8	9	10	11
(2) Hispanic	1.00 (360)									
(3) Black	-.311** (360)	1.00 (360)								
(4) White	-.388** (360)	-.311** (360)	1.00 (360)							
(5) Cannot sit still/restless/ hyperactive	-.026 (358)	.124* (358)	-.121* (358)	1.00 (358)						
(6) Poor school work	.092 (293)	.010 (293)	-.106 (293)	.153** (293)	1.00 (293)					
(7) Wets the bed	-.123* (293)	.092 (293)	-.001 (293)	.166** (293)	.062 (293)	1.00 (293)				
(8) Delinquent behavior score, CBCL (IV)	-.111 (293)	.185** (293)	-.118* (293)	.289** (293)	.253** (293)	.263** (293)	1.00 (293)			
(9) Aggressive behavior score, CBCL (IV)	-.025 (293)	.145* (293)	-.158** (293)	.334** (293)	.241** (293)	.128* (293)	.629** (293)	1.00 (293)		
(10) Delinq. behavior score, CBCL (DV)	-.124* (359)	.219** (359)	-.114* (359)	.198** (357)	.156** (293)	.082 (293)	.465** (293)	.430** (293)	1.00 (359)	
(11) Aggress. behavior score, CBCL (DV)	-.093 (359)	.211** (359)	-.153** (359)	.272** (357)	.177** (293)	.087 (293)	.424** (293)	.539** (293)	.708** (359)	1.00 (359)

** Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level

Variable	2	3	4	5	6	7	8	9	10	11
(12) Family Dysfunction binary	.109* (348)	.186** (348)	-.068 (348)	.042 (347)	-.066 (283)	.094 (283)	.111 (283)	.224** (283)	.175** (357)	.182** (347)
(13) PC mom or not	-.014 (359)	-.033 (359)	.016 (359)	-.042 (357)	-.027 (292)	-.031 (292)	.015 (292)	.042 (292)	.027 (358)	.072 (358)

Variable	12	13
(12) Family Dysfunction binary	1.00 (348)	
(13) PC mom or not	.054 (348)	1.00 (359)

** Correlation is significant at the 0.01 level

*Correlation is significant at the 0.05 level

Appendix T: Bivariate Correlation Matrix for the Hispanic Sample

Variable	1	5	6	7	8	9	10	11	12	13
(1) Gender of subject	1.00 (345)									
(5) Cannot sit still/restless/ hyperactive	.143** (344)	1.00 (344)								
(6) Poor school work	.010 (278)	.111 (278)	1.00 (278)							
(7) Wets the bed	.055 (280)	.114 (280)	.059 (278)	1.00 (280)						
(8) Delinquent behavior score, CBCL (IV)	-.009 (280)	.120* (280)	.207** (278)	.386** (280)	1.00 (280)					
(9) Aggressive behavior score, CBCL (IV)	.012 (280)	.328** (280)	.266** (278)	.276** (280)	.592** (280)	1.00 (280)				
(10) Delinq. behavior score, CBCL (DV)	.208** (280)	.192** (344)	.084 (278)	.145* (280)	.314** (280)	.377** (280)	1.00 (345)			
(11) Aggress. behavior score, CBCL (DV)	.094 (345)	.221** (344)	.140* (278)	.143* (280)	.208** (280)	.453** (280)	.652** (345)	1.00 (345)		
(12) Family Dysfunction binary	.023 (333)	.035 (333)	-.051 (268)	.113 (270)	.089 (270)	.180** (270)	.091 (333)	.187** (333)	1.00 (333)	
(13) PC mom or not	-.020 (345)	.045 (344)	-.017 (278)	.041 (280)	.089 (280)	.105 (280)	.023 (345)	.031 (345)	.112* (333)	1.00 (345)

** Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level

Appendix U: Bivariate Correlation Matrix for the Females in the Hispanic Sample

Variable	5	6	8	9	10	11	12	13
(5) Cannot sit still/restless/ hyperactive	1.00 (183)							
(6) Poor school work	.129 (146)	1.00 (146)						
(8) Delinquent behavior score, CBCL (IV)	.042 (148)	.253** (146)	1.00 (148)					
(9) Aggressive behavior score, CBCL (IV)	.328** (148)	.328** (146)	.627** (148)	1.00 (148)				
(10) Delinquent behavior score, CBCL (DV)	.200** (183)	.144 (146)	.411** (148)	.447** (148)	1.00 (183)			
(11) Aggressive behavior score, CBCL (DV)	.213** (183)	.104 (146)	.217** (148)	.465** (148)	.635** (183)	1.00 (183)		
(12) Family Dysfunction binary	.023 (176)	-.013 (139)	.146 (141)	.255** (141)	.207** (176)	.260** (176)	1.00 (176)	
(13) PC mom or not	.076 (183)	-.033 (146)	.088 (148)	.103 (148)	.028 (183)	.021 (183)	.048 (176)	1.00 (183)

** Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level

Appendix V: Bivariate Correlation Matrix for the Males in the Hispanic Sample

Variable	5	6	7	8	9	10	11	12	13
(5) Cannot sit still/restless/ hyperactive	1.00 (161)								
(6) Poor school work	.088 (132)	1.00 (132)							
(7) Wets the bed	.152 (132)	.083 (132)	1.00 (132)						
(8) Delinquent behavior score, CBCL (IV)	.298** (132)	.141 (132)	.313** (132)	1.00 (132)					
(9) Aggressive behavior score, CBCL (IV)	.338** (132)	.181* (132)	.148 (132)	.509** (132)	1.00 (132)				
(10) Delinquent behavior score, CBCL (DV)	.149 (161)	.041 (132)	.117 (132)	.289** (132)	.364** (132)	1.00 (162)			
(11) Aggressive behavior score, CBCL (DV)	.210** (161)	.174* (132)	.082 (132)	.224** (132)	.462** (132)	.671** (162)	1.00 (162)		
(12) Family Dysfunction binary	.043 (157)	-.091 (129)	.033 (129)	-.012 (129)	.072 (129)	.002 (157)	.112 (157)	1.00 (157)	
(13) PC mom or not	.017 (161)	.000 (132)	-.055 (132)	.103 (132)	.114 (132)	.028 (162)	.044 (162)	.178* (157)	1.00 (162)

** Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level

Appendix X: Bivariate Correlation Matrix for the Black Sample

Variable	1	5	6	7	8	9	10	11	12	13
(1) Gender of subject	1.00 (250)									
(5) Cannot sit still/restless/ hyperactive	.033 (248)	1.00 (248)								
(6) Poor school work	.119 (211)	.193** (211)	1.00 (211)							
(7) Wets the bed	.105 (212)	.149* (212)	.048 (211)	1.00 (212)						
(8) Delinquent behavior score, CBCL (IV)	.043 (212)	.261** (212)	.299** (211)	.199** (212)	1.00 (212)					
(9) Aggressive behavior score, CBCL (IV)	.104 (212)	.352** (212)	.213** (211)	.121 (212)	.647** (212)	1.00 (212)				
(10) Delinq. behavior score, CBCL (DV)	.162* (249)	.124 (247)	.105 (211)	.003 (212)	.439** (212)	.391** (212)	1.00 (249)			
(11) Aggress. behavior score, CBCL (DV)	.155* (249)	.221** (247)	.088 (211)	.048 (212)	.400** (212)	.530** (212)	.719** (249)	1.00 (249)		
(12) Family Dysfunction binary	.010 (240)	.044 (238)	-.008 (201)	.057 (202)	.121 (202)	.213** (202)	.186** (239)	.223** (239)	1.00 (240)	
(13) PC mom or not	.126* (249)	-.071 (247)	-.042 (210)	-.031 (211)	.043 (211)	.101 (211)	.120 (248)	.138* (248)	-.039 (240)	1.00 (249)

** Correlation is significant at the 0.01 level

*Correlation is significant at the 0.05 level

Appendix Y: Bivariate Correlation Matrix for the Females in the Black Sample

Variable	5	6	7	8	9	10	11	12	13
(5) Cannot sit still/restless/ hyperactive	1.00 (125)								
(6) Poor school work	.209 (106)	1.00 (106)							
(7) Wets the bed	.034 (107)	-.051 (106)	1.00 (107)						
(8) Delinquent behavior score, CBCL (IV)	.215* (107)	.251** (106)	.081 (107)	1.00 (107)					
(9) Aggressive behavior score, CBCL (IV)	.389** (107)	.180 (106)	.021 (107)	.640** (107)	1.00 (107)				
(10) Delinquent behavior score, CBCL (DV)	.105 (125)	-.027 (106)	-.052 (107)	.355** (107)	.355** (107)	1.00 (126)			
(11) Aggressive behavior score, CBCL (DV)	.164 (125)	-.042 (106)	.002 (107)	.315** (107)	.517** (107)	.715** (126)	1.00 (126)		
(12) Family Dysfunction binary	.064 (121)	.081 (102)	.043 (103)	.147 (103)	.161 (103)	.177 (122)	.306** (122)	1.00 (122)	
(13) PC mom or not	-.083 (125)	-.132 (106)	-.027 (107)	.094 (107)	.137 (107)	.089 (126)	.089 (126)	-.078 (122)	1.00 (126)

** Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level

Appendix Z: Bivariate Correlation Matrix for the Males in the Black Sample

Variable	5	6	7	8	9	10	11	12	13
(5) Cannot sit still/restless/ hyperactive	1.00 (123)								
(6) Poor school work	.185 (105)	1.00 (105)							
(7) Wets the bed	.249* (105)	.094 (105)	1.00 (105)						
(8) Delinquent behavior score, CBCL (IV)	.309** (105)	.337** (105)	.295** (105)	1.00 (105)					
(9) Aggressive behavior score, CBCL (IV)	.322** (105)	.222* (105)	.184 (105)	.653** (105)	1.00 (105)				
(10) Delinquent behavior score, CBCL (DV)	.135 (122)	.160 (105)	.008 (105)	.515** (105)	.401** (105)	1.00 (123)			
(11) Aggressive behavior score, CBCL (DV)	.271** (122)	.144 (105)	.053 (105)	.475** (105)	.528** (105)	.710** (123)	1.00 (123)		
(12) Family Dysfunction binary	.018 (117)	-.098 (99)	.055 (99)	.088 (99)	.253* (99)	.197* (117)	.154 (117)	1.00 (118)	
(13) PC mom or not	-.068 (122)	.017 (104)	-.061 (104)	-.033 (104)	.034 (104)	.117 (122)	.160 (122)	.009 (118)	1.00 (123)

** Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level

Appendix AA: Bivariate Correlation Matrix for the White Sample

Variable	1	5	7	8	9	10	11	12	13
(1) Gender of subject	1.00 (105)								
(5) Cannot sit still/restless/ hyperactive	.003 (105)	1.00 (105)							
(7) Wets the bed	.097 (84)	-.020 (84)	1.00 (84)						
(8) Delinquent behavior score, CBCL (IV)	-.099 (84)	.339** (84)	.038 (84)	1.00 (84)					
(9) Aggressive behavior score, CBCL (IV)	-.121 (84)	.469** (84)	.025 (84)	.831** (84)	1.00 (84)				
(10) Delinq. behavior score, CBCL (DV)	.073 (105)	.405** (105)	.108 (84)	.704** (84)	.596** (84)	1.00 (105)			
(11) Aggress. behavior score, CBCL (DV)	-.094 (105)	.438** (105)	-.013 (84)	.679** (84)	.645** (84)	.704** (105)	1.00 (105)		
(12) Family Dysfunction binary	-.197* (103)	.083 (103)	.094 (82)	.187 (82)	.259* (82)	.245* (103)	.213* (103)	1.00 (103)	
(13) PC mom or not	.022 (105)	-.096 (105)	.006 (84)	-.015 (84)	-.015 (84)	-.085 (105)	-.047 (105)	-.174 (103)	1.00 (105)

** Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level

Appendix BB: Bivariate Correlation Matrix for the Females in the White Sample

Variable	5	7	8	9	10	11	12	13
(5) Cannot sit still/restless/ hyperactive	1.00 (49)							
(7) Wets the bed	-.074 (41)	1.00 (41)						
(8) Delinquent behavior score, CBCL (IV)	.323* (41)	.003 (41)	1.00 (41)					
(9) Aggressive behavior score, CBCL (IV)	.431** (41)	.039 (41)	.886** (41)	1.00 (41)				
(10) Delinquent behavior score, CBCL (DV)	.502** (49)	.067 (41)	.808** (41)	.731** (41)	1.00 (49)			
(11) Aggressive behavior score, CBCL (DV)	.433** (49)	-.068 (41)	.722** (41)	.658** (41)	.840** (49)	1.00 (49)		
(12) Family Dysfunction binary	.161 (48)	-.017 (40)	.213 (40)	.266 (40)	.130 (48)	.199 (48)	1.00 (48)	
(13) PC mom or not	-.033 (49)	.123 (41)	.120 (41)	.077 (41)	.052 (49)	-.044 (49)	-.177 (48)	1.00 (49)

** Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level

Appendix CC: Bivariate Correlation Matrix for the Males in the White Sample

Variable	5	7	8	9	10	11	12	13
(5) Cannot sit still/restless/ hyperactive	1.00 (56)							
(7) Wets the bed	.032 (43)	1.00 (43)						
(8) Delinquent behavior score, CBCL (IV)	.367* (43)	.106 (43)	1.00 (43)					
(9) Aggressive behavior score, CBCL (IV)	.521** (43)	.038 (43)	.721** (43)	1.00 (43)				
(10) Delinquent behavior score, CBCL (DV)	.326* (56)	.129 (43)	.636** (43)	.486** (43)	1.00 (56)			
(11) Aggressive behavior score, CBCL (DV)	.468** (56)	.084 (43)	.572** (43)	.603** (43)	.601** (56)	1.00 (56)		
(120) Family Dysfunction binary	.022 (56)	.226 (42)	.109 (42)	.211 (42)	.381** (55)	.206 (55)	1.00 (55)	
(13) PC mom or not	-.155 (56)	-.127 (43)	-.237 (43)	-.138 (43)	-.211 (56)	-.047 (56)	-.169 (55)	1.00 (56)

** Correlation is significant at the 0.01 level
*Correlation is significant at the 0.05 level

Appendix DD: OLS Regression Results for Adolescent Delinquency within the Entire Sample with Specific Ethnicities and Outliers (N = 700)

Variable	B	SE	Beta	T
Gender of subject	**.600**	**.140**	**.160**	**4.297*** **
Hispanic	**-.588**	**.157**	**-.157**	**-3.743*** **
White	**-.442**	**.217**	**-.083**	**-2.039***
Cannot sit still/restless/hyperactive	.273	.159	.069	1.717
Poor school work	-.022	.194	-.004	-.111
Wets the bed	-.255	.219	-.045	-1.164
Delinquent behavior score, CBCL	**.181**	**.037**	**.241**	**4.834*** **
Aggressive behavior score, CBCL	**.054**	**.013**	**.212**	**4.074*** **
Family Dysfunction binary	.285	.146	.075	1.954
PC Mom or not	.147	.146	.075	1.954
F	19.885***			
R^2	.269			

Note: * is p < .05; ** is p < .01; and *** is p <.001

Appendix EE: OLS Regression Results for Adolescent Aggression within the Entire Sample with Specific Ethnicities and Outliers (N = 700)

Variable	B	SE	Beta	T
Gender of subject	.702	.359	.071	1.954
Hispanic	-.781	.405	-.079	-1.930
White	-.992	.559	-.071	-1.776
Cannot sit still/restless/hyperactive	**.857**	**.410**	**.083**	**2.090***
Poor school work	-.130	.4969	-.010	-.261
Wets the bed	-.131	.565	-.009	-.232
Delinquent behavior score, CBCL	.024	.096	.012	.248
Aggressive behavior score, CBCL	**.301**	**.034**	**.447**	**8.766*****
Family Dysfunction binary	**1.019**	**.375**	**.102**	**2.715****
PC Mom or not	.406	.547	.027	.743
F	22.865***			
R^2	.298			

Note: * is p < .05; ** is p < .01; and *** is p <.001

Author Note

At the time of the prospectus defense, some groundwork for accessing PHDCN data had been accomplished. S. Harrison (personal communication, June 30, 2008) at the National Archive of Criminal Justice Data (NACJD) at the Inter-University Consortium for Political and Social Research (ICPSR) advised that there should not be a problem obtaining the data sets once the Institutional Review Board (IRB) has approved the proposed study. She stated that this researcher's dissertation chair would fill out the Restricted Data Use Agreement (RDUA) form and list this researcher as staff. However, the access to the data could not be completed until the NACJD received the IRB approval and the RDUA form. As a follow-up, there was no issue obtaining the data after the prospectus defense and IRB approval was received by the NACJD. The data were successfully ascertained for the analysis.