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Mapping Serial Killer Life Pathways With Behavior Sequence Analysis

Morgann Lynn Brafford
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Walden University

College of Psychology and Community Services

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Morgann Lynn Brafford

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the review committee have been made.

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Walden University
2026

Abstract

Mapping Serial Killer Life Pathways With Behavior Sequence Analysis

by

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B.S. in Psychology, Michigan State University, 2017

B.S. in Anthropology, Michigan State University, 2017

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Forensic Psychology

Walden University

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Abstract

Although adverse childhood experiences (ACEs) are known to influence criminal behavior in adulthood, their potential influence on serial killer actions has not been scrutinized. This study was an investigation of how ACEs might affect serial killer actions later in life. The trauma-control model provided a conceptual framework for the investigation. Marono et al.'s research featuring behavior sequence analysis (BSA) was broadened to examine the impact of psychological abuse, sexual abuse, physical abuse, violence against animals, head injury, and bullying serial killer behaviors like stalking or sexual assault. The participants were 364 anonymized male serial killers from the Radford/Florida Gulf Coast University Serial Killer Database who were drawn using nonprobability sampling. The cases were coded for the presence of ACEs and serial killer behaviors. The BSA transition frequency matrix was completed before performing chi-square analysis to determine the significance, if any, of each pair. Many significant connections between ACEs were found (e.g., between head injury, bullying, violence against animals, and sexual assault). The study may promote positive social change by furthering identification of early risk factors for the development of violence, which might allow professionals to recognize these ACEs and be more proactive about treatment. By highlighting the strong correlations between certain factors, this study also pinpoints imperative areas of study in a field that has many gaps in the literature.

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Dedication

I would not be here today without the unwavering support of my mother and my very close friends. They've seen the highs and lows of gaining a graduate degree and have been a shoulder to lean on throughout the entire process. I could not have made it this far without them.

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Chapter 1: Introduction to the Study

Although serial homicide makes up less than 1% of crimes (Allely et al., 2014), these acts of the intentional killing of three or more human beings with a cooling off period in between (Sutton & Keatley, 2021) consistently hold the public's attention. This is likely because the actions enacted by these perpetrators are so severe that they demand addressing. The crimes committed by these offenders are often so heinous that any percentage would be enough to warrant further study (Petreca et al., 2021). In recent decades, the expanse of research into serial killers and the behaviors they exhibit has increased exponentially with much of the work pertaining to how sexual deviance and violence are developed and expressed during crimes. This refuses to acknowledge that there are many other risk factors that could propel a perpetrator into serial homicide offending. Understanding why serial murderers enact these actions on others and what possible root causes there are for these behaviors could not just potentially save lives but assist professionals identify possible perpetrators before any serial murder occurs (Marono et al., 2020). This chapter covers not only the origins of this topic in the field but also the purpose of the study, theoretical frameworks, research question (RQ) and hypotheses, nature of the study, definitions, assumptions, scope, and any other details involved with the study.

Background

The gap in the literature to be addressed was how adverse childhood experiences (ACEs), especially those beyond sexual or physical abuse, impact the development of serial murder behaviors in adult men in the United States. While initial forays into this

topic have been completed by Marono et al. (2020), the researchers only looked at three forms of ACEs leaving a significant amount of possible interfering variables that were not addressed. This dissertation aimed to close this gap by looking at the subject through a wider lens and taking the fuller picture into consideration.

This area of study addressed a population that has caused significant harm to individuals, their community, and society, and discovering the development of these behaviors is crucial in preventing them. It has been established that most serial murderers will not halt their killing activity until forced to through capture, death, or illness (Chan & Heide, 2009). Many killers will interact with police officials, therapy officials, or social workers across their lifespan, and understanding the potential presentation for development of serial murder behaviors could help professionals identify risk earlier (Keatley et al., 2021). Being able to identify potential influencing factors for developing these behaviors could have an impact on halting killers before they become just that.

There was a breadth of research in this field that illuminates some important context for the development of this dissertation. Droomer (2020) found that ACEs increased the risk factors on committing sexual sadism and violence in adulthood and created a category framework for logging offender childhood experiences that will be modified for this dissertation. Greene et al. (2020) saw that mistreatment in childhood increases risk for violence later in life, especially if that maltreatment is perpetrated by family members. Maladaptive fantasies preceding to serial murder have been found to take root in coping with childhood feelings of rejection and trauma (Brown, 2022;

Hickey, 2017). Oskarsson et al. (2022) and L. Zhang et al. (2023) have both supported ACEs as having substantial impacts on adult behavior.

Marono et al. (2020) studied how different ACEs can affect the development of serial killer behaviors utilizing behavior sequence analysis (BSA), albeit using limited variables, which was the founding basis of this dissertation. Keatley et al. (2019) supports the use of BSA in analyzing serial killer behavior and has been used successfully to link crimes based on exhibited behaviors over time. Furthermore, Reid et al. (2019) supports the importance of this topic being addressed and the necessary role it takes in preventing future violence.

Problem Statement

Researchers have surmised that some risk factors for development of violent behaviors begin with issues during pregnancy. When compared to non-offenders, those who committed violent crimes had delivery events or interpersonal violence events in utero that were similar in nature and could be used to predict violent offending behaviors presented later in life (Kandel & Mednick, 1991). Recent studies have shown that when reviewing literature on this topic, 75% of studies showed marked differences in child neurodevelopment (Toso et al., 2020). With women experiencing interpersonal violence during pregnancy and right after numbering up to about a third of individuals in the United States, the risk of this is significant (Ponting et al., 2024).

Prenatal socioeconomic risk and care have also been tied to the risk of poor child behavioral health (Ahmad et al., 2022). After prenatal effects, adverse events in early childhood are the next influencers of violence (Fanslow et al., 2021). Physical abuse in

early childhood was one of many events that have been identified as a precursor to violent behaviors later in life (Lu et al., 2019). An additional early life trigger can be family dysfunction such as substance abuse, domestic violence, or mental illness in the home (Fujiwara, 2022). These ACEs are constructed into a pyramid where interrupted neurodevelopment, disease, social problems, social/emotional/cognitive impairment and more can play a role in the emergence of negative behavioral, developmental, and other undesired outcomes (Hertler et al., 2022). Research into what types of adverse early childhood experiences occur among individuals who commit serial murder is limited and in desperate need of attention.

BSA is a form of quantitative research analysis that looks at behaviors over time to see how certain events may influence future actions or behaviors (Keatley, 2018). BSA has become widely utilized and accepted in the field in recent years especially in the field of psychology (Keatley & Clarke, 2021). It has been used to study paraphilias in regards to sexual, sadistic, and serial violence (Arrigo & Purcell, 2001), possible victim characteristics (Ardnt et al., 2004), and spree murders (Pollock, 1995). Initial forays using BSA in application to the interaction between ACEs and the actions taken by serial killers (Marono et al., 2020) looked at how these ACEs could affect the development of serial killing behaviors but used limited criteria (physical, sexual, and psychological abuse) to categorize the participants ACEs. This research study aimed to expand on this topic by incorporating a wider and more inclusive criteria of ACEs for a more precise look at how early childhood experiences affect future behaviors regarding serial murder before, during, and after their crimes.

Purpose of the Study

The purpose of this study was to delve into the perinatal and childhood trauma of male serial killers across the globe to measure the effects of aforementioned on the development of serial murderer behaviors in adulthood. The first half of the study coded the participants' ACEs to create a matrix for later chi-square statistical analysis (AlDahdouh, 2018). The chi-square test is chosen in BSA because it is used to compare observed results with expected results to determine if the variables being studied have a significant relationship. This was performed through gathering data from court records, the Radford/Florida Gulf Coast University (FGCU) Serial Killer Database (currently believed to be the most extensive in the world; Leary et al., 2021), and the research of Newton (1990), who created the first archival source for serial killer knowledge.

All information is to be verified from multiple sources through triangulation, a practice which has been accepted in the psychology community as the most effective way of gaining accurate data and includes gathering the same information from at least three verified sources to have accurate data (Ling & Mahadevan, 2013). If the data cannot be confirmed by multiple sources, it is considered unreliable and not used in the final analysis (Ling & Mahadevan, 2013). The second half of the study took the coding results and measured the behaviors observed to turn them into a transition frequency matrix to better understand how often they appear. Each square of the matrix was then analyzed using chi-square analysis tests to determine the standardized residuals, which will help illustrate the strength of the connections between the different serial murderer behaviors and ACEs (Keatley, 2018).

Research Question and Hypotheses

RQ: What is the association between ACEs and their impact on the crime-related behaviors of serial murderers?

H1₀: There is no association between ACEs and their impact on the crime-related behaviors of serial murderers.

H1_a: There is an association between ACEs and their impact on the crime-related behaviors of serial murderers.

I measured both variables nominally, marking either their presence or absence only. The independent variable was the ACEs that the offender had experienced in their youth. The dependent variable was the crime-related behaviors exhibited as an adolescent and adult later in life. The association between the two could give insight into what adverse childhood events have the biggest impact on the development of serial homicide-related behaviors.

Conceptual Framework

Eric Hickey (1997) developed the trauma-control model by building off the previous motivational model by Burgess et al. (1986), which proposed that traumatic experiences in early childhood shape the way that the thought patterns of the youth develop. The trauma-control model expands on this and establishes that the environmental and social issues that an individual experiences are exacerbated by the traumas that they have endured as children (Hickey, 2017). These early life events trigger an inability to cope for the individual as they age, leading to escalating behaviors and violence (Hickey, 2015). Early childhood experiences then become the foundation that

homicidal behaviors stem from after reinforcement through continuing trauma, predisposition, and other facilitators (Hickey, 1997).

For this research, I used a quantitative approach featuring BSA, which illuminates how the serial killer life pathway forms based on these ACEs. Once the pathways are laid out statistically, it is easier to establish possible correlations between the different life events and behavioral choices down the line (Bateman & Quera, 2011). The initial research involved extensive coding of the participants' ACEs along with their behaviors during and after their crimes. This data, once analyzed, creates a map of which ACEs most often impact which serial killer behavior. While the first research into this area seems extremely promising as far as the fact that ACEs do appear to impact future behaviors, this study aimed to identify which ACEs have the greatest impact on the development of serial murderer actions.

Theoretical Framework

The theory that underpinned this study was the attachment theory formulated by John Bowlby and Mary Ainsworth. Attachment theory posits that the attachment that an infant has to its early primary caregivers can have significant lasting effects throughout the rest of their life and their interactions with the world and individuals around them (Li et al., 2023). If the attachment is positive (called "secure attachment"), the child feels safe and encouraged in their early days and will develop more fruitful and trusting relationships later in life (O'Shaughnessy et al., 2023). If the attachment is insecure, the child will take this uncertainty and distrust into future interpersonal relationships. Those individuals who experience insecure attachment show a higher rate of aggression,

hostility, sexual offending, and other criminal acts as they age (Xu et al., 2023). The nature of most ACEs suggests that they would go hand in hand with the development of an insecure attachment style in early childhood. This is due to the fact that most of the serial homicide offenders studied have gone through events that would cause a souring of the relationship between the parent and child such as prepubescent or adolescent sexual abuse, physical abuse, psychological abuse, or other forms of adverse experiences.

Nature of the Study

I used a BSA approach to address the RQ. The first step required finding the participants and coding the historical “participants” life experiences of early childhood ACEs and behaviors at the time of the killings (Marono et al., 2020). This is referred to as “parsing” (Keatley, 2018) and involves breaking down their actions into separate and identifiable behaviors. After this data is collected and coded, the categorizing stage begins (AlDahdouh, 2018) which groups similar behaviors to allow comparison.

The analysis stage was last and used a lag-one BSA to illuminate the transitions between each individual pair of behaviors (Bakeman et al., 1987). This data yielded a transition frequency matrix which is run through chi-square analysis to produce the standardized residuals you need to construct the state transition diagram, which is basically a map of the connected behaviors using arrows of varying widths to draw correlations between ACEs and behaviors in a visual way (Keatley, 2018). These standardized residuals are simply a measure of the difference between observed and expected behaviors during and after the murders as a result of the occurrence of a specific ACE.

The population included United States born male serial killers from across the globe between the ages of 18 and 70 who had three or more murders and fulfilled the definition of serial killer as laid out by the recent definition from Sutton and Keatley (2021). All these participants were pulled from historical archives or databases and included no live participants. The sampling was chosen based on quantity and quality of available background and criminal demographics with the aim to garner at least 150 participants. Each participant must have at least three credible sources of information for proper triangulation to ensure as much accuracy as possible (Ling & Mahadevan, 2013). Luckily, the majority of the data will be gathered from the Radford/FGCU Serial Killer Database which has already done all the triangulation and verification of accuracy, which will eliminate a significant amount of work for the researcher (Aamodt, 2016). As all the information is public knowledge and most of it is historical, no institutional review board approval was officially needed but was pursued for dissertation completion.

Definitions

A serial killer, or serial homicide offender, is defined as someone who has 3 or more victims with a period of rest or return to normal life in between (Sutton & Keatley, 2021). There are other existing definitions, including the FBI (2008) definition which only specifies two victims, but research has begun to suggest that those who only have two victims exhibit different behaviors than those with 3+ (Williams, 2023). The first ACEs that will be used for the BSA will be physical abuse, psychological abuse, sexual

abuse as studied by Marono et al. (2020), followed by abandonment, neglect, death of a parent, and head trauma as detailed by Droomer (2020).

I added the final additional variables because of their possible identified contributions to the development of violent behavior like violence towards animals (DeMello, 2021; Girotra, 2021; Zuniga, 2021), substance abuse (Slocum et al., 2022), issues during childbirth (Kandel & Mednick, 1991; Oskarsson et al., 2022), and maladaptive fantasies (Chan & Beauregard, 2016; Reid et al., 2019). The independent variable in this study was the ACEs measured, whereas the dependent variable was the behaviors shown later in life before, during, and after the murders. The behaviors that were defined by the term “serial homicide offender behaviors” were sexual assault, stalking, torture, binding, quick kill (usually opportunistic, like ambushing a lone person on the street), overkill, mutilation, posed body, moved and hid body, body left at scene, left hidden at the scene of the crime, and dismemberment. The scales of measurement for both the independent and dependent variable were nominal, rating simply for the presence or absence of the identified criteria.

Assumptions

I had a few assumptions when performing the statistical analysis. The first of which was homogeneity of variance, which assumes that the variance of the dependent variable is consistent across independent variables (Nimon, 2012). While there may be some variables measured that could have varying levels of influence, this was something that will fall under “further study necessary” as this is some of the first forays into studying this topic. Additionally, the homogeneity of variance/covariance where the same

homogeneity of variance applies just over multivariate groups (Nimon, 2012) was relevant and was utilized. Other statistical assumptions like sphericity and homoscedasticity should not apply in this scenario because of the type of statistical analysis being used.

Scope and Delimitations

I studied what types of ACEs occur among individuals who commit serial murder and how these interactions may have impacted the actions they took as a serial homicide offender. To study serial murderers, there are numerous ways to approach the research that can impact how the data is collected and interpreted. For this study, the BSA was chosen as it allowed data to be collected over the course of someone's lifespan without requiring long-term observation (Keatley et al., 2021). This approach permitted the inclusion of varying forms of data from across differing perspectives without getting too convoluted. For example, one can look for both physical trauma to the head and emotional abuse at the same time, tying together theories from a biological standpoint as well as psychosocial. The population was men convicted of serial murder who were between the ages of 18 and 70, were residents of the United States, and were convicted within the United States. The sample size was 150 to garner enough data for the study to have significance.

The independent variable being studied in this dissertation was the ACEs being measured, where the dependent variable measured were the behaviors exhibited later in life before, during, and after their crimes. The independent variables considered included the initial categories laid out by the original researchers (Marono et al., 2020) of physical

abuse, psychological abuse, and sexual abuse. Added to this list to expand the study were abandonment, neglect, death of a parent, and head trauma (Droomer, 2020), as well as violence towards animals (DeMello, 2021; Girotra, 2021; Zuniga, 2021), substance abuse (Slocum et al., 2022), childbirth issues (Oskarsson et al., 2022), and maladaptive fantasy (Reid et al., 2019).

Generalization, or the application of the results to a broader population (Polit & Beck, 2010), has always been hotly debated, especially when dealing with smaller niche populations like this research did. While quantitative research is usually seen as more “generalizable” than small sample size qualitative work as a whole, it is still important to be mindful when constructing a study to ensure it will have the most generalizable results possible. To do so with this study, a larger population size, a wider set of variables, and inclusion of data that has only been verified and triangulated were all utilized to increase the generalizability of this dissertation (Ling & Mahadevan, 2013).

There are countless theories that can apply when dealing with serial murderers, and it would be impossible to look at any given set of data from all angles at once. Because of this, there were some theories that were not considered while approaching this study. While some biological factors were included and considered, more detailed biological theories that center around prenatal issues, hormone changes or fluctuations, hereditary violence, or more were not included because of both the complicated nature of the theories and the lack of available data to be able to accurately consider them in this context. Additionally, widely disproved or disavowed theories like Freud’s speculations on crime development or Franz Gall’s phrenology were not addressed (Dixon, 1986).

Limitations

With any study, there are limitations that can affect the outcome and results.

While there were more that arose while conducting the research, at the onset, there were a few limitations worth noting. Access to serial killer backstories and history can be challenging, and there always runs the risk of reporter bias or dramatization of details. Finding significant details on enough serial killers to make an extensive population is unlikely. This limits the samples significantly because of the decreased population. This research study was performed by a sole researcher which also leaves the possibility for errors in analysis, data collection errors, or confirmation bias. Furthermore, BSA can be time-consuming as it does require a significant level of detail for proper use.

Measures taken to avoid limitations included utilizing the Radford/FGCU database which not only is the most accredited and comprehensive serial killer information database to exist, it also only includes data that has been verified and triangulated already (Aamodt, 2016), which freed up a lot of work on the part of the researcher. A population size that was large enough for the study to have enough participants to produce meaningful data analysis had been planned for. While the population would ideally be as large as possible, the database includes enough participants for a good sample size and the ability to randomly choose participants. Inclusion of an increased range of independent variables allows for less intrusion of confounder variables or possible alternative explanations to behavior. BSA was also chosen as it is a tool that has been used and approved in similar research and fields of study (Marono et al., 2020).

Significance

Significance to Theory and Practice

Criminal profiling is one of the subsets of forensic psychology and aims to comprehend patterns and commonalities between offenders who commit certain crimes (Petherick & Brooks, 2020). Rudimentary profiles to lay out basic possible features or experiences of various categories of criminals were created by criminal profilers, but there is still much debate on the validity of such profile use and its reliability in the field of forensic psychology (Ribeiro et al., 2021). Due to the fact that these profiles have yet to be statistically validated (Ribeiro et al., 2021), creating more accurate profiling tools with statistically supported data is crucial. Using proper statistical analysis to identify common risk factors for serial homicide offenders will bolster current psychological tools and increase their effectiveness. BSA is a great tool for this task as it will not only yield the type of results that work well for understanding these effects but is also widely accepted in the field of study (Keatley & Clarke, 2021).

Significance to Positive Social Change

Positive social change is defined by Walden University (n.d.) as the process of applying or creating ideas and strategies that will encourage and increase the worth and development of individuals, communities, and societies. Significant positive social change would be enacted through research that helps identify developmental triggers for serial murders with the ability to ideally identify individuals with the risk factors to offend in this manner before they are able to act (Petreca et al., 2021). As Keatley et al. (2021) pointed out, gaining a better understanding of which risk factors and events in a

life's course may lead to certain offenses allows police and other professionals in the field to identify which offender may be likely to commit which crime. It has also been established that most serial killers will not stop until they are caught or killed, further adding another layer of urgency to the study of the development of this category of killer (Chan & Heide, 2009). Lastly, even if the nature of the crime itself is ignored, reducing crime in society in general is something highly desirable as shown by the wide breadth of study that has been done on the topic.

Summary

In summary, while the field of research into serial murderers may be a limited one, it is one worthy of attention and further study. The implications of ignoring this gap in knowledge and gaining a better understanding could be a literal matter of life or death (Petreca et al., 2021). Serial killers often will not stop unless forced to (Chan & Heide, 2009), and early intervention may be an important step in preventing these forms of crimes. Being able to identify problematic behaviors at their start, rather than after the fact, whether as psychological professionals or within law enforcement allows for the chance to reroute these poor behavior choices into something more productive and less harmful (Saurez, 2025).

I conducted this study to address this gap in knowledge by analyzing the lives of a wide sample of serial homicide offenders through BSA to attempt to identify risk factors caused by ACEs to gain understanding on what risk factors are more likely to appear in serial murderers' early childhoods if any. If certain later serial killer behaviors can be linked to select adverse childhood events, then that allows for a psychological

professional to intervene early to reroute to a healthier coping mechanism when they identify that a child has experienced that specific ACE (Petreca et al., 2021). BSA illuminates the connections between pairs of behaviors to see the significance between the interactions of the two (Keatley, 2018). While there are some established connections between ACEs and later violence (Cekic, 2024; Craig & Zetter, 2021; Fishbein, 2000; Keatley et al., 2021), there may potentially be connections between behaviors that researchers have yet to think of. By looking at these unexpected interactions, the results could lead study in new directions. Additionally, by re-testing the older variables again, this dissertation also tested the significance of those connections to confirm or oppose previous study results. In the next chapter, the researcher will cover the literature that inspired the formation of this study and establish the foundation on which the dissertation will function within.

Chapter 2: Literature Review

The purpose of this quantitative study was to describe the possible risk factors and the strength of their potential impacts on the development of serial killer behaviors. Serial killing has been around for countless centuries (Hickey, 2015), but major focus in the media and in research has come in the last 4 to 5 decades. Research on serial killing has been frequently seen as sensationalistic and unfit for proper study (Beauregard, 2019). Over time, the field began to advance as studies into case studies, typologies of killers, and how to identify killers became more common and more acceptable (Petherick et al., 2022; Yaksic, 2016). Though research in the field is beginning to truly expand with many scientists looking at various different possible risk factors, very little study has been done on how these varying factors interact with each other and overlap in the life histories of killers (Marono et al., 2020).

This chapter provides an in-depth summary of the existing literature on the origins of serial killer research, the development of aggression, and current theories on the creation of the serial killer. It begins with an overview of the databases utilized within the study and what keywords and search terms were used to direct the research. The impact and creation of the Serial Killer Database from Radford and FGCU is covered, bleeding into a much larger discussion about serial killer research as a whole and its history. This extensive deep dive covers the origins of study, definitions both historical and current, models of serial killer psychology across the years, and where current research resides. This section ends with the broader worldview and the impact of this research on the media as well as the media's impact on this research. The chapter then details the modern

understanding of possible risk factors of the development of serial killer behaviors as well as the gap in literature this study aims to fill. Before ending with the conceptual framework and conclusion, the chapter discusses the outcomes of serial killer violence and its' impact on society and possible implications.

Literature Search Strategy

The literature review search strategy began with a wide search of serial killer literature for history, origins, definitions, and past and current theories in peer-reviewed journals. Study then narrowed to more specific fields like certain risk factors, study on the interactions of risk factors, ACEs, and aggression development. Many databases were utilized to locate these peer-reviewed articles including, but not limited to, Walden University Library (Thoreau), Dissertations & Theses @ Walden University, ScholarWorks, Google Scholar, ProQuest One Academic, Taylor and Francis Online, Criminal Justice Database, PsychiatryOnline, SAGE Journals, ScienceDirect, SocINDEX, APA PsycArticles, and the Radford/FGCU Database. The keywords used to retrieve this research included, but were not limited to, serial killer, serial murd* (to include murder, murders, murdered), multiple murd*, violence, interpersonal violence, aggression, prenatal complications, prenatal, animal cruelty, animal violence, development of aggression, fantasy, maladaptive fantas*, child abuse, and childhood abuse.

Due to the fact that the field is still blossoming, some books and textbooks were supplemented to get a more comprehensive field of literature available. Additionally, for the later data collection on serial killer life histories, some popular media and other non-

peer-reviewed studies are used. The data range for this literature review was expansive as it included an in-depth view of historical theories and studies. The research used for our current understanding and next steps was confined to studies published in the last 6 years.

Conceptual Framework

Motivational Model

The original basis for this framework came from the motivational model (Burgess et al., 1986) of criminal behavior. This model describes the psychological process by which a child who has been repeatedly exposed to adverse childhood events will begin to develop a pattern of thinking that dwells on perceived and real threats from the environment (Burgess et al., 1986). Not only will the child have periods of time where they mentally withdraw from the trauma, but they can start to exhibit thinking patterns meant to alleviate fear and reinstate a sense of control over the situation (Burgess et al., 1986) like imagining someone coming and beating up the person that is hurting them physically. The researchers posit that these thought patterns become established early in life and usually within a context of social distance and isolation (Burgess et al., 1986). Overall, they identify five factors of an individual's life that interact to create later criminal acts which are defined as an ineffective social environment, the presences of ACEs, the thinking pattern established by these events, the reaction that then exhibited to others, and the offender's mental feedback filter utilized when processing the transpired events (Deepak & Ramdoss, 2021). It is how these five different factors interact within the child's life that defines how they will then respond to the experiences that happen to them in the future.

Trauma-Control Model

From the motivational model (Burgess et al., 1986), Hickey (2015) developed the trauma-control model. This model views criminal behavior differently and emphasizes that early childhood traumatic events and a negative childhood environment are the main contributing factors to exhibiting homicidal behaviors (Hickey, 1991). Trauma, in this model, becomes the catalyst for the search for control and triggering thought patterns that become deeply associated with violence. This is often accompanied by facilitators such as alcohol abuse, substance abuse, violent pornography (Arrigo, 2007), and maladaptive fantasy (Hickey, 2015).

This model has been widely adopted by the field and has been used in numerous studies across the decades. Pollock (1995) used this method to study spree murderers. Arrigo and Purcell (2001) utilized this model to study paraphilias and the motivations behind lust driven murders. Arndt et al. (2004) use this model to look at male serial killers, where they looked at the relationships between the male offender's characteristics and victim characteristics. Additional support for this theory has been shown through studies that have found significant correlations between trauma and dissociation (Dalenberg et al., 2012) which is the primary motivator of Hickey's (1997) model.

Theoretical Framework

A frequently arising theory that coincides with most ACEs is that of attachment theory. Attachment theory is prolific in psychological research with some studies clocking over 69,000 different scientific articles relating to the subject (Grady & Yoder, 2024). John Bowlby, in 1958, purported that children create beliefs about the world based

on the connections they make with their early caregivers (Ogle & Cozza, 2023). These attachments inform the child's inner mental representations of the world as well as the self and others they may interact with. The child will use these for the rest of their lives to understand and categorize the events and relationships they experience as they navigate the world (Ogle & Cozza, 2023).

Young children who experience poor attachment to their early caregivers tend to create insecure working models which interfere with their ability to successfully navigate interpersonal interactions (Li et al., 2023). Previous theories had seen attachment as learned, but Bowlby challenged this, instead believing that it was a product of evolutionary practices which gave the infants an innate drive to create attachments with their primary caregivers. When they create these attachments, which are founded on nurturing and responsiveness to the infant, the child learns that they are safe, stable, and cared for. This influences how the child sees and responds to the world around them (Ogle & Cozza, 2023).

Mary Ainsworth started working with John Bowlby in the 1950s and dedicated her career to the empirical proof of John's theories. While she did conduct independent research, the two would collaborate on their theories and research over the years. Experiments conducted by Mary, like the Strange Situation test, would help support Bowlby's theories on attachment (O'Shaughnessy et al., 2023). This test consists of a 21-min procedure where the researchers observe two different separations and reunions between a child and caregiver (Madigan et al., 2023). By creating a slightly stressful situation for the child (separation from caregiver in the presence of a stranger), this

allows the researchers to observe how the child not only reacts to stressors but also their reaction to the leaving and reuniting with the caregiver (Madigan et al., 2023). This analysis of behavior can illuminate what forms of attachment styles are developing with the primary caregiver.

Together, Bowlby and Ainsworth laid out the four major stages of attachment development. The first stage takes place from birth through 8 weeks, where the infant is pre-attachment and any signals the baby puts out are directed at anyone (O'Shaughnessy et al., 2023). The second stage from 8 weeks to around 6 months is the start of attachment where the infant begins to distinguish between faces and show preference to caregivers. From 6 months to around age 2, the child has clear attachments with established patterns and will show signs of preference for caregivers when experiencing stress or a threat (O'Shaughnessy et al., 2023). Around 2, the relationship between the child and caregiver becomes more reciprocal and more of a partnership with the child becomes better able to understand concepts of identity and self.

Secure Attachment

Secure attachment styles develop when the child feels a high level of trust, stability, and a healthy balance between independence and care (O'Shaughnessy et al., 2023). Children with secure attachments generally experience a positive view of self, strong emotional regulation, and high self-esteem (O'Shaughnessy et al., 2023). They may also have less trouble communicating their needs, boundaries, and other interactions within their relationships (O'Shaughnessy et al., 2023). These individuals have a higher level of trust in those around them and know how to work cooperatively with others.

They tend to demonstrate more empathy for others, while maintaining a comfortable boundary between connection and codependency (O'Shaughnessy et al., 2023). A calmer and less reactive nervous system can also be a sign of a secure attachment style. Around 1 in 2 infants will develop a secure attachment with their caregiver, according to expansive literature reviews (Madigan et al., 2023).

Insecure Attachment

Insecure attachment is categorized in three different forms such as anxious, avoidant, and disorganized. Anxious attachment manifests in clinginess, inability to trust, struggles being alone, and low self-esteem (O'Shaughnessy et al., 2023). It gets in the way of relationships as the individual tends to carry deep mistrust in others and an intense fear of rejection and abandonment (O'Shaughnessy et al., 2023). They may find a need for constant validation from those in their lives. Avoidant attachment creates a too powerful form of independence that does not allow the individual to create close relationships or intimacy easily (O'Shaughnessy et al., 2023). They do not tend to seek out relationships or assistance. They may be dismissive or struggle to create trust and emotional closeness in their relationships (O'Shaughnessy et al., 2023).

Disorganized attachment (or fearful avoidant) creates issues with lasting deep emotional relationships due to an inability to regulate emotions (O'Shaughnessy et al., 2023). These people tend to exhibit signs of having a negative view of self and others, fear of rejection and unpredictability of actions, and increased levels of interpersonal anxiety marked by consistent fears of something going wrong (O'Shaughnessy et al.,

2023). They may struggle to self-soothe and may act against their environment or community to try and exert control over emotional dysregulation.

Recent research suggests that those who commit sexual crimes against others have an increased rate of insecure attachment styles (Grady & Yoder, 2024). Evidence suggests that this insecure attachment is associated with more than just sexual offending as it increases the chance for other risk factors to form that inflate the risk of someone committing other criminal acts like issues with cognitive processing, struggles with interpersonal relationships, or dysregulation (Grady & Yoder, 2024). As Xu et al. (2023) summarize, adolescents with insecure attachment styles tend to engage in elevated rates of physical aggression, hostility, psychological and proactive/reactive aggression. Negative early interactions with caregivers can also impede the development of self-control which can feed into the aggressive actions of these insecure attachment individuals (Li et al., 2023). Wide scoping literature reviews suggest that the distribution for attachment styles globally is about 51.6% secure, 23.5% disorganized, 14.7% avoidant, and 10.2% anxious (Madigan et al., 2023).

Literature Review Related to Key Variables and/or Concepts

Serial Killer Database

Development and Undertaking

As research into the field has become more commonplace, there has become a distinct roadblock in the creation and execution of new studies. Accurately studying large groups of serial killers is incredibly difficult because the individuals themselves are almost never available to access, and very small numbers exist at any given time.

Looking at working with historical data, the background information on many killers was scattered, hard to access, and possibly sensationalized by the media (Yaksic et al., 2019). Spurred on by an idea in 2006 after students were tasked with creating serial killer timelines in a class at FGCU, Radford started the Radford/FGCU Serial Killer Database which houses the information on 5,752 serial killers currently (Leary et al., 2020) and is known as the most extensive and reliable database to gather information in the field. Each individual's information is triangulated and verified through multiple sources to ensure that the information contained is confirmed and accurate for research use.

Data and Accuracy

This database currently has information on 5,752 serial killers, covering United States based and global killers and covering over 15,000 victims (Leary et al., 2020). The histories within have been rigorously collected over 17 years following an intense standard. There are 143 variables that are considered before the killer is placed within the database (Aamodt et al., 2007). They start with demographic information like age, race, gender, ethnicity, and then branch out into their childhood and other defining traits. This includes backgrounds, education, IQ, and vocational and military history (Aamodt et al., 2007).

The database then covers the criminal and forensic records, information about crimes committed, the trial details, and the classification of the killer (Aamodt & Surrrette, 2010). Classification of the killer looks at the actions the killer takes before, during, and after the crime, what their motivations are, the location, the kinds of victims chosen, and methods used. Methods covers a wide array of actions before, during, and after the

crimes as well as it covers stalking, robbery, staging, sexual assault, torture, trophies, and other factors involved in the crimes.

Impacts on the Field of Study

The creation of this database has had significant impacts on the field of study. By gathering and verifying so much information, it has allowed more accurate research to be performed on larger samples within the population (Aamodt & Surrrette, 2010; Marono et al., 2020). This has allowed for much smaller teams and individual researchers to be able to contribute to the field without drowning trying to gather a myriad of triangulated sources for each killer they may want to include. Trend studies performed on this database have also shown interesting data that combats commonly held “myths” in the field like that the stereotypical image of a serial killer as a young adult white male is only accurate about 16% of the time (Leary et al., 2020). In fact, according to statistical analysis done by Leary et al. (2020), only about 29% of serial killers (of any location, race, gender, et cetera) fall into the 23-29 age bracket at all. It is clear that the inclusion of this database not only allowed for a larger sample population but permitted the collection and analysis of information in this dissertation to be much more manageable.

Serial Killers

Origins of the “Serial Killer”

While rumors of serial killers go back much farther, the first officially identified U.S. serial killer was Herman Webster Mudgett, better known as H. H. Holmes. This case was discussed at length even back as far as Talbot (1896), covering the general details of the case and the societal attitudes towards it. The case reached massive heights, not only

when it first broke, but continuing to this day (Selzer, 2017). Popular media had caught hold, and cases like this were likely what strayed scientists away from the field at the time (Frost, 2019). Many scientists viewed study on such things as sensationalism and a grab for fame rather than academic rigor (Beauregard, 2019). While there is academic value in studying not only this first big case of serial murder, many details of the H. H. Holmes case were exaggerated or straight up manufactured to create media interest (Frost, 2019). With this in mind, it is not shocking that credible researchers at the time wanted to steer clear of the topic gracing the front pages of newspapers everywhere to preserve their own reputations.

As the years passed, especially in the later 20th century, it became clear that this phenomenon could not be ignored any longer and needed to be addressed. The number of repeat homicide offenders being found was rising quickly (likely due to technologic advancements in forensics, DNA processing, and increasing camera presence in public places). The Federal Bureau of Investigation emerged as the first U.S. based law enforcement agency to come forward and publicly use the term “serial homicide” or “serial homicide offender” (Vronsky, 2004). Robert Ressler, a Federal Bureau of Investigation special agent, coined the term for law enforcement use in 1974 at a lecture at the Police Staff Academy in Bramshill, England (Petherick et al., 2022). This was not the first ever use of this term as it had appeared in American writer John Brophy’s (1966) book, “The Meaning of Murder”, as well as by a German book about killer Peter Kurten in 1930 (Gennat, 1930). Iconically though, this was its first initial introduction to the criminal justice stage.

Early Definitions

With this new focus on serial homicide, it was clear that the field was going to need a clear definition of what this meant. Early proposed definitions began with two or more murders committed at different times (Egger, 1984). Some researchers believed that the definition should include at least a 30-day period between the first and last killings for it to count (Holmes & Holmes, 1994). This was mainly introduced to delineate serial killers from mass murderers or spree killers. Spree killers/mass murderers differ from serial homicide in one minor but incredibly crucial way. Their crimes are committed right after another, involving a large amount of violence in a short period of time (Choo & Choi, 2020). This differs from those who would enter a public place and try to exterminate as many lives as possible in one go knowing they likely may not walk away from the crime scene from a killer who would take careful consideration to not be caught. There are many important differences in the psychology of the two (Choo & Choi, 2020) which is why they should be considered separately.

The Protection of Children from Sexual Predators Act of 1998 brought a national definition to the crime occurrence by defining it in the legal code as a killer who has 3 or more victims with periods of time in between (Office of the Federal Register, 1998). The most updated legal version of the definition is from the FBI who define it as the unlawful killing of two or more victims by the same offender(s) in separate events (Morton, 2005). For this dissertation, the study used the most up to date scientific definition, which is the same as the FBI's, but included 3+ victims instead as recent research has indicated that the number of victims does matter in the psychology of the offender (Vincent et al., 2022).

Early Theories of Serial Homicide

Early Biological Theories

Humans have been seeking biological reasons for behavior since science originally emerged, and serial homicide is no different. Some of the earliest theories have a purely biological basis for the development of aggression and violence. Cesare Lombardo, one of the founding fathers of criminology, used craniometrics to explain why men attacked others like head shape, size, and brow ridges (Facco et al., 2019). This was an application of an older form of study called phrenology to serial homicide. Phrenology was created in the 1700s by Franz Joseph Gall and used physical features to describe behavior (Eling & Finger, 2020). Both the initial theory and Lombardo's later applications were rife with racism, misconceptions, and other inaccuracies and were used to create harm and discrimination against minority groups (Eling & Finger, 2020). Recent studies into biological implications have deviated strongly from these early theories and have disavowed early opinions.

Early Psychosocial Theories

There are a wide variety of early psychosocial theories that were used to try to explain the actions of serial homicide offenders. Many of these later found themselves to be disproven or cast aside for more effective theory. This literature review covers the original four most relevant and commonly occurring theories in the psychosocial field of criminal psychology for a brief overview of existing research development. It will also cover how they are used today (if applicable), why they are no longer in use, or what their current day place in theory is.

General Strain Theory. Robert Agnew (1992) developed general strain theory. The main tenet of the theory was that the daily strains that an offender goes through causes them to try to cope with crime to try to alleviate these (Agnew, 1992; Barbieri et al., 2019). Objective strain is an event or situation that is disliked by most people while subjective strain is one that is expressively disliked by the person experiencing it (Agnew, 2006). These subjective strains tend to be seen as a better predictor of crime because not everyone will view an event in the same way (Teijon-Alcala & Birkbeck, 2019). What traumatizes some might not phase others. The three major varieties of strain present themselves as losing something, being viewed negatively by others, and the lack of achievement in reaching goals (DeCamp et al., 2020). While promising correlations have been made on the accuracy of general strain theory (Jang & Johnson, 2003), it ultimately places the “blame” of crime solely on environmental factors without considering biological influence among other factors, so its independent use is considered lacking and reductive (Agnew & Brezina, 2019; Jang & Agnew, 2015).

Social Learning Theory. Social learning theory took prominence with Albert Bandura’s (1977) work on the motivation behind developing criminal tendencies. It suggested that there is no innate desire to conform to society’s rules and that the learned behavior of crime is learned in the same way as one learns to conform, also known as differential reinforcement (Akers & Jennings, 2019). This theory was garnered from Bandura’s work in the 1960s with monkeys, learning how attachments are formed and impact behavior (Bandura, 1977). While there has been some support for the role that parental attachment plays in the development of aggression (Masud et al., 2019), some

researchers have gathered mixed results when trying to apply social learning theory to the development of interpersonal violence (Powers et al., 2020). Other scientists have protested the use of social learning theory because of the lack of validation or even observation of the main tenet of the theory of differential reinforcement (Brauer, 2009; Brauer & Tittle, 2012) and claim that not nearly enough is understood about the learning processes themselves in the first place to be able to then utilize these to understand the motivation behind criminal action.

Routine Activity Theory. Routine activity theory, which Cohen and Felson (1979) created, took the revolutionary view of looking at crime from the viewpoint of the offender. The theory posits that a crime will only be committed if the offender who is assessing the situation thinks that the target is appropriate and that there is no guardian to stop the behavior (Miro, 2014). This theory has been applied to violence in several ways, for example in mass shooting events. This has been used to identify motivations (like media attention and fame seeking), targets (open spaces and schools), and guardian interactions (history of mental illness, owning guns, et cetera) for subjects such as the perpetration of mass gun violence (Silva & Greene-Colozzi, 2021). There are fewer detractors of routine activity theory, but there is emerging work which suggests that the theory is not all applicable and that other factors can influence the usefulness of the theory like religious affiliation (Zavala et al., 2022).

Applications of this theory in serial murder are limited and seem to have been abandoned in recent years. In the early 2000s, there was some work to suggest that the disposal sites chosen by serial murderers could be analyzed using routine activity theory

to propose that many killers chose locations they are familiar with (Lundrigan & Canter, 2001). Other research has investigated the murder of children by serial homicide offenders using routine activity theory but found that it did not apply well and did not explain the varying motivations that seemed to change greatly between the ages of the victims (Boudreaux, Lord, & Jarvis, 2001). Later work has tried to connect social learning theory and routine activity theory to explain the risk factors of sexual murder while painting a pretty cognizant view of the sexual murderer (Chan, Heide, & Beauregard, 2011). Unfortunately, it seems to have not been expanded on much since within the field though.

Social Control Theory. Social control and bond theory was created by Travis Hirschi (1969) and explains that crime is something every person is capable of. Hirschi (1969) posits that strong social bonds are what connect others to society and detracts them from committing criminal actions. The strength of these bonds is what increases rates of conformity to social norms and decreases the chance of deviance (Greenburg, 1999). The theory is based on earlier work by Ivan Nye (1958) that proposed that there were three types of behavior control which are internal (using the conscience), indirect (thinking of those the behavior would impact), and direct (actual punishment from family, friends, or authority). Social control theory takes this farther and states that all crime is the result of social contracts and that areas of lesser community (impoverished areas for example) have a higher rate of crime because there is less of a connection to the “rules” of the society (Costello & Laub, 2020). It also expands the factors of control to include not only attachments to parents and peers, but also school, occupational

commitment, and general belief in social rules (Hirschi, 2017). Applications of this theory have shown issues in its use over longitudinal studies and its lack of acknowledgment of additional risk factors (Agnew, 1991), which has led to issues when attempting to understand behavior over time and how different risk factors may interact and influence such.

Other Approaches to the Study of Serial Homicide

MacDonald Triad

John MacDonald (1963) created the MacDonald triad to try to identify possible serial homicide offenders while they were still in their youth and had not committed crimes, at least not of such a severe nature. The theory explains that there are certain behaviors that manifest in childhood of potential serial homicide offenders like bedwetting past age 5, obsession with fire and fire-setting, and cruelty to animals (Zuniga, 2021). There has been limited research into its applications. Initial studies into this seem to imply that all three conditions are rarely fulfilled in each perpetrator and that the theory might be more applicable to identifying troubled home lives than risk of violent offending (Leary et al., 2017). Other research has posited that the association between cruelty to animals and fire-setting could have correlations to the development of antisocial behavior (Joubert et al., 2021), but there is much more study needed to confirm the validity of this theory in any way.

Worldview and Global Research on Serial Killers

Research on serial killers in the United States cannot be applied on a global scale. Western culture has a very different focus on serial killers than most of the world where

many countries believe the phenomenon to be strictly a Western influence (Pilson, 2011). The accuracy of this is highly debatable as there are quite a few countries who have reported serial killers. There are numerous nations who have refused to acknowledge the presence of potential serial homicide and in doing so have let crimes build up before acting like in the case of Luis Garavito in Columbia. While his body count was over 140 suspected murders, he was not even considered for custody until a mass grave of 36 bodies was found, despite constant reports to authorities, because officials were convinced serial homicide did not exist in Columbia (Chan & Chan, 2019). Additionally, he only ended up serving 22 years in prison for the Columbian law did not allow for persecution of such a serious natured crime (Chan & Chan, 2019).

For example, on continents like Australia, serial homicide offenders make up a similar statistic of the population as the West and have a similar focus on serial killers in the media (McKinley & Petherick, 2021). Despite this shared fascination with the West, the field is much more unstudied with initial forays into the topic emerging quite recently in literature. Canada, despite being so close to the United States and sharing a lot of Western ideals, has also found themselves lacking in serial killer research with some of the first deep dives into Canadian serial killers by local researchers beginning in the last fifteen years (Mellor, 2012). Countries farther from Western influence like Japan only really started considering serial homicide research in the early 2000s and found that despite the fact that there were less homicides in Japan than the United States (most likely due to population size and increased police presence), the trends of serial homicide events followed an incredibly similar trend to U.S. rates (Aki, 2003). While the

discussion of global serial homicide politics remains for another study, this was an important factor to choosing to focus on only U.S. based serial killers for the study as outside the U.S. there was significantly less information on the topic available.

Role of the Media in Serial Homicide Cases

Serial killing has taken the world of media by storm since the earliest days of serial homicide identification. Cases like H. H. Holmes, Jack the Ripper, and Jeffrey Dahmer have plagued movies, shows, and books since the origin of the crimes. This does not include, of course, the myriad of news outlets and popular media focusing on real life ongoing cases, which have their own impacts on investigation and the criminal justice system (Vats, 2021). While the term ‘serial killer’ did not reach the main media until the 1980s (Choo & Choi, 2020), killers were featured in books, films, and articles much earlier. Movies about the subject have only skyrocketed with time as their number grew from around 30 or so films between 1960 and 1979 to almost 500 released between 2000 and 2015 (Hickey, 2015). As the term “serial killer” became more well known, the media took this on as well, with the current level of popular media containing serial homicide growing in all directions (Call, 2019) including TikTok, podcasts, Youtube, and more modern avenues of media.

The role of media in cases involving serial homicide has been long debated as many newspapers, documentaries, books, and others have an issue of exaggerating the crimes, the perpetrators actions, promoting misconceptions involving the case, and sometimes printing straight up misinformation to sound more exciting (Leary et al., 2019). There has also been concern about the framing of the news media taking a fear-

based approach to covering stories which are meant to shock and awe the viewers while also giving them a skewed view of the actual happenings of the case (Marceaux et al., 2023).

Critics have suggested in recent years that the focus on graphic true crime media such as this has also created a desensitization to the violent nature of the crimes and a shifting of sympathy from the victims to the perpetrator (Saltzman, 2023). Some researchers have also expressed the concern that media like this is many individuals only real form of exposure to the field and the material (Rafter, 2006) with the viewers gaining gratification from the violence and detail depicted rather than a negative opinion of the perpetrator (Latora, 2020). Other researchers have suggested that this effect can be generalized to more than just television and film on serial killers, though this warrants further study (Hawkins & Scherr, 2017).

While the focus on the role of media was not one of major concern in this study, it would be omitting a large portion of the field to not at least mention its impacts. The way that greater society – as well as the research sphere – view these crimes plays a large role in how they are addressed and handled. It has clearly played a part in the development and pursuit of theory evolution and the understanding of these criminal behaviors.

Another concern when dealing with serial killer media is the importance of verifying all the data collected to ensure its validity. This is one of the main motivations for utilizing the Radford/FGCU Serial Killer Database as this triangulation verification has already been completed (Leary et al., 2020). This saves the researcher a considerable amount of time in the data collection process, making it possible for one to do alone.

Outcomes of Serial Killer Violence

Classification of Killers

In the 1970s and '80s, United States law enforcement spent a lot of time trying to understand serial killers and what prompted serial homicide. They believed that by analyzing the ways that a killer behaves during the crimes that this could have meaningful applications to what type of person they are (Ressler et al., 1986). This was intended to be used to help the police identify possible killers when they interviewed them based on certain characteristics that were more likely to appear when select behaviors had been enacted (Oleson, 2013). This had mixed results in the field with many researchers finding issue with how a large portion of killers looked at had features of both with some scientists even referring to the original typologies as “more myth than model” (Canter et al., 2004).

The Organized Killer. The organized killer is an individual who is purported to have at the very least average intelligence if not superior, is socially competent, and is skilled at work (Kerr et al., 2013). They are seen to be someone who comes from a stable background and is currently at the time of the crimes stable as well. The crimes are methodical, well thought out, and leave little evidence behind (Oleson, 2013). The offender is measured, controlled, and has a strong plan in mind before they act. Additionally, the organized offender is more likely to pursue the crime in the media and keep careful tabs on the investigation process (Chan & Heide, 2009).

The Disorganized Killer. The disorganized killer is very loosely the opposite of the organized killer. The disorganized killer is likely to be incompetent socially and

sexually with a below-average intelligence (Kerr et al., 2013). They probably come from an unstable home and faced harsh discipline as a child. They are more likely to commit crimes that are close to them, not well thought out, and crimes of opportunity. These killers can be unpredictable in their crimes and can exhibit irrational or sloppy behavior during (Beauregard & Martineau, 2016). The disorganized killer is also not likely to follow the media and to have the pressure of their crimes reflected in their following behavior with substance abuse, embracing religion, or others (Oleson, 2013). These killers are also more reported to be loners and to not have significant interpersonal relationships.

The Mixed Killer. When the initial issues of cross-application of killers appeared, they originally created a third category, mixed. The mixed killer was one that showed characteristics of both disorganized and organized serial homicide offenders (Beauregard & Martineau, 2016). While this was a movement in the right direction in the field of analysis, it was the start of the end of the typologies as many killers could now be identified as “mixed”, which revealed little pertinent information to law enforcement (Chan & Heide, 2009).

Motive-Driven Research on Serial Killers

In 1998, Holmes and Holmes came out with their own updates to the typologies, which they had found to be less applicable than they would like with many killers ticking off requirements under both umbrellas. This was the first push towards motive-driven research which posits that serial homicide offenders were more accurately categorized by the motives behind the killing rather than demographics (Holmes & Holmes, 1998). The

researchers broke down the crimes into four main categories titled visionary, mission-oriented, hedonistic, and power/control.

The visionary offender is one that may be experiencing mental health issues and is drawn to commit crimes out of a loss of touch with reality like a psychotic episode or schizophrenic delusions (Canter et al., 2004). A mission-oriented serial killer has a specific goal in mind that the murders will help “solve” (Hickey, 2015). For example, a mission-oriented offender could have grown up religious and feel as if it is their mission to rid the world of prostitutes because they see them as an unfit part of society.

Hedonistic serial homicide offenders are those who do it simply for the thrill, fulfillment, or sexual gratification of the killer (Holmes & Holmes, 1998). They have little reason for committing the crimes other than they wanted to and got some form of satisfaction or fulfillment out of it. Lastly, the power/control offenders get more out of the crime from the use of control over the victims specifically and almost always involves some form of sexual activity (Hickey, 2015).

Further research on this has shown some improvement in application, but it is plagued by the same issues as its forefathers in that too many of the killers measured apply to multiple differing categories. In application, it has been observed that the majority of offenders fall into the power and control category while also applying to others (Canter et al., 2004; Yaksic et al., 2019). This seems to follow similar issues with the creation of typological profiles for killers, especially based on wide-sweeping study (Ribeiro et al., 2021). Future study is needed in the interactions of these categories and how often they overlap before it can be widely accepted.

Risk Factors for Serial Homicide

Adverse Childhood Experiences

An ACE is an event that is experienced by a child during their period of development that can have negative impacts on their later physical, social, emotional, and mental development (Anda et al., 2020). There is expansive research being done in this field to see how these childhood experiences can influence the course of an individual's life with some studies showing significant correlation to the development of mental disorders (Lee et al., 2020) and the increased risk of interpersonal violence (Thulin et al., 2020). These ACEs are beginning to be linked as a possible influence on the development of serial killer behaviors with study showing interesting correlation between those who are diagnosed and exhibit psychopathy and a high level of ACEs (Moreira et al., 2020). Increased measurement of ACEs has also been correlated to a higher chance of the perpetuation of violent recidivism, especially involving sexual abuse and domestic violence (Craig & Zetter, 2021).

When looking at the trends of adverse childhood experiences, there are some concerning results coming out that suggest that ACEs are extremely prevalent with one study by Giano et al. (2020) recording that 58% of participants had experienced an ACE with over 21% experiencing more than 3. There is conflicting research being done on whether the COVID-19 pandemic has increased or decreased the experience of ACEs. Bryant et al. (2020) suggested that ACEs have increased since the pandemic and that further study is crucial to ensure these do not have long term effects on individuals. Others purport that ACEs are trending down in recent years (Finkelhor, 2020). It is clear

that more study needs to be done in this area, especially when considering that some literature points to not only certain ACEs having a more reactive impact than others (Briggs et al., 2021) like sexual abuse, physical abuse, and neglect, but also that ACE trauma can possibly be “passed down” to children via their parents through the attachments styles exhibited by parental units because of their trauma (Narayan et al., 2021).

Biological Risk Factors

Biological risk factors are factors that involve the body’s function and processes as potential explanations for the appearance of certain behaviors (Manchia et al., 2020). The field of biological influences on psychology and mental illness is extensive and worth including with the other identified ACEs. To keep data collection manageable, all biological risk factors will be under one umbrella with encouragement for greater expansion on the effects of these individually at a later date.

Gene Expression. There are many researchers who believe and are quantifiably finding that different expressions of certain genes can have an influence on later development and behavior. From the work done on the MAO-A enzyme, which processes dopamine and serotonin, it has been discovered that this could possibly contribute to the adoption of violent behaviors later in life (DeHart & Mahoney, 1994; Heide & Solomon, 2006; Raine, 2019). Other genetic defects or mutations can cause further issues that have shown correlation to violence like low dopamine levels and the effects of dysfunction in the prefrontal cortex (Ramsland, 2006). Neurochemical imbalances within the brain and the communication and creation of neurotransmitters were identified by Fishbein (2000),

where others have found irregularities in the production and distribution of other hormones in the body to have an impact (Raine, 2019; Van Goozen et al., 1998).

Even the witnessing of violence in the community over time throughout generations is being proposed as a possible trigger for violence as DNA studied from three generations of families showed that each progressive family member experienced greater levels of DNA methylation (the process of gaining a methyl group onto existing genes effectively turning them off or on) which has been found to have impacts on development (Serpeloni et al., 2019). Work by Saadatmand et al. (2021) has also supported this theory of DNA methylation over time impacting gene expression and development. While these are important developments and crucial to further understanding of the field, virtually no serial killers exist in the historical files who were tested or measured for these gene issues, so this was not addressed in the data collection, though it is an important portion of the field to note the existence of.

Prenatal and Perinatal Issues. Pregnancy and its trials and tribulations have been found to have a correlation to the presentation of deviant behavior later in life with the stress and other life events of the mother having an impact on the child (Bogat, Levendosky, & Cochran, 2023). Abuse in the home can create obstacles in familial relationships which can lead to issues with attachment, among other negative health and mental effects (Bernard et al., 2022). Even worse, it may be a seriously unreported area of concern as some research has discovered that many physicians were not screening for domestic violence in their pregnant patients (Long et al., 2019). Even when screened, the numbers are high with it being estimated that around 25% of children or their families

have experienced intimate partner violence in the home (Berg et al., 2022). Links have been found between the experience of interpersonal violence during pregnancy and the emergence of antisocial and violent behavior in the child (van Hazebroek et al., 2019). Other recent work in the field supports this with Tien et al. (2019) finding strong correlation between prenatal and perinatal issues and the child's later challenges with externalizing or internalizing problems unhealthily.

Some of the studies in the field contradict each other, making it difficult to understand exactly what impact risk factors like prenatal stress and interpersonal violence can have on a child. Some researchers have found that children whose mothers faced severe stress or domestic violence during pregnancy have increased levels of mental health disorders in the child (Babenko et al., 2015; O'Donnell et al., 2017). Elevated stress in the mother has also been tied to difficulties with an increased level of FKBP5 mRNA, which can lead to higher anxiety and a lower chance of being able to cope with stress (Halldorsdottir et al., 2019). In contrast, other studies have found that prenatal stress can sometimes lead to the child having an increased resistance to negative psychiatric effects (Russo et al., 2012; Rutter, 1999). Because of the unclear nature on the exact role of prenatal effects, serial killers with difficult births or in a home with domestic violence will be coded for to see the extent of what these influences might play a role as researchers like Raine (2019) have posited that most neural maldevelopments happen in this prenatal/perinatal state.

Physical Trauma and Its Effects. One biological influence that often gets overlooked when looking at the development of violence and serial homicide offenders is

the effect that physical damage to the body can have. This is not addressing the same issue as physical abuse in the home (though they can be connected), but the aftereffects of an actual injury or disease. The first studies into the effect of brain damage on the development of violent behavior were done by Nachson and Denno (1987) but have found nothing but support since. Lange and DeWitt (1990) posited similar theory with the addition of brain abnormalities. Disease was also added to the field with studies that have supported the changing of behavior after experiencing certain severe illnesses (Allely et al., 2014; Stone, 2009). Additionally, in recent years, Narang et al. (2020) have found that abusive head trauma is much more common in infant populations than currently realized, which could mean an increased risk for these impacts on societal behavior.

There was a plethora of promising studies into the impact of head trauma and illness and their influence on behavior. Serious or repeated head trauma has been identified to cause chronic traumatic encephalopathy (CTE) which is a condition where repeated brain damage from impacts over time compounds and can cause a loss of control over emotion and behavior (Ventresca & Henne, 2022). Frequently studied regarding football and other athletic professions (Martin & McMillan, 2022), many serial homicide offenders have identified a moment or several where they experienced severe head trauma which then changed their behavior moving forward (Aamodt, 2016).

Psychosocial Risk Factors

Impact of Abuse. The impact of physical, sexual, and emotional/psychological abuse are some of the most well studied areas when it comes to serial killer knowledge. Most studies, including the one that this dissertation is expanding upon, focus solely on

the influence of these on the offender's life at the neglect of other possible contributing factors. Studies going back decades have all found similar results that witnessing or experiencing physical abuse in the home increased the risk of continuing the cycle of abuse later in life (Clearly & Luxenberg, 1993; Greene et al., 2020). Sexual abuse is no different, with those who have gone through it or witnessed it as a youth finding a higher risk of perpetrating the same behaviors towards others (Dutton & Hart, 1992). Marono et al. (2020) also discovered a significant correlation between offenders and the experience of one of these three forms of abuse using BSA.

Abandonment, Neglect, and Parent–Child Attachment. Abandonment and neglect have also shown significant ties to the emergence of deviant behavior. Hale (1994) pinpointed the risk of child humiliation by peers and family leading to isolation as a major risk factor for violence. Hickey (2015) identified lack of acceptance and rejection, whether that be from family, friends, peers, or society, have a correlation to the development of violence and maladaptive fantasy. Perpetrators have been found to have a higher rate of elopement or having run away from home at a young age (Carter & Hollin, 2015). Martens and Palermo (2005) found that loneliness during all points in life was a significant predictor on the emergence of antisocial and violent behavior. The effects of neglect and parent maltreatment were also supported by Greene et al. (2020) which found significant associations with negative actions with age.

Much research has been done in the field of parent–child attachment impacts on development. The 1st year after birth is one of the most crucial times for this attachment to be established (Ogle & Cozza, 2023; Whitman & Akutagawa, 2004). As early as 1956,

scientists like Sigmund Freud were already creating theories on how a poor attachment to the mother could leave the child unable to learn how to control their unbridled rage, leading to maladjustment (Dixon, 1986). Albert Bandura's (1971) studies with monkeys on preference for comfort over a reliable food source suggested that the affection that a child receives from a parent can be more important than their physical survival needs being met. This has been supported in the literature with continued findings that the poorer the attachment of the child to the parental unit, the higher chance of deviance (Kesner & McKenry, 1998). Correlations between children of divorce and violence have been identified as far back as Holmes and DeBurger (1985). Studies on convicted murderers show correlations between those who had cold and distant attachment to their mothers and the increased extremity of their crimes (Ressler & Schachtman, 1992). Mackey & Immerman (2004) found that families without a solid father figure present exhibited much higher rates of dysfunction and violence than those with one.

Other Risk Factors

Violence Towards Animals. Violence towards animals was introduced as a possible indicator of serial killer behavior back with the MacDonald triad (MacDonald, 1963). While the rest of the triad has been mostly put aside by scientists as mentioned above, this tenet of the triad has been the case of further promising study since. A study by Hensley et al. (2009) found that in a prison population, animal cruelty was the only indicator of violence out of the triad. They also found that the reasons behind the cruelty did not matter for the violence against animals to have an impact on their crimes or recidivism. Following research has replicated this study with a larger population of 257

inmates and discovered that the results were the same, lending validity to the claim (Trentham et al., 2018). As recent as the last few years, scientists like Girotra (2021) have called for a focus on how animal cruelty in youth impacts behavior development later in life and purport that these actions are a significant warning sign of later violence.

Maladaptive Fantasy. Maladaptive fantasy is when an individual experiences unusually excessive fantasies that are used to cope with everyday life but have become so extensive that they now interfere with daily activity and behaviors (Hickey, 2015). Burgess et al. (1986) was one of the first researchers to point out that unresolved stress could lead children into development fantasies where they are able to exhibit control in a way that they cannot do in reality. Person (1995) supported this and posits that these were misguided attempts to resolve conflict in their life before they have learned better methods. This becomes a coping mechanism for the child that, once mature, becomes staging grounds for actual violence (Hickey, 2015). It has been found that these maladaptive fantasies will escalate with time with the content growing increasingly extreme as the individual requires growing stimulation to reach the satisfaction they are looking for (Miller, 2014). In conjunction with this, the presence of ACEs in childhood has shown promising possible correlations to the catalyst for enacting deviant fantasies (Maniglio, 2010).

Gap in the Literature

While ACEs have been studied in their influences regarding attachment styles, development of violent behaviors, recidivism and more, the application of these events to serial homicide offenders is severely lacking. The current research suggests that ACEs

can impact parental attachment styles (Narayan et al., 2021) and that poor attachment to parental figures can lead to the development of violent behaviors (Moriera et al., 2020), yet studies which consider the experience of ACEs regarding serial homicide behaviors are extremely limited. In researching for this dissertation, only one study was found that had utilized ACEs by comparing 233 male serial killers using BSA (Marono et al., 2020). While yielding promising results, Marono et al. (2020) only focused on three main ACEs (sexual abuse, physical abuse, and emotional abuse), while there are many more ACEs left unaddressed (Briggs et al., 2021).

This dissertation aimed to address this gap in the literature by expanding on the previous research to investigate the influence of a greater variety of ACEs experienced by documented serial homicide offenders. In addition, the reason for the inclusion of maladaptive fantasy in this dissertation is that early studies like Maniglio (2010) have found that these deviant fantasies were statistically more likely to be acted out in real life when certain ACEs were present in childhood. The inclusion aimed to expand on this and compare this to a greater scope of ACEs that were previously studied.

Summary and Conclusions

Despite its popularity in global media (Gulina et al., 2025; Saltzman, 2023), the field of serial homicide offender research lays woefully unexplored compared to other criminal offenders. While there are proposed risk factors that may facilitate the development of violent homicide behaviors (Bernard et al., 2022; Thulin et al., 2020; Ventresca & Henne, 2022), there is little understanding on how these interact and overlap when looking at different serial homicide offenders. While early comparisons between

the intersection of physical, sexual, and emotional abuse have shown promising results (Marono et al., 2020), the inclusion of a more nuanced set of criteria would lend a greater understanding to the formation and implementation of these behaviors. By extending the ACEs compared to the behaviors, this allows for a more accurate view of the possible development of serial killer behaviors.

On top of abuse, other adverse childhood events should also be considered such as neglect (Briggs et al., 2021), bullying (Esposito et al., 2024; Y. Zhang et al., 2023), violence against animals (Girotra, 2021), or head trauma (Ventresca & Henne, 2022) to name a few. Understanding the interactions of these ACEs allows for the improved profile for the development of violent behavior which would be ideal for earlier spotting of possible problematic or dangerous behavior before it escalates. Insight into this social issue could lend better comprehension for law enforcement officials, psychology professionals, social workers, school counselors, and other adjacent workers to understand the risk factors that may interact to cause the greatest concern for the development of serial homicide offender actions later in life before the actual crimes and killing occurs.

When considering the bigger picture like the nature of the development of violent serial homicide offender behavior, the right framework for study is crucial. Without a proper foundation to stand upon, no scientific study has merit or worth in any field. It is important that the study be replicable and valid in its constructs. In the next chapter, the methodology of this study and how it aimed to receive these answers is laid out, as well in detail how all the data was collected, processed, and analyzed. Plans for population,

sampling, data collection, operationalization of constructs, frequency matrixes, and more are covered. The chapter ends with a discussion on threats to validity and how ethical procedure will be followed moving forward.

Chapter 3: Research Method

In this chapter, I discuss the methodological choices I made in conducting the current study. The purpose of this study was to look at the impacts of ACEs on serial homicide offender behavior which this chapter explains and supports the methodology choices made to accomplish this purpose. I utilized BSA to identify possible associations between the ACEs an offender has and the actions that they take in relation to their crimes. After explaining the population and sample selection, the chapter breaks down the reasoning behind the selection of BSA and the practical application of such to this topic. Issues of validity, bias, instrumentation, and operationalization are explained. Lastly, this chapter ends with an in-depth data analysis plan for completing the data collection and statistical analysis.

Research Design and Rationale

The independent variable for this study was the ACEs measured, while the dependent variable in the situation was the serial homicide offender behaviors enacted before, during, and after the murders. The research design for this dissertation was chosen carefully according to time and researcher constraints, utilizing lag-one BSA that is less labor intensive than other forms of BSA and is, in general, less labor intensive than other forms of statistical analysis. Due to this choice, and other choices like limiting the number of ACEs measured, a singular researcher could reasonably handle the task alone. Additionally, lag-one BSA looks at the interactions of pairs of behaviors over time and how the antecedent behavior may be significantly connected to the following behaviors (Keatley, 2018), which makes it the perfect choice for this study. It is also able to look

across long periods of time without the need for extensive participant communication or tracking, again making it easier for a singular researcher to manage. Finally, this type of research methodology in this matter of study is established in the field with this dissertation building off a previous study of the same execution (Marono et al., 2020). BSA, in general, is also utilized in this field and has found footholds in study like paraphilia (Arrigo & Purcell, 2001), spree murders (Pollock, 1995), and victim characteristics (Ardnt et al., 2004).

Methodology

Population

The target population for this study included male serial killers from the United States to reduce possible confounding variables influenced by a change in the culture and general societal structure the offender was raised under (Pilson, 2011). Male serial killers have been shown to have longer homicide careers than women and appear with much more frequency (Campedelli & D'Orsogna, 2024). The ages between 18 and 70 were included to try to get a range of different offenders as individuals have been shown to exhibit different behaviors depending on the age they start murdering (Campedelli & D'Orsogna, 2024). Each individual chosen must fulfill the definition of "serial killer" set out by this study, which was evaluated using Sutton and Keatley's (2021) definition of a perpetrator who has committed three or more murders in separate events with a cooling off period (a period of returning to normal life in between incidents) between them. All the participants were selected from archival data within the Radford/FGCU Serial Killer Database (Aamodt, 2016), and the study included no live participants. The ideal

estimated population size would look at 150 perpetrators, which should be manageable given the wide selection criteria and the breadth of the database itself. This number was chosen as the sample size with the hope of including enough participants to garner more generalizability in the results, but not too large as to overwhelm a single researcher and using G*Power calculations.

Sampling and Sampling Procedures

The sampling strategy was based on the quota version of non-probability sampling where the participants are included or excluded based on a pre-set criterion (Piedmont, 2024). Because this study was looking at a specific set of killers, any participants not fitting the criteria like individuals who are not United States based, within the age range, and having committed mass or spree killers will be excluded from the study. As this dissertation aimed to include as large a population as possible in this very limited niche of research study, participants fitting the criteria who were randomly selected were included in the study. Normally, the range of public information available would play an important role in participant selection when it comes to serial homicide offenders. Fortunately, the Radford/FGCU Database (Aamodt, 2016) already has done the heavy work of verifying information, triangulating sources, and ensuring credibility of provided life information so most of this has already been completed for the researcher.

Sample size corresponds to the power of a study, which is a measure of how well the test measures what it aims to, and the average study power a researcher is looking for is at least 80% (Piedmont, 2024). This ensures that the study has a higher chance of

measuring what the researcher is attempting to and yielding significant results (Kowialiewski, 2024). The power of a study tells how accurately the study may predict an outcome and how much the results should be trusted (Kowialiewski, 2024), so it was considered carefully when choosing the sample size in this dissertation. The effect size, or the strength of the phenomenon, was also considered, and a medium effect size was chosen. The program G*Power was utilized, using the chosen power level for this study (80%), a standard alpha level of 0.05, and an effect size of 0.3, this yielded the sample size of 143. Because of this, the sample size of 150 was chosen to give the best chance of finding statistically significant results.

Procedures for Recruitment, Participation, and Data Collection

Recruiting participants for this study was relatively simple as all individuals were selected from historical archived documentation. This eliminated the need for creating a recruitment strategy as well as methods for ensuring participation. Data collection was completed by the researcher using the Radford/FGCU Serial Killer Database which contains verified crime details and general backgrounds on 5,752 serial homicide offenders (Aamodt, 2019; Leary et al., 2021). This database was accessed with permission from the original researchers of the database themselves through electronic communication. This wide range of available subjects allowed for the randomized selection of participants from the population of those who fall under the select criteria for inclusion. This database is accessible for researchers who reach out to the original researcher of the source, who still handles the data set (Aamodt, 2016). Once the researcher approves the dissertation topic and filled out the requisite permission forms for

access, the data set was sent over. There was a choice given between access to the older data set the previous study used or access to the newest most updated sources. The choice to use a more updated data set was an encouragement towards a larger population as the database had grown by several thousand participants since the previous study (Marono et al., 2020). The sources of data provided in this database are reliable as they have already undergone intensive research, scrutiny, and triangulation before their inclusion in the list (Aamodt, 2016). This allows outside researchers to be able to utilize the information out of the database without having to do additional research and verification themselves, saving time, energy, and resources.

Instrumentation and Operationalization of Constructs

The dependent variable in this study was the crime-related behaviors enacted by serial homicide offenders and is defined as the behaviors committed in adult life that directly pertain to a serial homicide offense. This excluded outside influences like marital status or sexual orientation. The behaviors were measured on a nominal basis marked for their presence or absence. The behaviors being measured were limited because of the limit of the available researchers for this project. The criteria for this were gathered from the basis study for this work (Marono et al., 2020) with some small additions. There are three main subsets of behavior that will be measured in relation to the crimes before (or motive), during, and after the crime occurred. The first category looked for the presence of stalking, as well as the motivations of the action itself. The four motives this study looked at were rape/lust, power, anger, and financial gain. The rape offender is driven by lust, which is a killing done for the purpose of sexual assault, partial sexual assault, or

enacting simulated intercourse because of impotence like insertion of a foreign object (Douglas et al., 1992; Marono et al., 2020). Power driven killers enact their crimes to exert control over victims while anger-based offenders act on their emotions, whether they are real or imagined (Hickey, 2017). Lastly, financial gain killers do so to gain material goods, money, or other forms of perceived success (Reid et al., 2019).

The behaviors during the crime were also coded for and include evidence of overkill, mutilated victims, sexual assault, binding the victim/kidnapping, torture, and carrying out quickly (crime of opportunity). After the crime, the following criteria were studied, leaving the body at the scene, moving the body and hiding it, moving the body and displaying it, and dismemberment. Each of these criteria were measured for their presence and then scored accordingly (0 for absence, 1 for presence). The data once gathered was inputted into the statistical program R to create the necessary tabulation and further analysis.

As far as the independent variable, this was also scored on a nominal basis (0 for absence, 1 for presence) and looked at the inclusion of ACEs in the offender's life. These ACEs were defined as preventable but potentially traumatic events that occur to someone under the age of 18 (Swedo, 2023). For the sake of re-testing the initial research, the original criteria of physical abuse, sexual abuse, and psychological abuse were included to start (Marono et al., 2020), though it was not included the combined categories of these from the original study like physical and sexual abuse, sexual and emotional abuse, or all three experienced at once. This study does not specify the reliability or validity values in

their published work. The additional criteria added were violence towards animals, neglect, head trauma, substance abuse, issues during childbirth, and maladaptive fantasy.

Data Analysis Plan

The RQ addressed whether there is an association between a serial homicide offender's action and their experience of ACEs. The null hypothesis states that there is no association, where the hypothesis states an association between the variables. The data was first coded utilizing a code established by the researcher. This code considered a wide variety of identified risk factors for possible serial homicide behaviors and coded for their presence in the participant's life or absence. The first three variables to be coded for were chosen based on their inclusion in the original base study this dissertation looked to expand upon and include physical abuse, psychological abuse, and sexual abuse (Marono et al., 2020). The next coding criteria to be added were inspired by work in the field by Droomer (2020) and adds abandonment, neglect, death of a parent, and head trauma to the list.

Several sources have identified violence towards animals as another risk factor which has spurred its inclusion to this list (DeMello, 2021; Girotra, 2021; Zuniga, 2021). Substance abuse (Slocum et al., 2022) and prenatal and perinatal issues (Kandel & Mednick, 1991; Oskarsson et al., 2022) were also identified as possible significant risk factors. To round out the list, maladaptive fantasy was also included for its presence in numerous studies surrounding the field (Chan & Beauregard, 2016; Hickey, 2017; Reid et al., 2019). All the chosen participants had their life histories coded based on the presence or absence of these ACEs. After the ACEs are coded, the researcher then coded for

relevant behaviors later in life. These behaviors were identified in a cohesive list but will include sex crimes, forms of murder, disposal of the body (Keatley et al., 2021), as stated in the operationalization section.

As BSA looks at the transition of behaviors over time (A → B → C), coding for the resultant behaviors allowed for the ability to place the events on a timeline. After this step was complete, this data was run through multiple binary logistic regression where each ACE was a predictor for one dichotomous behavior (example, each ACE compared to the torture of victim). These results were placed into a transition frequency matrix to analyze how often a behavior followed a preceding event (like the ACEs coded). Once the matrix was complete, then statistical analysis of the data could begin (Keatley, 2018). A chi-square test was then used for each box in the matrix to measure if its chances of occurring were higher than the probability that it occurred by chance (Keatley et al., 2021). These values allowed the researcher to identify what ACEs had the most impactful (if any) effect on the resulting serial homicide-related behaviors.

The software used for the analysis was SPSS, whose license is provided by Walden University as part of enrollment. This software was utilized for the transition matrix and chi-square statistical testing. The coding done prior to analysis will be done using a coding software program like NVIVO for easy data gathering and summarization of results. Once completed, the results were interpreted using key parameter estimates to apply the measured data from the sample to the greater population. This was performed using a confidence interval of 95%. This value was chosen by the researcher as it is the

widely accepted value for psychological statistical analysis of this nature (Keatley et al., 2021).

Threats to Validity

When considering the possible threats to validity, this structure of this dissertation aimed to eliminate as many of these as possible. Because of the use of archived data and not active participants, there are certain aspects of external validity that will not apply like testing reactivity (as no participants are being tested), interaction effects of the experimental variables (as a specific experiment is not being conducted), or reactive effects of experimental arrangements (as the participants are historical). Multiple treatment interference does also not apply as the participants will not be put under testing. This eliminated most external validity concerns for this dissertation.

As far as internal validity goes, there are also several criteria that are not applicable in this study's design. History was not applicable as all the sources are archived, and no new behaviors are occurring. This also eliminated the possible effects of maturation (all participants are historical), testing (no participants are being tested), or experimental mortality (participants will not have an option to leave or drop the study). Instrumentation was not changed over the course of the study, which removed the chance that a newly developed instrument may cause skews in readings and data collection. Because the selection of the samples was randomized within the population, this eliminated any possibility of interference from statistical regression (choosing the outliers based on extreme scores) or selection-maturation interaction (as maturation is not a factor). The John Henry effect was not in place as there is no competition or technology

involved experimentally. Lastly, the selection of randomized participants should have eliminated most risk of selection bias. The Simpson paradox, which is the appearance of a trend that then disappears when combined with other data, cannot be ruled out completely as the killers will not be broken down in subsections of the population and will likely need future study to rule out as this is a relatively introductory foray into the field.

Construct validity is the degree to which a study measures the variables that it is aiming to study (Piedmont, 2024). Because some of the constructs that are being measured in this study are more abstract (like the concept of neglect), each of these was translated into a concrete operational definition to allow for ease of inclusion or exclusion from coding. This is addressed further in the *Operationalization* section of this dissertation. The statistical conclusion validity has also been considered when organizing this study. The power level was calculated before beginning to avoid the interference of low statistical power and was verified by the Walden Methodology Center before being utilized to try and reduce issues with an incorrect effect size calculation.

The Walden Methodology Center was consulted frequently during all steps of statistical analysis for guidance and any course correction needed while conducting the coding and analysis. Assistance with the initial structure of the study itself when trying to expand on existing research was also sought out through the center. Once ran, the analysis was not repeated to look for another outcome, even if the gathered results did not match the original hypothesis. The strict operationalization of definitions helped bolster against effects from unreliability of measures and helped to avoid any ambiguity or

confusion while reading the dissertation. The nature of the study itself eliminated any issues with unreliability of treatment, variance in the experimental setting, or restriction of range.

Ethical Procedures

I used historically archived and publicly available data for this study. There are no confidentiality issues with any of the data being used or analyzed in this study. This study does not utilize live participants, so the approval, recruitment, and handling of participants was not applicable. There was no chance that the participants involved would want to rescind their participation, and this study was not published with names or identifying information on specific cases that could possibly harm the families of the perpetrator or the victims. The data was already confidential and anonymous upon arrival, and the names and specific identifying information would not be necessary to include in the study regardless. Each participant was then also assigned an arbitrary number as they were randomly selected, which was then utilized throughout the rest of the research, further anonymizing the participants.

As far as personal implications are concerned, the author has done their due diligence to avoid any ethical issues that could arise on their end. This included choosing a study population which was not connected to their own work environment and in which they have no conflicts of interest. There were no other researchers to be influenced by or to have results swayed by or to possess conflicts of interest. The author also had no incentive of any sort for completing the study or achieving a certain result at its

conclusion or in a certain time frame. As far as the researcher could identify, there seem to be no obvious ethical concerns about proceeding with this dissertation.

Summary

I used BSA to study the potential association between ACEs and the crime-related actions of serial homicide offenders. This study utilized the Radford/FGCU Serial Killer Database which contains over a hundred variables for each participant and whose data has already been triangulated and confirmed valid (Leary et al., 2021). This database is also extensive, allowing for a large population to draw from.

The data to be collected was gathered through documentation of this database, and each participant had their lives coded for both ACEs and the presence of the identified serial homicide behaviors (Marono et al., 2020). Because of the currently unknown contents of this database at the time of writing and how many details they contain, the plan was to code for each criterion with a simple present or not present. Once this data was collected, the data would then be put into a transition frequency matrix, and each square would be run through chi-square analysis to find the standardized residual (Keatley, 2018). Once these standardized residuals were found, the state transitional diagram could be formed for easy identification of significant transitions (Keatley et al., 2021).

These significant transitions illustrate an interaction between pairs of behaviors that is occurring at a higher rate than expected. The findings of these significant transitions can give researchers either support on previous theories or new directions to pursue that may have not been considered previously (Keatley, 2018). Psychology

professionals, social work professionals, law enforcement professionals, and more all stand to benefit from an extension of the field and higher understanding of risk factors for potential serial killer behaviors. As Chan and Heide (2009) state, the vast majority of serial killers will not stop unless they are physically stopped, so understanding the origins of these behaviors is crucial to not only stopping killers but addressing the prevention of their development.

This study adopted this research methodology also in part to eliminate many possible ethical issues. Because of the use of historical archival data, this eliminated the need for many ethical concerns that may have arisen when working with active live participants and experimentation. The lack of intervening variables in this research method rids the need for ethical concerns about experimental validity issues, participant maturation, or need for further interventions down the road. The next chapter details the process of data collection, the ins and outs of coding and statistically analyzing the data, as well as the reported results from this study.

Chapter 4: Results

The purpose of this study was to study the ACEs in the lives of male serial killers to look at possible implications of these events on later adult serial murder behaviors. This was done by coding for identified behaviors between the selected ACEs and chosen serial homicide offender behaviors. After this was completed, the study measured the frequencies at which these behaviors happened in that order and placed them in a transition frequency matrix. To understand their significance, chi-square analysis was conducted on the resulting transition frequency matrix to see which events had the strongest correlations as shown by the resulting standardized residuals. It is also important to remember when reading BSA results that the standardized residuals are calculated differently. While in a traditional statistical analysis, a standardized residual over ± 3 is considered an outlier, this is not the case in BSA where reported standardized residuals are frequently around or above that number (Keatley, 2018).

The specific RQ being measured was what was the association between ACEs and their impact on the crime-related behaviors of serial murder offenders? The null hypothesis stated that there was no association between ACEs and later serial homicide offender behaviors while the hypothesis posited that there would be a correlation found between ACEs and serial homicide offender observed behaviors. This chapter begins by covering the previous study that this dissertation expands upon and reporting in detail their results and conclusions. It then covers the processes of data collection, analysis, and results. Rounding off the chapter, these results are compared to the reported results of the Marono et al. (2020) study that this dissertation was expanding upon.

Previous Study

In their previous study, Marono et al. (2020) took 233 serial homicide offenders and coded their ACEs, serial homicide-related behaviors, and body disposal methods before running them through BSA. The researchers only included three ACEs to code which were psychological abuse, sexual abuse, and physical abuse (Marono et al., 2020). All the data was collected from the Radford/FGCU database (Aamodt, 2016; Leary et al., 2021). The team first broke down their participants into the typology of the killer before specifying which adverse childhood events they experienced and which serial homicide actions they took (Marono et al., 2020).

After coding the behaviors, Marono et al. (2020) placed the frequencies into a matrix and performed multiple binary logistic regression. They organized the resultant values into a transition frequency matrix. The statistical frequency at which these coded behaviors appeared was then statistically analyzed with chi-square analysis resulting in a table of standardized residuals. Table 1 is a transition frequency matrix table with the reported standardized residuals.

Table 1.

Standardized Residuals of Adverse Childhood Experiences and Serial Homicide Offender Behavior (Marono et al., 2020)

Behavior		Standardized residual
Antecedent*	Sequitur	
Torture	Binding	9.39
Binding	Mutilation	8.63
Mutilation	Cannibalism	8.0-8.99
Mutilation	Binding	5.0-7.99
Sexual assault	Binding	7.11
Overkill	Mutilation	6.84

Torture	Overkill	6.25
Mutilation	Dismember	5.0-5.99
Physical abuse	Quick kill	5.75
Overkill	Necrophilia	4.0-5.99
Physical abuse	Binding	4.64
Quick kill	Binding	4.0-4.99
Overkill	Left hidden	3.0-3.99
Quick kill	Left open	3.0-3.99
Quick kill	Overkill	3.0-3.99
Mutilation	Moved and hid	3.0-3.99
Overkill	Left open	3.0-3.99
Overkill	Moved and hid	2.0-2.99
Sexual assault	Quick kill	2.63

Note. This table displays data reported in Marono et al. (2020) compiled by the author.

Frequencies were not given within the study.

**General Note.* An antecedent behavior is a behavior that occurs first in a timeline, while the sequitur behavior is the behavior that follows the antecedent.

For physical abuse, Marono et al. (2020) found strong associations to the rape/lust typology (SR = 4.80) and the anger typology (SR = 2.77). Those in the rape/lust category were found to have a higher chance of carrying out a crime of opportunity like a quick kill (SR = 5.75) and were also more likely to bind their victims before their murder (SR = 4.64; Marono et al., 2020). The researchers reported that physical abuse was also related to committing overkill during their crimes, but the standardized residual was not reported.

For psychological abuse, the researchers of the previous study found a high correlation between this and the rape/lust typology (SR = 6.50) and the financial gain typology (SR = 4.60; Marono et al., 2020). Murders that were related to rape/lust were more likely to take their time (SR = 3.63), rather than committing a quick kill. Overkill

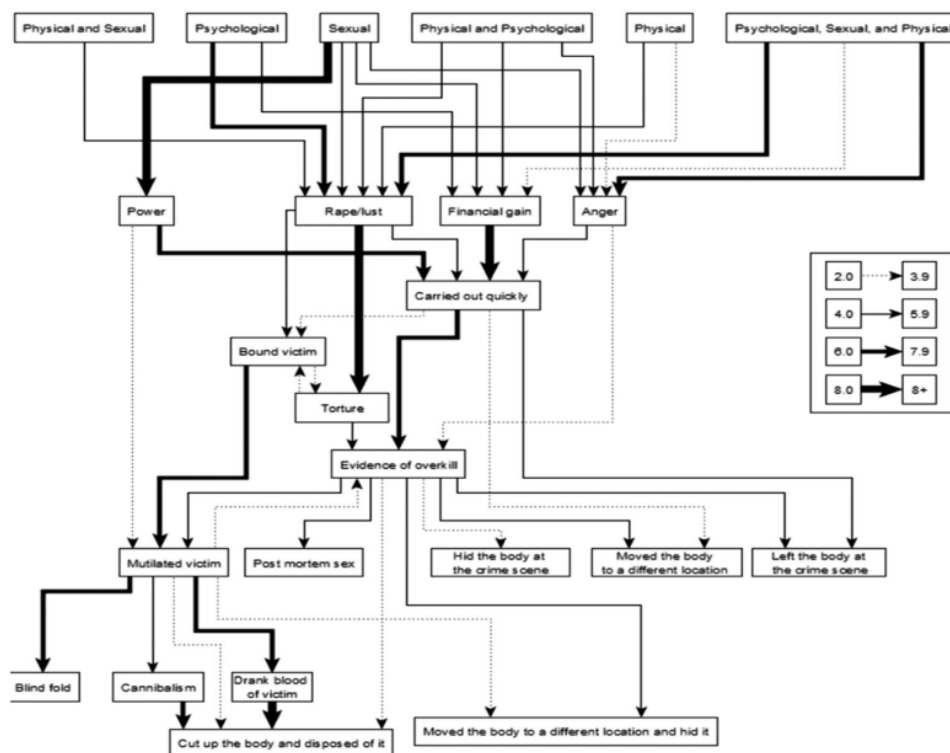
was noted to be related strongly to torture (SR = 6.25) and mutilation of the body (SR = 6.84).

For sexual abuse, there were numerous strong associations. There was a strong relation to rape/lust murder, murder of anger, murder of power, and financial gain related serial murderers (Marono et al., 2020). Rape/lust was more often related to torture (SR = 5.92) and overkill (SR = 4.27). There were strong correlations found by the researchers between torturing the victim and binding them (SR = 9.39), as well as binding and mutilation of the victim (SR = 8.63; Marono et al., 2020). Lastly, the rape/lust motivation was correlated to binding the victim (SR = 7.11). For a more visual description of these connections, see Figure 1.

The division of participants into the typology of killer was not included in this dissertation due to the lack of information provided on how the typologies were decided (Marono et al., 2020) and the lack of identifying data in the database on the participants to be able to split them into typologies individually. Because the initial researchers were involved in the creation of the database, they had access to more lifestyle and crime scene data than was present just in the anonymized database. There is no way for an outsider to know exactly how the creators of the database chose to categorize events, exactly what their specific inclusion criteria is for each variable listed, or what their sources of data were exactly. The anonymized nature of the database does not allow the researcher to add additional information or measurements to the original participants. Due to the inability to be able to ensure this information is accurate given the methodology of this dissertation, this variable was unfortunately unable to be considered in this study.

Figure 1.

Transition of Adverse Childhood Experiences to Serial Homicide Behavior (Marono et al., 2020)



Note. From “A Behaviour Sequence Analysis of Serial Killers’ Lives: From Childhood Abuse to Methods of Murder,” by A. J. Marono, S. Reid, E. Yaksic, and D. A. Keatley, 2020, *Psychiatry, Psychology, and Law*, 27(1), p. 131

(<https://doi.org/10.1080/13218719.2019.1695517>). Copyright 2020 by the Australian and New Zealand Association of Psychiatry, Psychology, and Law, reprinted by permission of Informa UK Limited, trading as Taylor & Francis Group, <https://www.tandfonline.com>

Because BSA looks at the interactions of pairs of behaviors, the structure of their study looked at how their three chosen ACEs impacted the typology of the killer (Marono et al., 2020). It then looked at how the typology of a serial homicide offender impacts serial homicide offender crime-related behaviors (Marono et al., 2020). This dissertation aimed to study the direct influence ACEs may have on serial killer crime-related behaviors, rather than the effects on what typology of killer they fall under, so this was another reason to eliminate the typology category and an important consideration for results.

Data Collection

Before data collection was started, a variety of variables for study were proposed as the exact content of the Radford/FGCU database (Aamodt, 2016; Aamodt & Surrette, 2010) were unknown at the time. Upon receiving access to the database, some variables had to be omitted for either lack of presence in the database or lack of information present for the vast majority of participants in the database. Not all participants had all 143 variables filled in, which was not known prior to starting the analysis process. These variables included neglect, substance abuse, typology, prenatal and perinatal issues, and maladaptive fantasy. The final independent variables that made it into the final coding platform were sexual abuse, physical abuse, psychological abuse, bullying, violence against animals, and head trauma. The behaviors that were coded for in the original study (Marono et al., 2020) were all included, so the final list became sexual assault, binding, stalking, torture, overkill, quick kill (or crime of opportunity), and mutilation. The body disposal methods stayed the same as the previous study (Marono et al., 2020) as well

with bodies left openly at the crime scene, bodies left hidden at the crime scene, bodies that were moved locations and then hidden, and those that were dismembered.

The time frame for the data collection ended up taking several weeks. There were no active participants to poll, interview, or observe, but there were over 5,000 participants within the database pool to sift through. The database was already anonymized, so there was no need to randomize or anonymize participants again. To maintain random selection though, a random number generator was used to choose participants which were then either included or excluded depending on if they fulfilled the criteria. The sample was declared finished when 100 random numbers were chosen with no new participants added to the sample. This left the sample at 364 participants who fulfilled inclusion criteria. The inclusion criteria were 18 years old to 70 years old, male, fulfills the definition of serial killer with at least three victims killed in separate occasions (Vincent et al., 2022) and who had present data for all the chosen variables. The sample was randomly sampled from a population with matching demographics like a similarity in gender, life directions (serial killer), et cetera. The representativeness of the population was put to the test when the chi-square tests were run as these compare the observed transitions to the expected frequencies (Keatley et al., 2021).

Treatment and Intervention Fidelity

There was no treatment administered to participants or any interventions applied to a sample over the course of this dissertation. Because of this, there were no unexpected challenges or adverse events associated with the application of an intervention or treatment. The only issue that arose while processing the population into a sample was

the sheer number of possible participants. When beginning, the perception of the data set was that each participant would have all 143 characteristics filled out, but that only applied to a small majority. There were many participants within the population that did not have enough recorded data to be useful to this study which resulted in their exclusion from the study.

Results

For the original power calculations, I used G*Power with a power level of 80%, a field alpha level of 0.05, and an effect size of 0.3 yielding a sample size of 143. After reaching 150 participants rather easily, I decided to instead include as many in the sample as was possible with the inclusion criteria to try to accurately represent the population, which led to an actual sample size of 364. In addition, a confidence level of 95% was used for all testing. In BSA, the sample is coded in accordance with the order of events as they occur, illustrating the frequency of transitions between coded behaviors. These transitions are placed within a transition frequency matrix which demonstrates the numerical occurrence of the transition.

Because these tables become extremely large quickly because of the volume of variables and behaviors that were studied, they are often represented in a more compact format called a transition frequency matrix table which lays out the antecedent and sequitur behaviors and their frequency of occurrence in the sample for clarity of understanding and ease of publishing. After creating the original transition frequency matrix, this simplified matrix table was created, highlighting the significant transitions between measured variables. Each transition in the transition frequency matrix was also

ran through chi-square analysis, and the standardized residuals of the transitions are also included in this transitional matrix frequency table (see Table 2).

Table 2.

Standardized Residuals and Frequencies of Adverse Childhood Experiences and Serial Homicide Offender Behavior

Behavior		Standardized residual	<i>f</i>
Antecedent*	Sequitur		
Sexual assault	Torture	15.49	82
Torture	Stalking	14.16	81
Stalking	Overkill	12.17	71
Sexual assault	Stalking	10.15	75
Animal violence	Sexual assault	8.89	50
Bullying	Sexual assault	8.3	52
Head injury	Animal violence	7.24	39
Stalking	Quick kill	7.16	50
Moved and hid	Left open	7.12	43
Left open	Left hidden	6.99	34
Binding	Mutilation	6.83	37
Quick kill	Binding	6.58	37
Head injury	Sexual assault	5.92	39
Stalking	Binding	5.52	45
Bullying	Animal violence	5.24	31
Stalking	Left open	4.72	60
Binding	Moved and hid	4.31	27
Overkill	Binding	4.07	25
Mutilation	Moved and hid	3.63	21
Left hidden	Dismember	3.61	17
Bullying	Left open	3.17	5
Moved and hid	Dismember	2.74	15
Quick kill	Mutilation	2.28	16
Left open	Dismember	2.06	11
Posed	Left hidden	2.05	1
Quick kill	Left open	2.03	26
Sexual abuse	Sexual assault	1.28	8
Psychological	Head injury	1.26	6
Physical abuse	Sexual assault	1.16	9
Head injury	Torture	-2.12	3
Animal violence	Left open	-2.43	2
Sexual assault	Moved and hid	-2.63	1
Sexual assault	Binding	-2.69	1
Head injury	Left open	-2.96	3
Sexual assault	Left open	-4.26	6

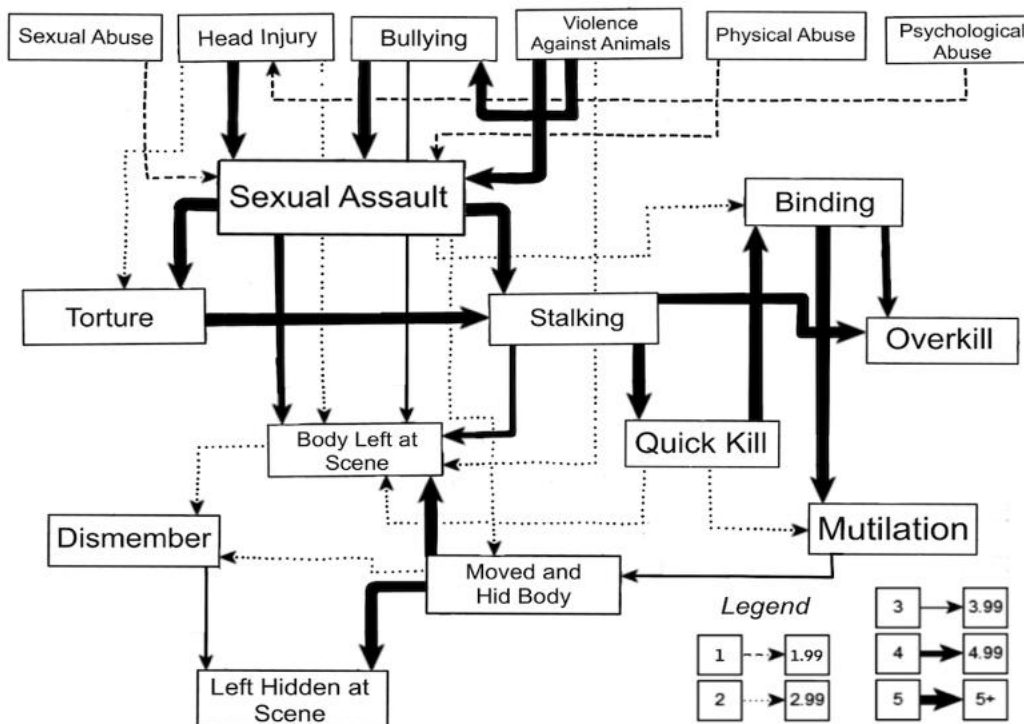
**General Note.* An antecedent behavior is the first behavior to occur on the timeline, while the sequitur behavior is what follows the antecedent.

In Table 2, the antecedent (preceding) and sequitur (resulting) behaviors are listed next to their observed frequencies and standardized residuals. The standardized residuals are the measurement of the difference between the reported data and expected data. The higher the standardized residual in BSA is, the stronger the association between the two variables is implied (Keatley, 2018). With some of the strongest correlations, sexual assault and torture (SR = 15.47), as well as sexual assault and stalking (SR = 10.15) top the list. These were far from the only variables with significant results. In addition, torture and stalking (SR = 14.16) and stalking and overkill (SR = 12.17) were very highly associated.

Sexual assault was also found to frequently follow offenders who experienced or expressed violence against animals in their childhood (SR = 8.88) as well as bullying within their school years (SR = 8.296). Per the results of the chi-square statistical analysis, serial homicide offender behaviors were not the only ones to interact. Interactions between the appearance of multiple ACEs find themselves at the height of the list like head injury preceding violence against animals later on (SR = 7.24) or bullying in school preceding violence against animals (SR = 5.24). At the top of the largest negative correlations were sexual assault and body left at scene (SR = -4.26) and head injury with body left at scene (SR = -2.96). For ease of understanding, Figure 2 illustrates more clearly the interactions between the variables.

Figure 2.

Transition From Adverse Childhood Experiences to Serial Homicide Offender Behavior



Results of Early Abuse

In the chosen ACEs variables, physical abuse was only strongly related to one behavior, which was sexual assault (SR = 1.15). This was contrary to Marono et al. (2020) results which found physical abuse correlated to rape/lust murder (SR = 4.0-5.9) and anger typology (SR = 2.0-3.9). Psychological abuse was only significantly related to head injury (SR = 1.26). Marono et al. (2020) found psychological abuse correlated with rape/lust typology (SR = 6.0-7.9) and financial gain murder (SR = 4.0-5.9). Sexual abuse was correlated to sexual assault (SR = 1.28). Marono et al. (2020) found sexual childhood abuse related to rape/lust murder (SR = 4.0-5.9), financial gain typology (4.0-5.9), anger

typology (SR = 4.0-5.9), and very strongly to the power typology (SR = 8.0+). Figures 3 and 4 are flowcharts for the current study showing the transition from physical abuse and sexual abuse, respectively, to serial homicide offender behavior.

Figure 3.

Transition From Physical Abuse to Serial Homicide Offender Behavior

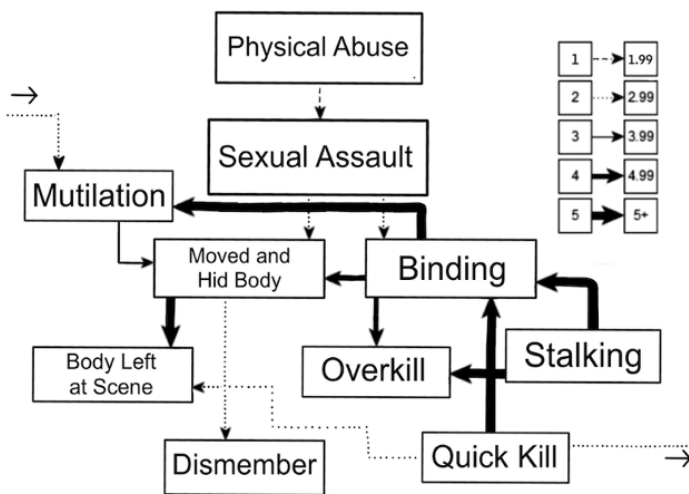
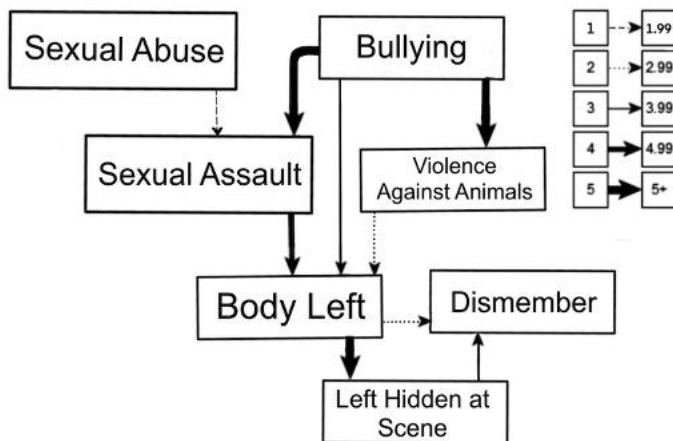


Figure 4.

Transition From Sexual Abuse to Serial Homicide Offender Behavior



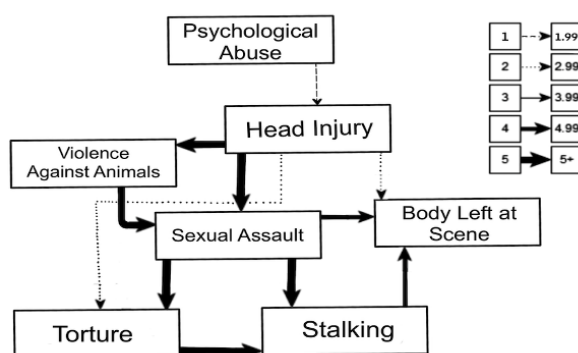
These results were somewhat unexpected, especially when considering the early widely accepted belief that early sexual abuse can lead to increased sexual violence in adulthood (Hilton & Mezey, 1996), this had a much lower significance and standardized residual than was expected. When diving into more up to date literature on the subject, modern researchers also struggle to support this claim (Maker et al., 2001), meaning that this is a possibly valuable area of study worth further inquiry. Having an understanding on the impacts of experiencing child sexual abuse to becoming a sexual assault perpetrator is crucial not only due to the nature of the crime but the magnitude with which child sexual abuse is perpetrated. The estimated average experience of childhood sexual abuse is around 11% of children studied (Piolanti et al., 2025), which left this area of focus standing out as something that would be worthwhile replicating. The previous study found a connection between childhood sexual abuse and the rape/lust typology (Marono et al., 2020), but it was not as strong as other correlations stemming from sexual abuse.

Bullying was found to be correlated to several behaviors like sexual assault (SR = 8.29), violence against animals (SR = 5.24), and body left open at scene (SR = 3.17). Violence against animals' enactors tended to be more likely to sexually assault their victims (SR = 8.89), but they were unlikely to leave a body openly displayed at their crime scenes (SR = -2.43). Head injury was also found to have several significant correlations such as violence against animals (SR = 7.24) and sexual assault (SR = 5.92). In addition, head injury sufferers were less likely to torture (SR = -2.12) or to leave the

body open at the scene (SR = -2.94). Psychological abuse was additionally found to be strongly correlated with head injury with a standardized residual of 1.26. Figure 5 is a flowchart showing the transition from psychological abuse to serial homicide offender behavior.

Figure 5.

Transition From Psychological Abuse to Serial Homicide Offender Behavior



When it comes to behaviors, there were many significant correlations discovered. Sexual assault was strongly related to torture (SR = 15.49), stalking (SR = 10.15), as well as inversely correlated to moving and hiding a body for disposal (SR = -2.63) and body being left open at the crime scene (SR = -4.26). Torture was found to be associated with stalking (SR = 14.16). Stalking itself was related to quite a few behaviors such as overkill (SR = 12.17), quick kill (SR = 7.16), binding (SR = 5.52), and the body being left openly displayed at the crime scene (SR = 4.72). Overkill was also associated with binding (SR = 4.07). Binding was shown to have a correlation to mutilation (SR = 6.83) and moving and hiding the body somewhere different than the crime scene (SR = 4.31). Mutilation was connected to moving and hiding the body as well (SR = 3.63). Lastly, quick kill was

found to have an association with binding (SR = 6.58), mutilation (SR = 2.28), and body left openly at scene (SR = 2.03).

When it comes to body disposal methods, these had extensive relations with each other as well. This seems to suggest that these serial homicide offenders are changing their methods of disposal over time. Understanding how a serial homicide offender may change their disposal methods could be key to predicting where a missing person may be located. This also opens the possibility that there could be additional accounted crimes committed by killers that were never identified because of a change in body disposal method. Being able to identify trends at which these disposal methods may evolve could be key to locating missing persons. Moving and hiding the body was correlated to also leaving the body open at the scene (SR = 7.12) and dismemberment (SR = 2.74). Leaving the body open at the scene was tied to leaving the body hidden at the crime scene (SR = 6.99) and dismemberment (SR = 2.06). Leaving the body hidden at the crime scene was associated with dismemberment (SR = 3.61). Posing the victim specifically was connected to also leaving the body hidden at the scene (SR = 2.05).

Post Hoc Analyses

Post hoc tests are used in research to further clarify where a statistically significant result may be coming from and to provide more detailed information about the source of the statistical change (Althouse, 2021). In recent years, the use of post hoc testing in psychological statistical analysis has been applied sporadically with some experiments requiring certain tests over others and many choosing to use none at all (Agbangba et al., 2024). In critical review, many authors were found to be using post hoc

tests that did not even apply to the data of their research, which was mostly concluded to be because of user lack of awareness (Agbangba et al., 2024). BSA does occasionally utilize post hoc tests depending on the application or the type of BSA used (Keatley, 2018). In the case of a BSA that is mapping data that is purely descriptive like a state transition diagram, the use of post hoc tests is not common (Keatley, 2018). This being established, post hoc statistical tests were not performed on this data because of its only intention to map state transition diagrams.

Summary and Conclusions

The RQ in this study concerned the nature of the association between ACEs and the crime-related behaviors of serial homicide offenders. I used BSA to be able to calculate the significance of each pair of behaviors' interactions (Keatley et al., 2021). This is a type of quantitative research method that studies the frequency at which certain behaviors occur together and the significance of such (Keatley, 2018). The original research was conducted using BSA but by studying only the interactions between psychological abuse, physical abuse, sexual abuse, and the serial killer behaviors (Marono et al., 2020). To expand comprehension of the topic, this dissertation takes that platform of study and adds on a more extensive list of ACEs as the full compiled list of ACEs is significantly longer.

There was a wide variety of variables proposed for the ACEs, but these were narrowed due to lack of availability of data (like neglect and prenatal issues) down to psychological abuse, physical abuse, sexual abuse, head injury, bullying, and violence against animals. These variables were recorded from the randomized sample of

participants, and each transition frequency was mapped in the transition frequency matrix (Keatley, 2018). Each box of the matrix is then run through chi-square analysis to find the standardized residual and the significance of that pair (Keatley et al., 2021). Once this was completed, the data analysis found that there were many transitions between behaviors that were statistically significant. Early life experiences like head injury, bullying in school, or different types of abuse appear to be connected to actions like sexual assault, torture, and stalking in later life crimes.

Correlations between head injury and violence against animals and actions like sexual assault and torture show that there is more to learn about the interactions and development of these behaviors. Looking at the research, quite a few of the interactions previously found to be significant were absent from the research, indicating a need for exploration. Some serial killer behaviors were correlated to each other in sometimes unexpected ways with interactions like the presence of sexual assault increasing the likelihood of torture to the presence of stalking behaviors being correlated strongly with overkill. ACEs seem to precede certain crime-related actions with a high frequency in both previously identified patterns and not yet addressed ones. While some of the results that were received were along expectations, there were several interactions that were not predicted or expected before the statistical analysis was conducted. This next chapter aimed to propose some possible explanations of the observed correlations that might be happening. After some discussion, the chapter transitions into next steps and how these results could be utilized to move forward the field of forensic psychology and serial homicide offender understanding.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to examine the impacts of ACE on the development of later life serial homicide offender behaviors to see which ACEs had the greatest impact. This was done by coding for the participant's early childhood traumatic experiences and then observed how often behaviors occur and in what order. Once the frequencies were recorded, chi-square analysis was completed on every square of the resulting matrix to see which behavior transitions were the most statistically significant. This method of statistical analysis is called lag-one BSA and aims to help explain connections between pairs of behaviors (Keatley, 2018). The nature of this study studied United States based male participants from ages 18 to 70 who fulfilled the established definition of serial killer (Vincent et al., 2022) as is laid out by this study, whose information was gathered from the Radford/FGCU Serial Killer Database (Aamodt, 2016; Aamodt & Surette, 2010; Leary et al., 2021).

This dissertation aimed to shed some light on the possible implications of early childhood trauma and adverse childhood experiences on the planning, hunting, murder, disposal, and other crime-related serial homicide offender actions that they exhibited later in adulthood. With better insight to warning signs early in life, the chances that a serial homicide offender could be stopped before starting their killing raise (Keatley et al., 2021). When confronted with the fact that most serial killers will not stop until they are forced to through the law or through death (Chan & Heide, 2009), this makes the early identification and proactive treatment of the trauma of ACEs crucial to stopping these behaviors before they begin.

There were quite a few behavior transition pairs that were found to be statistically significant. Violence against animals was found to precede sexual assault frequently (SR = 8.88). Bullying and head injury also made the top of the list as the antecedent behaviors to the sequiturs of sexual assault (SR = 8.29) and (SR = 5.29) respectively. Sexual abuse in childhood was found to be correlated to sexual assault but at a much lower significance and frequency than anticipated (SR = 1.26), where physical abuse was actually correlated with a lack of sexual assault (SR = -2.12).

There were several associations between differing crime-related behaviors that may be worth taking a deeper look at. Sexual assault had the highest correlation of all, occurring as the antecedent to torture at a record rate (SR = 15.49). Torture of victims in a crime often preceded further stalking (SR = 14.16), and binding of the victim frequently appeared before mutilation of the victim (SR = 6.83). A crime of opportunity occurred before mutilation often (SR = 2.1). Unexpectedly, stalking preceded overkill at a large rate with a standardized residual of 12.19.

Quite a few strong associations existed between certain crime scene behaviors and body disposal methods. Stalking, for example, was the precursor to several crime scene and body disposal methods like overkill (SR = 12.17), opportunity killing or quick kill (SR = 7.16), binding (SR = 5.52), and body left open at the crime scene (SR = 4.72). Body disposal methods also seemed to fluctuate with many different forms being used by an offender. For instance, moving and hiding the body was very strongly correlated to leaving the body open at the scene (SR = 7.12). Leaving the body hidden at the scene and

dismembering the victim as a form of concealment also occurred together frequently (SR = 3.61).

Interpretation of the Findings

When performing the literature review, head injury and its resulting physical trauma was originally studied way back in 1987 with Nachson and Denno, and further results have done nothing but back their claims that head trauma and injury have an impact on the development of violent behavior (Allely et al., 2020). The findings in this dissertation seem to also support the initial research. Head injury was correlated with violence against animals (SR = 7.24) and sexual assault (SR = 5.92). It was also reported to have an inverse association to torture (SR = -2.43), which implies that head trauma was less likely to be correlated with the act of torture. This could be a topic for future study as the implied association of increased aggression and enacting torture seems obvious but is not supported with the lack of correlation between extreme violent activity like torture or mutilation. With the newer study into the field finding that the current numbers of reported childhood head trauma could be under-reported, this issue has the potential to be much more pervasive than originally thought (Narang et al., 2020).

More recent study finds that 80% of the measured high profile serial killers have had significant head trauma (Nwako, 2025), while another reports that at least 60% of men within the prison population they measured had experienced significant head injury (Erhatic, 2024). New findings also purport that the timing of the head trauma may also have an impact on the resulting behaviors with early injury showing an interruption in social and emotional development in adolescence or older injury having more of an effect

on impulse control and judgement (Nwako, 2025). Emerging imaging study into traumatic brain injuries has found the development of sequelae in the brain tissue started with injury and persisted in growing even without further injury, triggering deficits in cognition and emotional regulation or more depending on location (Erhatic, 2024; Strube, 2025).

This new form of traumatic brain injury graphing not only measures the extent of the injury itself but also progression of the resulting damage, allowing for a better understanding of the areas a person might see deficits in and the extent of those (Strube, 2025). In a study of 239 serial homicide offenders, 44% of them were found to have experienced at least one traumatic brain injury, while a shocking 81% of that percentage had additionally experienced childhood trauma (Strube, 2025). This persists in being a worthwhile avenue to probe deeper into other ways violence can present after head injury outside of what has already been intensely recorded like its involvement with professional sports athletes (Martin & McMillan, 2022).

With the connection between head injury and violence becoming clearer all the time (Aamodt, 2016; Strube, 2025), the importance of correctly identifying children who have experienced head trauma, delivering to them proactive treatment, and the careful monitoring for possible behavioral or cognitive changes is emphasized here. While this dissertation's findings did not find significant associations to overly violent acts like torture or mutilation, the results do suggest that there may be other areas outside of domestic violence or physical abuse (Ventresca & Henne, 2022) that need to be pursued. As far as what direction this research should pursue, significant correlations were found

between head injury and sexual assault (SR = 8.29), head injury and violence against animals (SR = 7.24), and head injury and binding (SR = 6.58).

There were also several body disposal methods that would appear for a significant amount of serial homicide offenders with statistically significant transitions between methods like posing the victim's body and moving and hiding the body (SR = 2.05), which could suggest that the killers may be moving between differing methods of disposal. The researcher could find no existing research to confirm or deny this theory, so this seems to remain an unexplored topic of study. Current studies in the field of body disposal in serial homicide cases do suggest a few explanations for why a killer may choose a specific burial site. Ploeg et al. (2025) examined 326 homicide cases and found there were several factors about the killings that influenced how the offender(s) disposed of the body. Victim gender, substance abuse, cause of death and location of scene, and the necessity of disposal of evidence or not all played a significant role in how the body was disposed of (Ploeg et al., 2025).

Campedelli and Orsogna (2024) suggest that body disposal methods can also vary depending on when their crimes occurred as different decades have had varying levels of forensic technology which greatly influences their ability to identify offenders. This research also utilized the Radford/FGCU Serial Killer Database though with a wider range of inclusion with an older form of the database with 2,888 serial killers studied. Researchers like Gurian (2017) have found that solo male serial homicide offenders changed their body dumping locations and killing methods often, while married offenders were much more likely to stay close to home. Some studies suggest that body disposal

has more to do with geographic location and site availability with offenders choosing areas that were easy to access and limited the need for traveling far with the body (Marsden, 2025).

Delicato (2025) discovered that mutilation was a good indicator of childhood sexual abuse and diagnosed mental illness. This theory had been put out into the world originally by Ressler et al. (1986) but, as far as the research shows, was not pursued much further. This dissertation's results did not support this claim of childhood sexual abuse influencing body disposal methods, insinuating this area of study could be worth further analysis and a more rigorous approach. This dissertation did not consider any participants in regards to their mental illness diagnoses, so additional review of the effects of mental illness on body disposal should be replicated and confirmed.

Bullying was the predicator to several crime-related behaviors such as sexual assault (SR = 8.29) and dismemberment (SR = 3.17). Studies into bullying have suggested that bullying is a close to universal experience for serial homicide offenders (Toates & Coschug-Toates, 2022). Recent research into the inclusion of anti-aggression teaching at a young age within the school system can be an effective tool to lower the rate of bullying that occurs to children (Esposito et al., 2024). Reducing the occurrence of this ACE could have an impact on further general criminal behavior as well as it is well established that the higher the appearance of ACEs, the more likely the appearance of criminal behavior (Craig & Zetter, 2021; Spytka, 2025). Finding effective interventions for these ACEs is crucial when 50% of children are experiencing at least one adverse childhood event (Spytska, 2025), so recommended research into anti-bullying

interventions for school-age children and reviews and endorsements of current functioning programs could make a worthwhile impact onto the development of violence from the experience of ACEs.

As teenager-related violence numbers grow (Santioso, 2024), it is important to find counter-acting actions to offset this development. Some researchers suggest that bullying can cause intense resentment to form in the individual, which provides an open well to aggressive and temperamental outbursts later (Toates & Coschug-Toates, 2022). This is supported by the theoretical framework for this dissertation which is the trauma-control model created by Hickey (1997). This framework posits the rejection, humiliation, and ridicule directed from their peers can lead to escalating fantasies of gaining control in a world where they feel their life is out of their control (Hickey, 2017). These evolving fantasies eventually bubble over into escalating violent behaviors, culminating in serial homicide offender behaviors (Hickey, 2017). One study on the subject reported that around 73% of offenders measured were socially isolated (Toates & Coschug-Toates, 2022). With this lack of interaction, combined with ostracization and resentment building, this leaves the perfect avenue for the introduction of aggressive behavior (Hickey, 1997; Hickey, 2017). This is a concerning connection when so many offenders are exposed to these risk factors over the course of their lifetimes. This dissertation's results appear to partially support this as bullying was frequently tied to several serial homicide offender behaviors and crime scene actions like sexual assault (SR=8.3) and leaving the body at the scene (SR=3.17). It also appeared in tandem with other ACES measured for like violence against animals (SR=5.24).

Violence against animals was an ACE that also appeared as a predecessor to a few serial killer crime behaviors like sexual assault (SR = 8.88) and stalking (SR = 1.79). It only correlated to one body disposal method, which was the body not being left at the scene (SR = -2.12). Bullying was also strongly tied to violence against animals (SR = 5.92), suggesting that these ACEs may often arise together. Head injury was also correlated with violence against animals (SR = 7.24), which also increases twofold the possible potential for violent behavior to develop (Allely et al., 2020). While most of the MacDonald triad has been disproven (Leary et al., 2017), violence against animals does appear to be a topic worth putting more scientific effort towards. In a study done by Holoyda (2024), 254 male sex offenders were found to have significant histories of violence against animals, where another found out of 206 offenders, animal abusers were the most likely to commit crimes of aggression (Hensley et al., 2009). This dissertation's statistical results additionally support these findings and the need for better intervention concerning childhood behaviors like violence against animals. Early intervention for behaviors like this may help deride possible criminal action in the future.

Stalking emerged as a significant predictor of many serial homicide offender criminal behaviors like overkill (SR = 12.17), quick kill or a kill of opportunity (SR=7.16), and binding of the victim (SR = 5.52). Recent study has found that 25 to 40% of English-speaking individuals will experience stalking in their lifetime (Mullen, 2024). Stalking has not been tied to any certain mental disorder, but rates of stalking offenders have escalated in recent years (Mullen, 2024). With rising numbers, and a clear impact on

serial homicide behaviors, identifying stalking individuals and prevention of such seems to need more focus directed its way.

There were a few results that the researcher did not predict and ones that seem to contradict popular opinions in the field. For example, sexual abuse is something that has been studied for decades with a scientifically established foundation that the exposure to sexual abuse as a child is correlated with sexual abuse of others in the future (Clearly & Luxenberg, 1992; Greene et al., 2020). Some studies even found that 56% of offenders studied had never had consensual sex before and that these individuals were more likely to score higher on psychopathy measures (Toates & Coschug-Toates, 2022). Sexual assault during serial homicide offender's crimes and sexual abuse had a very small correlation with a standardized residual of 1.26 in this study however. The previous study (Marono et al., 2020) did find a more significant connection between the two with a SR of between 4.00 to 5.99 (exact number unreported). Even compared to their other findings, this was a relatively insignificant correlation compared to the many behavior transition pairs that had much higher standardized residuals (Marono et al., 2020). The previous study utilized a smaller sample than the current study, which may have influenced this result, but this was an identified area for potential re-study with such unexpected figures.

Limitations of the Study

There were a few limitations impacting this dissertation. Firstly, the data collection, coding, and analysis were all conducted by one researcher leaving the chance for bias or mistakes to possibly occur at a higher rate than one with a full team of

researchers. While the researcher checked over every number and code several times, this may not be as helpful as having a third party to assist with such. Looking at a higher number of variables always leaves a larger chance for mistakes or interference as the volume of data collected is greatly increased in size. The population of this study was contained to male serial homicide offenders, which does mean that this dissertation's results are not applicable to women, the general population of the United States, or the average person. While there was a large participant pool from the Radford/FGCU Serial Killer Database (Aamodt, 2016), there was limited participants who had enough data on the variables chosen to measure. Because the database spans an extensive period of time, there are many conditions and experiences that were not recorded for the participants (Aamodt, 2016). This dissertation originally aimed to cover a higher number of variables, but the limited information in the population did not allow for this resulting in the elimination of some of the proposed variables. This dissertation viewed the subject matter through the lens of the trauma-control model (Hickey, 2015) and acknowledges that looking at the topic through a differing lens may impact results.

Recommendations

Updated study in the occurrence of ACEs finds that children who experience ACEs are more likely to criminally offend, and 50% of children will experience an ACE (Giano et al., 2020; Spytka, 2025). All serial killers studied had experienced ACEs, and these offenders were more likely to report a negative childhood environment, aggressive behaviors, poor mental health, and struggles with controlling emotion (Spytska, 2025). This research supported the theory that a loss of control can influence youths to seek

those feelings of control elsewhere (Spytska, 2025), which again suggests that the use of the lens of the trauma-control model (Hickey, 1997) continues to be an effective one and one that is recommended by this researcher. The trauma-control model views criminality through the viewpoint that psychological and physical trauma occurring early in life lead to an increased number of fantasies (Hickey, 2017). These fantasies usually start on a tame level but will escalate over time in regards to the nature of violence and extremism (Hickey, 2017). Once these fantasies reach their breaking point, they result in the serial homicide behaviors that are measured here.

Additionally, while the author had to reduce the number of ACE variables included, research in the field still suggests the importance of the inclusion of more of these ACEs in future study. The full list of ACEs is vast, containing life events like neglect of both physical and emotional forms, poverty, substance abuse in the household, witnessing household violence, discrimination, or an incarcerated close relative (Briggs et al., 2021). These differing criteria could all play a role in the development of these behaviors, and it is worthwhile to pursue all these known influences. Marono et al. (2020) combined some of their variables together to see if experiencing the combination had different results, but due to the increase in variables that was not possible in this study. In further research, potential combinations of ACEs should be studied to confirm results and gain a deeper comprehension of the complicated relations between life events.

A larger population to study would also likely yield more statistically accurate representations of the effect of ACEs on the population with increasingly generalizable results. While the Radford/FGCU database is extensive, spanning over 5,000 participants

(Leary et al., 2021), the available data was limited when it came to some of the ACEs. Statistical studies that can utilize a smaller sample size would be recommended when looking at the additional ACEs.

There are a few regions in which the research indicates that further exploration could be helpful in the comprehension and prediction of serial homicide offender's behaviors during and after their crimes. The resulting statistics of this study suggest that stalking could be a serious indicator of the offender's body disposal methods, among other crime related behaviors like torture or overkill, so further study into the influence of stalking on these behaviors could be beneficial in understanding serial homicide offender actions taken during criminal activity.

Body disposal, in general, is an understudied region of the field. While there is some knowledge about a few predictors of body disposal methods, there is not much research into how serial homicide offenders may move between methods of disposal and how this could impact or be impacted by other aspects of the crime scene behaviors. Longitudinal studies that focus on long-term change over years may be an effective tool for further study in this area as they would illuminate the evolution of body disposal, if such a phenomenon exists (Cekic, 2024). This gap in the literature is also accompanied by conflicting results on what behaviors and experiences might spur on an offender to mutilation or dismemberment with some research pointing towards mental illness playing a substantial role (Delicato, 2025). Others argue that the presence of dismemberment comes from a few different motives depending on the style of the wounds (Posa et al., 2025). Some may appear defensively like the removal of identification for protection

against forensic services, while offensively these serial killers dismember out of rage and usually involve forceful tools like an ax or aggressively with clear meticulous intent for sadistic gratification (Posa et al., 2025). A more expansive view of this portion of the serial homicide offense needs to be taken before any real comprehension of the subject is possible. An approach that may yield useful information would be to study the post-crime factors and their intervention in body disposal as some research suggests that these may have more to do with body disposal than pre-crime experiences (Chai et al., 2020). Approaching the subject from multiple directions would likely be helpful in painting the picture of body disposal methods.

The intersection between bullying and serial homicide offenders is also well identified but woefully unexplored. While connections between bullying and serial killers are almost universal (Toates & Coschug-Toates, 2022), there is little study to explain exactly why this is the case or how this impacts later crime behaviors besides just a general higher propensity to crime (Craig & Zetter, 2021). Hickey (2017) linked lack of acceptance, rejection, and humiliation to the development of violence, all of which are associated with experiencing bullying as a child. This has been supported by other studies, who found that loneliness at any point in life is a risk factor for antisocial behavior and violence (Palermo, 2005). While it is clear that bullying has impacts on the development of behaviors like sexual assault, violence against animals, and leaving bodies at the scene of the crime from the results of this data analysis, unearthing the nuances in these interactions could be increasingly beneficial in reducing their effects.

Violence against animals was a predictor of several crime behaviors including torture and aggression, not only in this dissertation but in other research as well (Holoyda, 2024; Sezgin, 2024), though the explanation between why these interactions occur remains to be studied, especially empirically. Violence enacted against animals in childhood clearly has some form of impact on the development of violent behavior when several independent studies have discovered that violence against animals was a significant risk factor present in the majority of inmates measured (Hensley et al., 2009; Joubert et al., 2021; Trentham et al., 2018) on top of the results from this dissertation. Girotra (2021) echoes these concerns as well as the need for further study of this phenomenon and the risks it poses towards developing violent or serial killer behaviors.

Furthermore, while sexual abuse has been studied extensively on its own, sexual abuse and its effects warrant more study within this specific population. While this data analysis did find a slight correlation between sexual abuse and sexual assault later in life, the significance of such was much below what was expected. It also was much lower than what was found in the previous study (Marono et al., 2020), but the sample used by that team was less extensive and could have led to an influence in results. With the conflicting results of this study and the previous study (Marono et al., 2020) in addition to popularized research, further analysis on these interactions is necessary. With the proposed rates of childhood sexual abuse being around 11% of children (Piolanti et al., 2025), understanding the impacts of this specific ACE is crucial not only for the child itself, but for the crime-related behaviors it might trigger later. Even general researchers of sexual abuse express their concerns over the lack of study into young boys (Piolanti et

al., 2015) which are the primary demographic for serial killer development (Hickey, 2015). There is clearly a gap in comprehension of this specific ACE's role in future behavior that is worthy of further pursuit.

Implications

This dissertation has the potential to help push for positive social change. Positive social change is defined by Walden University (n.d.) as the process of applying knowledge and strategies that will increase the worth and development of individuals and societies. Profiling serial homicide offenders is a field that is currently outdated and in need of more rigorous statistical analysis (Ribeiro et al., 2021). Gaining more clarity on how early childhood adverse experience influences later serial killer behavior could help strengthen not only profiling of serial homicide offenders but earlier intervention as well, before concerning or violent behaviors can fully develop. This follows right in line with Walden's (n.d.) goal of positive change as the adjustments to identification and treatment of adverse childhood experiences would lead to not only more productive and healthy children in the community through improved treatment, but also the potential removal of violence from society and lessening of victimhood in the community.

Building on to existing beginning forays into this topic from Marono et al. (2020) allows for a more expansive take on adverse childhood events and their relation to different serial homicide offender actions. This dissertation's results show that all of the measured ACEs interacted with at least one of the measured behaviors, which is an indication that these interactions need to be explored even further. In an ideal world, a mental health professional would be able to identify these experiences in a child's life

and take action to treat the trauma from those events before they result in violence.

Resources for treating trauma from ACEs are not always widely available though (Bastion et al., 2025), so having improved understanding of what is most important if a child does get access to assistance is crucial.

Early intervention may prevent future death as well as improve the lives of teens and adults (Petreca et al., 2021). Stopping an offender at early escalating behaviors can save not only victims' lives but also the life of the offender. With the goal ideally being able to correct their path to a productive role in society over one spent in prison or deceased. Chances for offenders who are caught returning to prison after release are high with some studies stating recidivism rates as much as 60% (Lussier et al., 2025). While it is almost impossible to know exact recidivism risk (Lussier et al., 2025), it is clear that a significant portion of offenders will continue to offend once released. While extensive study into criminal recidivism has been conducted for years, there is a distinct gap when looking at it through the lens of ACEs and serial homicide offender risk. Future research into how finding and treating the trauma from adverse childhood events and its' effects on the entrance into the prison system seem to be warranted when looking at the results, especially when backed by results like Ramhe et al. (2025) who found a strong connection between childhood trauma and physical and non-physical violence.

Conclusion

The aim of this dissertation was to study the long-term impacts of ACEs and their role in the development of later serial homicide offender behavior. By utilizing the quantitative BSA to map the pathways from ACEs to later serial killer actions, this

dissertation discovered possible correlations between certain ACEs and serial homicide offender behaviors before, during, and after their crimes. BSA looks at transitions between pairs of behaviors and tests the significance of each interaction through chi-square analysis (Keatley, 2018). Each ACE that was measured was found to have a correlation to one or multiple serial homicide offender actions like how violence against animals, bullying, and head injury all tie to the increased chance of the occurrence of sexual assault within the offender's crimes or how bullying and head injury were correlated to leaving victims' bodies at the scene of the crime. These significant findings illuminate future directions for research to explore and help to identify which behaviors may be influenced by which early adverse experiences.

This dissertation contributes to positive social change, as encouraged by Walden (n.d.), by expanding the field of ACE study and indicating areas that further expansion or repeated testing is necessary. When a serial killer often does not stop until they are physically stopped (Chan & Heide, 2009), it becomes crucial to identify the origins of these behaviors before they are enacted on a victim. Having a greater comprehension of how ACEs occur in relation to serial homicide offender behaviors could allow law, psychology, social work, and additional professionals of all levels to spot individuals under their care that may be at risk for enacting this form of violence (Keatley et al., 2021).

This dissertation found several areas that were worthwhile for potential further study like the strong connections between stalking victims and committing overkills on their victims, committed quick kills of opportunity, binding their victims, and leaving

their victim's body open at the crime scene without attempt at concealment. There were several serial homicide offender crime-related actions that were strongly correlated with each other, which could signify that certain criminal actions may be more likely to occur in the same individual. For instance, sexual assault went hand in hand with stalking, binding, hiding the body in a secret location, or leaving the body open at the scene. As far as ACEs were concerned, head injuries in childhood had a significant connection to violence against animals, while experiencing bullying was found to increase the chances of committing violence against animals and dismemberment of a victim's corpse. Above all, there was found a significant connection between every ACE measured and sexual assault.

While there has been a focus on sexual assault in study, the connections seen here are not fully apparent in the research, implying that this may be a good area of future pursuits. Additional research should be directed towards the connection between the rest of the list of ACEs that were not covered here and the serial homicide offender behaviors. Other paths to pursue should look at the identified significant behavior pairs to better illuminate the interactions between the two variables. Continuing studies in the field are recommended to be empirical if possible as the majority of the existing research within the scope of the field is either case study or qualitative based. Understanding these topics through the lens of experimentation and measurement may lend a more complete comprehension of the subject. When it comes to reducing serial killer violence, all worthwhile avenues should be studied if possible because, when it comes down to it, it is quite literally a matter of life or death.

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