# Homicide and Perpetration-Induced Traumatic Stress

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**Abstract**

Homicide is a horrific event that produces immeasurable trauma to a community. For the perpetrator, the act of killing can be associated with increased risk of experiencing traumatic symptoms. Perpetration-induced traumatic stress (PITS) has been shown to be associated with negative outcomes among people who have perpetrated homicide. A secondary analysis of existing data was implemented to investigate how killing in a criminal context would differ from other forms of violence and nonviolence. Responses by incarcerated adults to the nationally administered Survey of Prison Inmates (SPI) were analyzed for associations between offense severity and health outcomes, including psychiatric treatment history, substance use treatment, and in-prison misconduct. Logistic regression analyses revealed a significant association between violent offenses and negative health outcomes. When compared with those incarcerated for non-lethal violent offenses or nonviolent offenses, being incarcerated for a homicide offense was associated with a higher likelihood of being diagnosed with posttraumatic stress disorder (PTSD), having elevated symptoms of hopelessness and worthlessness, and for receiving mental health treatment if diagnosed with a depressive disorder. Nonviolent offenses were associated with the highest odds of utilizing substance use treatment. Implications and suggestions for future research are discussed.

## Table of Contents


Chapter 1: Introduction 7
- Research Problem. 9
  - Undiagnosed and Untreated PTSD 9
  - Violence and Recidivism 10
  - Suicide 11
- Research Purpose 12
- Research Question 14
  - Hypotheses 14

Chapter 2: Literature Review 18
- Homicide-Related Traumatic Stress. 18
- Combat-related Moral Injury 27
- Default Mode Network 31

Chapter 3: Methods 35
- Sample Selection 35
- The Data Base 36
- Participants and Exclusions 37
- Assignment to Comparison Groups 38
- Regression Model 39
- Measures 41
  - Limitations 41
  - Diagnosed with Mental or Emotional Condition 43
  - Kessler Psychological Distress Scale 44
  - Mental Health Treatment 45
  - Substance Use Treatment 47
  - Write Up History 48
- Procedures 48
  - Level 1 Analysis: All Respondents 48
  - Level 2 Analysis: First Admission Respondents 49
  - Level 3 Analysis: Starting Treatment Among First Admission Respondents 50
  - Follow-Up Analyses 50

Chapter 4: Results 51
- Level 1 and Level 2 Analyses 51
  - Diagnoses 51
  - Kessler Psychological Distress Scale 54
  - Mental Health Treatment 58
  - Substance Use Treatment 62
  - Write Up History 65
- Level 3 Analysis 69
- Follow-Up Analyses 72

Chapter 5: Discussion 77
- Diagnoses 77
- Kessler Psychological Distress Scale 78
- Mental Health Treatment 79
- Substance Use Treatment 82
- Write Ups 85
- Summary 87
- Limitations 88
  - Psychopathy 88

Measures 90
Analysis 93
Implications 94
Support to Existing and Future Research 94
Treatment of PITS 96
Suggestions for Future Research 98
Direct Survey of Homicide-Related Traumatic Stress 98
Virtual Homicide 99
Replicative Dream Frequency 100
Dream Intensity and Central Image 102
Longitudinal Study 102
Conclusions 103
References 104
Appendix A: Respondent Demographics 127
Appendix B: Supplemental Tables and Results 133

## Chapter 1: Introduction

Of all the types of violence in which humans engage, homicide stands out as particularly unique and devastating. The vast and rapid spread of the traumatic ripple through the victim's family, friends, and community is difficult to fully appreciate. Unlike some other forms of violence, the damage of homicide cannot be undone, and the harm cannot be taken back. For the survivors, homicide is disruptive to most aspects of their lives, including grief processing (Connolly & Gordon, 2015), and contributes to high rates of posttraumatic stress disorder (PTSD; van Denderen et al., 2016).

While it is no surprise that victims and survivors suffer greatly from such events, it is perhaps less commonly considered that perpetrators of homicide may themselves be negatively affected by the act of killing. People engaging in killing may experience traumatic symptoms as a consequence of their actions, a phenomenon known as perpetration-induced traumatic stress (PITS; MacNair, 2002b), a form of posttraumatic stress that includes both full and subthreshold PTSD (MacNair, 2015). While the psychological impact of killing may be a relatively new subject for formal academic research, it is not a new topic of human interest. The notion that the act of killing can be emotionally scarring to the killer has been the subject of countless works of literature, art, and film throughout history.

Currently, the primary source of evidence on the psychological sequelae of PITS draws on the experience of members of the U.S. military (Griffin at al., 2019; Steinmetz et a., 2019). Evidence of trauma symptoms after exposure to military combat has been observed through analysis of veteran records going back to the American Civil War (Pizarro et al., 2006), and is well accounted for in current definitions of PTSD. However, several studies of combat veterans have shown that the conceptualization of PTSD as being caused only by fear or helplessness,

such as that experienced during life-threatening trauma, has significant limitations and does not account for other routes to developing PTSD, such as through the act of killing (Farnsworth et al., 2017; Jordan et al., 2017; Nash, 2019; Stein et al., 2016). In fact, non-life-threatening traumas are more frequently endorsed as Criterion A events than life-threatening traumas by treatment-seeking veterans with PTSD (Litz et al., 2018). Interest in this trauma syndrome developing from perpetration acts in combat has fueled a rapidly growing body of research investigating an alternative route to PTSD through what is called *moral injury,* a phenomenon related to PITS.

While a consensus definition of moral injury is still in development (Currier et al., 2020; Griffin et al., 2019), early attempts to define the phenomenon have typically endorsed moral injury as a trauma syndrome stemming from perceived violations of deeply-held moral beliefs either through one's own actions or through those of a trusted other, through failure to act, or through betrayal (Jamieson et al., 2020; Jinkerson, 2016; Litz et al., 2009). Early exploration of the phenomenon identified common symptoms of guilt, shame, anxiety, intrusive symptoms, and avoidance behaviors (Litz et al., 2009).

Moral injuries resulting from one's own actions – the perpetration of moral transgressions - have been delineated from other forms of moral injury both in concept and in characterization of symptoms (Currier et al., 2019; Griffin et al., 2019) and can cause PITS (MacNair, 2015). The severity of moral injury is predictive of PTSD chronicity (Currier et al., 2021). In other words, perpetrating an act that violates one's own deeply held morals, such as killing, can have a negative impact on the perpetrator that is different from other forms of moral injury and is associated with a risk for PITS and full PTSD. Perpetration-based moral injury, compared to other forms of moral injury, is associated more with re-experiencing symptoms, negative

cognitions related to self, negative hindsight-bias, and sense of wrongdoing (Litz et al., 2018; Stein, 2012).

PITS and the related concept of perpetration-based moral injury share similar characteristics in that they both describe traumatic stress arising from perpetration. They differ, however, in that moral injury assumes an underlying moral processing and a sense of moral violation. While moral injury has the potential to cause PITS (MacNair, 2015), not all who kill and experience PITS consider their actions moral violations. That is, regardless of whether one perceives their acts as moral or immoral, there is evidence that the perpetration of violence, particularly the act of killing, is associated with a higher risk of inducing traumatic stress, which can result in PTSD.

## Research Problem

### *Undiagnosed and Untreated PTSD*

A primary concern of this study is the limited diagnostic support for homicide-related traumatic stress and the limited research on the phenomenon. Perpetration of homicide is, in general, associated with higher rates of mental disorders, with one study finding an incidence rate of 53% among a U.S. sample (Martone et al., 2013). In a meta-analysis of studies of homicide-induced traumatic stress, Badenes-Ribera et al. (2020) observed that 42% (across included studies) of participants met full criteria for PTSD, with an additional 13.1% who met partial criteria. However, it is not clear given current conceptualizations of PTSD if the experience of a perpetrator of homicide would meet criteria for a traumatic or Criterion A event. The current definition according to the American Psychiatric Association (APA, 2013) defines PTSD as resulting from specific types of events, such as exposure to death or threatened death through direct experience, direct witnessing, learning of the event happening to a close family

member or friend, or through repeated or extreme exposure to details of the event. This definition places several restrictions on what meets criteria, though some have argued that killing does qualify as a Criterion A event for PTSD (e.g., Litz et al., 2018; MacNair, 2015; Pham & Wilocq, 2013). The question of whether or not PITS satisfies Criterion A will only be answered through sufficient research exploring the relationship between homicide and subsequent traumatic symptoms.

### *Violence and Recidivism*

In the absence of adequate treatments for PITS, perpetrators of homicide may be left with an increased risk for a number of negative trauma-related outcomes, including further violence. A relationship between untreated PTSD and violence has been observed in several studies. PTSD is associated with increased odds of being arrested for a violent crime such as homicide, sexual assault, or assault (Collins & Bailey, 1990), and among incarcerated methamphetamine users, PTSD symptom severity has been shown to be predictive of aggression (Wahlstrom et al., 2015). Among female prisoners, PTSD symptoms were associated with increased odds of violent offending (Howard et al., 2017). In a meta-analysis, Facer-Irwin et al. (2019) found a significant association between PTSD and increased risk of non-instrumental violence (i.e., reactive, unplanned violence). When looking at risk factors for recidivism, having committed a felony homicide has been shown to be associated with the highest level of risk, associated with a 4.7-times increase in likelihood for recidivism (Liem et al., 2014); however, only 15% of offenses were violent, only 3% were for homicides, and it is not known if the risk for violent recidivism was mediated by PTSD symptoms. The association between untreated PTSD symptoms and risk for further violence is clear and would suggest that identifying PITS and treating its symptoms might reduce the risk for violence, possibly reducing risk for recidivism.

### *Suicide*

In addition to reducing violence towards others, effective treatments for PITS may reduce the risk for harm to self among perpetrators of homicide, as violence and PTSD symptoms are both associated with an increased risk for suicide (Facer-Irwin et al., 2019). The rate of suicide in jails for indivduals arrested for violent offenses is triple that of those arrested for nonviolent offenses, and double in prisons, with homicide being among the highest-risk offenses (Felthous & Sass, 2010). Inmates who have committed a violent crime are more likely to die from suicide attempts than those who have committed nonviolent crimes (Boren et al., 2018). In a systematic review and meta-analysis of suicide risk factors in prisons, homicide was found to be the second highest criminal history risk factor, second only to remand status (Zhang et al., 2021). Homicide represents a higher risk factor than life sentences, other violent offenses, sexual offenses, and drug offenses; it is a higher risk factor than all demographic factors; it is a higher risk factor than institutional factors such as single-cell occupancy and not having social visits; and it is a higher risk factor than the clinical factors of alcohol misuse and poor physical health (Zhang et al., 2021).

In military samples, reports by veterans of firing a weapon and killing, or believing one has killed, have been shown to significantly correlate with suicidal ideation (Tripp et al., 2016). Killing in combat has been associated with increased depression, anxiety, suicidality, and hazardous alcohol use (Kelley et al., 2019). Perpetration-based moral injury has been shown to serve as a risk factor – more so than other forms of moral injury - for self-injurious thoughts and behaviors and higher severity of suicidal ideation (Bryan et al., 2014). However, Bryan, Theriault, and Bryan (2015) found that higher levels of reported self-forgiveness were associated with lower PTSD symptoms and differentiated between those who had experienced only suicidal

ideation, and those who had attempted suicide. This would suggest that not only is the risk for suicide associated with trauma highest among those who have perpetrated moral transgressions, but also that certain factors may prevent (resilience factors) or reduce (treatment factors) the risk of suicide. Assuming the dynamic applies in criminal homicide, it would suggest that the increased risk for suicide among homicide perpetrators is related to PITS, and that strengthening resilience factors or developing treatments may reduce risk of suicide among homicide perpetrators, one of the most at-risk populations in correction settings.

**Research Purpose**

Harry and Resnick (1986) note that accurately identifying PTSD related to the commission of homicide may improve treatment, reduce the risk for suicide, and hasten the overall progress of rehabilitation for those in a corrections setting. Similarly, in their review of the role of trauma in later violent conduct, Welfare and Hollin (2012) argue that better understanding of PITS might lead to improved assessment and treatment, increased safety among prison staff and other incarcerated adults, and reduce the risk of further violence. Fleurkens, Hendriks, and van Minnen (2018) argue that successful treatment of PITS may reduce further health complications, future aggression, and recidivism.

Effective treatments for PITS may differ from other forms of PTSD. While existing evidence-based treatments (EBTs) for PTSD may be a good starting point, many aspects of the impact of killing may not be adequately addressed by fear-based treatments relying on exposure techniques (Keenan et al., 2014; Maguen &Burkman, 2013). Deeply held negative cognitions, feelings of guilt, remorse, shame, and unresolved grief may all need special attention in treatment that is not always considered in EBTs for PTSD (Maguen & Burkman, 2013). Treatments targeted specifically for those who have killed while in combat (e.g., Maguen et al.,

2017) or committed criminal homicide (e.g., Fleurkens et al., 2018) have shown some initial promise. Studies that investigate the nature of PITS will provide support to the continued development of novel and effective treatments for PITS.

The notion that perpetrators of homicide may experience trauma from their own acts may be poorly received. While there is an increasing call for more research into PITS (e.g., MacNair, 2015; Welfare & Hollin, 2012), the topic is not popular. It may evoke feelings of disgust, moral contagion, or questioning of an investigator's sympathies. MacNair (2015) has noted that sympathy - or a lack thereof - for perpetrators is a barrier to conducting research on PITS. The current expansion of research on moral injury and the traumatizing impact of killing in military combat provides a valuable source for understanding how people respond to killing in general, but it does not account for differences between combat-related killing and homicide, such as the role of social approval or condemnation in modulating experienced distress (Webber et al., 2013).

In state prisons, over half of individuals incarcerated for violent offenses are released in less than 3 years, while the median time served for murder is 17.5 years (Kaeble, 2021). This means that if homicide-related PITS is associated with more frequent or severe PTSD symptoms and is thereby associated with higher risks for violence and suicide, the associated costs of incarceration are compounded by the substantial length of time spent in prison. This would also imply that early detection of PITS through targeted assessment of perpetrators of homicide could pay dividends over the course of a long sentence.

Given the potential benefits of effectively treating PITS in incarcerated adults (e.g., reduced suicides, reduced institutional violence, reduced recidivism, increased safety to prison

employees, reduced physical and mental health costs of incarcerated individuals), there is a pressing need to investigate the nature of this phenomenon within the incarcerated population.

## Research Question

The present study seeks to quantify the frequency and severity of PITS within an incarcerated population and describe how negative health and behavior outcomes vary depending on types of violence committed. While there has been research on the incidence rate of PITS resulting from criminal homicide, to date there has been no known study to include a explicitly nonviolent control group to rule out other factors shared by incarcerated populations (e.g., the impact of arrest, loss of freedom, or exposure to institutional violence). Additionally, the inclusion of a non-homicide violent offense group would strengthen the position that homicide has a unique impact on PTSD symptom severity. Therefore, this study will seek to compare the perpetration of homicide to other forms of violence and to nonviolent forms of perpetration (e.g., fraud, theft) to demonstrate a gradient of symptom severity associated with increasing severity of violence.

The overarching hypothesis is that the perpetration of violence, especially homicide, is associated with a higher likelihood of experiencing negative mental and behavioral health outcomes known to correlate with PTSD. As the present study design relies on secondary analysis of existing data, targeted queries regarding specific symptoms of PTSD and PITS are not available. Instead, less specific indicators of symptoms available in existing data will be used to infer mental and behavioral distress.

### *Hypotheses*

The evaluations of this study will involve the comparison of three groups, excluding participants reporting a sexual offense:

- Group 1: Adults incarcerated for offenses that involved killing (e.g., homicide)
- Group 2: Adults incarcerated for violent offenses that did not involve killing (e.g., assault)
- Group 3: Adults incarcerated for nonviolent offenses (control group)

The study will evaluate the following hypotheses regarding these three groups:

**Level 1 Hypotheses.**

- H0: There will be no effect of offense type on the degree of traumatic symptoms experienced by incarcerated adults.
- H1: Group 1, when compared with Group 2 and Group 3, will experience the highest degree of traumatic stress symptoms, and Group 3 will experience the lowest degree of traumatic stress symptoms, as evidenced by the following:
    - History of PTSD diagnosis
    - History of depression or anxiety diagnosis
    - Severity of mental health symptoms in the prior 30 days, particularly those associated with depression and anxiety
    - Mental health treatment since admission to prison
    - Substance use treatment since admission to prison
    - Frequency of rule breaking while incarcerated

**Level 2 Hypotheses.**

Additionally, the above hypotheses will be more narrowly evaluated based only on respondents who have been admitted to prison (or are potentially being admitted) for the first time. Respondents reporting two or more prison admissions will be excluded at this level of

analysis to reduce the potential impact of multiple occurrences of PITS, and to inform additional hypothesis based on first time admissions to prison:

- H0: Excluding respondents with multiple prison admissions will have no effect on measures of traumatic stress, as measured in the Level 1 analysis.
- H1: Excluding respondents with multiple admissions will reveal a more pronounced effect of offense type, yet consistent with the pattern of direction of the results of the Level 1 analysis.

**Level 3 Hypotheses.**

Finally, the subset of respondents from the level 2 analysis will be explored for potential evidence of perpetration being associated with starting treatment after perpetration of an offense; since they do not have a history of previous prison admissions, any discrepancy between receiving treatment in the community and in prison suggests a higher likelihood that they are 'starting' treatment, rather than continuing treatment:

- H0: Offense type will have no effect on the probability that a respondent who has not been admitted to prison multiple times will start mental health or substance use treatment.
- H1: Among respondents without multiple admissions to prison and who were not taking psychiatric medication at the time of their arrest for their present incarceration, offense type will affect the probability that they receive psychiatric medication in prison. Group 1 will be associated with the highest probability of starting psychiatric medication after a first admission to prison, while Group 3 will have the lowest probability of starting psychiatric medication after a first admission to prison.

- H2: Among respondents without multiple admissions to prison and who have not received community-based substance use treatment, offense type will affect the probability that they receive prison-based substance use treatment. Group 1 will be associated with the highest probability of starting substance use treatment after a first admission to prison, while Group 3 will have the lowest probability of starting substance use treatment after a first admission to prison.

What follows is a literature review, wherein the existing evidence on PITS related to criminal and non-criminal violence is presented. In particular, this review will focus on the criminal violence of homicide, and non-criminal violence such as military combat. Following this review, an overview of aggression and violence, as well as potential neural bases for understanding PITS will be considered. These topics are considered key to understanding the current state of research on PITS, both at a behavioral and neurological level. As there is limited research on the topic of PITS and a growing body of research on the topic of moral injury - particularly in studies of military combat - this review will include both studies of PITS and moral injury to present evidence of negative outcomes associated with perpetration.

# Chapter 2: Literature Review

## Homicide-Related Traumatic Stress

While prior case-studies and small investigations of PTSD incident rates among perpetrators of violent offenses have presented possible linking between committing homicide and experiencing posttraumatic stress (e.g., Harry & Resnick, 1986; Kruppa et al., 1995), Pollock (1999) conducted the first study specifically investigating the occurrence of posttraumatic stress originating from committing criminal homicide. Pollock recruited 80 male homicide perpetrators over a five-year period. Each of these participants completed structured interviews in order to determine the type of violence committed (reactive or instrumental), as well as to assess personality traits and PTSD symptoms. Of the 42 participants (52%) who met criteria for PTSD, 33 (79%) reported their index offense as being traumatic and 28 (67%) reported no other trauma history aside from their index offense. Thirty-eight (90%) of those meeting criteria for PTSD had perpetrated reactive violence. There was a significant main effect of the form of violence on PTSD symptoms, in which all measures of PTSD symptoms were higher for those who had perpetrated reactive violence compared to instrumental violence. Participants without previous non-offense related trauma were more likely to report re-experiencing symptoms. Participants with primary psychopathy were least likely to have an index offense associated with reactive violence and were least likely to report trauma symptoms related to their index offense. Interestingly, the primary psychopathy group, while being least traumatized by the index offense, reported the greatest history of non-offense trauma. Pollock's study provides strong support for the existence of PTSD stemming from the perpetration of homicide. Though the study did not compare with a control group, the results shed light on the incidence rate of homicide-related

PTSD, in this case 79% of homicide perpetrators who met criteria for PTSD, and about 42% of all homicide perpetrators sampled.

Di, Chung, and Wan (2018) observed a similar PTSD incidence rate of 45% among Chinese homicide perpetrators, evidencing cross-cultural consistency with Pollock's (1999) observed incidence rate of 52%. Di, Chung, and Wan (2018) noted that this consistency was remarkable given understanding about East and West differences and existing literature on PTSD. Additionally, Di, Chung, and Wan (2018) observed that severity of past traumas and immature defense styles influenced the development of PTSD after homicide. Maturity of defense styles was predictive of PTSD following homicide when controlling for the number of imprisonments (Di, Chung, and Wan, 2018). However, including past trauma in the model improved the prediction of PTSD following homicide and rendered defense style non-significant; PTSD from past trauma was the strongest predictor of PTSD following homicide, supporting their hypothesis of a cumulative effect of traumatic experiences (Di, Chung, and Wan, 2018).

Spitzer et al. (2001) investigated the frequency of traumatic events and PTSD symptoms among forensic hospital inpatients in Germany. Combining structured interviews and self-report measures, Spitzer et al. administered the Clinician-Administered PTSD scale (CAPS), Modified PTSD Symptom Checklist (MPSS), Dissociative Experiences Scale (DES), and the Symptom Checklist-90 (SCL-90-R) to 53 patients who did not meet exclusion criteria (51 male, 2 female). Based on the CAPS, 34 (64%) participants reported traumatic events that met DSM IV criteria for PTSD, with the most common trauma being childhood physical abuse (25% of all participants). The second most common trauma was the participants own criminal offense, with five participants (9% of all participants) identifying their own criminal offense as a traumatic event. Of these five cases, three were for murder. Of the entire sample, three participants had

committed homicide, and five had committed manslaughter, indicating that 38% of the participants who had killed met full criteria for PTSD based on their own criminal offense. Although the sample size of those who had committed homicide was small, there was still notable evidence of killing contributing to PTSD, and harming others more generally being a more common contributor to the development of PTSD than some other forms of trauma history.

Gray et al. (2003) investigated the incidence rate of PTSD among incarcerated adults with mental illness, noting that the chronic stress from untreated PTSD could exacerbate other serious mental illnesses, such as schizophrenia. Thirty-seven participants with serious mental illnesses at a secure hospital participated in the study, completing a semi-structured interview to determine the presence of PTSD symptoms, the Impact of Events Scale (IES), and self-report measures of depression and anxiety (Gray et al., 2003). One third of the sample met full criteria for PTSD. In comparing IES scores to a normative sample, Gray et al. observed a significant presence of general PTSD symptoms (more than 2 standard deviations above the normative sample) in 54% of participants, intrusive symptoms in 46% of participants, and avoidant symptoms in 49% of participants. An analysis of variance comparing type of offense (murder or serious violent offense that did not result in death) showed a trend towards an effect on total IES score, and significant effects on intrusive symptoms but not avoidant symptoms. Lastly, Gray et al. looked at differences in participants whose symptoms were in remission and who no longer believed that their actions against their victims were justified, revealing a significant increase in IES scores compared with those who still felt their actions were justified, including total IES score, intrusive score, and avoidance score, which suggests that guilt or remorse for one's actions may have contributed to the development of trauma symptoms. Linear regression analysis showed that beliefs about whether the violence was justified or not accounted for a significant

proportion of the variance of PTSD symptoms, as did whether the participant's mental illness had an affective component, with both factors combined accounting for 44% of the total variance in IES scores.

Papanastassiou et al. (2004) set out to build upon the findings of Pollock (1999) and establish current and lifetime prevalence of full and partial homicide-related PTSD among incarcerated adults with mental illness. Nineteen homicide perpetrators experiencing mental illness were recruited from a medium secure unit in London and were administered the CAPS by the study authors (Papanastassiou et al., 2004). They also self-administered the LEC. Every participant identified their crime as a traumatic event, 58% met criteria for full PTSD at some point after committing the offense, and 26% met full criteria at the time of the assessment. The prevalence of partial PTSD at the time of the assessment was 16%. Killing a family member was significantly more likely to be associated with the development of PTSD, as was the presence of guilt. More early adverse events were associated with a reduced likelihood of developing PTSD.

The findings of Pollock (1999) and Papanastassiou et al. (2004) are inconsistent with the observed cumulative effect of trauma identified by Di, Chan, and Wan (2018). Pollock (1999) observed decreased trauma associated with psychopathy, and psychopathy was associated with early trauma. It could be the case that Pollock (1999) and Papanastassiou (2004) observed a culture-specific numbing through repeated trauma exposure, while Di, Chan, and Wan (2018) observed increased sensitivity and decreased coping as a result of traumatic experiences. Gobin et al., (2015) suggested that trauma contributes to later development of antisocial personality disorder (ASPD) and psychopathy. ASPD has been shown to be associated with a history of being a victim of physical or crime-related trauma, but not associated with current symptoms of PTSD (Gobin et al., 2015). A history of physical trauma is associated with a 5-times increase in

likelihood of being diagnosed with ASPD (Gobin et al., 2015). Similarly, being a victim of crime-related trauma is associated with nearly a 3-fold increase in likelihood of being diagnosed with ASPD, though only a history of physical trauma was associated with increased psychopathy (Gobin et al., 2015). Psychopathy may serve as both an adaptive deficit that prevents the development of PTSD, or it may result as an adaptive response to violence that protects against PTSD. Considering these findings, ASPD could be conceptualized as a trauma outcome in itself.

While both Gray et al. (2003) and Papanastassiou et al. (2004) observed significant relationships between offense-related guilt and PTSD, Crisford, Dare, and Evangeli (2007) investigated specifically how guilt relates to the development of PTSD among perpetrators of violent offenses with mental illness. In this study, participants were recruited via referral by a psychiatrist at a secure unit in the United Kingdom, of which 45 met inclusion criteria (43 male, 2 female), (Crisford et al., 2007). Rather than base analysis on each participant's most recent offense, Crisford, Dare, and Evangeli asked participants to identify which offense they felt was most distressing while completing questionnaires. In total, five participants chose an offense other than their most recent. Offenses were assigned one of five levels of violence ranging from 1 (e.g., robbery) to 5 (e.g., murder or grievous bodily harm with intent). Participants completed the following self-report questionnaires: The Detailed Assessment of Posttraumatic Stress (DAPS), the Revised Gudjonsson Blame Attribution Inventory (GBAI), the Trauma-related Guilt Inventory (TRGI), and the Positive and Negative Affect Scale (PANAS). Of the 45 participants, 18 (40%) met full criteria for PTSD, and 31 (68.9%) were psychotic at the time of their offense. A hierarchical regression analysis demonstrated that negative affect, offense severity, white ethnicity, trauma history, and guilt cognitions accounted for 54.4% of the variance in reported total trauma symptoms, with negative affect, guilt cognitions, and offense severity uniquely

predicting offense-related trauma severity. Crisford, Dare, and Evangeli not only found similar rates of offense-related PTSD as past studies, but also provided clearer evidence that both offense-severity and offense-related guilt contribute to PTSD symptomatology. While these results are promising, additional evidence is still needed given the sampling methods of Crisford, Dare, and Evangeli, and the rate of psychosis at the time of offense.

Pham and Willocq (2013) argue that the commission of homicide can satisfy diagnostic criteria for PTSD. Based on previous reports of a connection between the commission of homicide and PTSD symptoms (e.g., Pollock, 1999; Sptizer et al., 2001), Pham and Willocq investigated the occurrence of traumatic stress reactions in response to homicide and non-homicide offenses in a French speaking population. They recruited 46 (42 male, 4 female) inmates from two high-security facilities in Belgium who all had prison terms of five years or more, and who had all been in prison for at least one year. A psychologist or psychology student administered the Stanford Acute Stress Reactions Questionnaire (SASRQ), which inquired about lifetime traumatic events and measured traumatic symptoms related to the most traumatic event selected.

In comparing homicide versus non-homicide offenses, 13 homicide perpetrators (53%) gave homicide as their most traumatic event (Pham & Willocq, 2013). Prevalence of meeting acute stress disorder criteria was higher among homicide perpetrators (65%) compared with non-homicide perpetrators (35%), and total SASRQ scores were higher among the homicide perpetrators group, particularly on the avoidance subscale. Of those who identified a homicide as their most traumatic event, 92.3% met acute stress disorder criteria, compared with only 33% of those with non-homicide offenses meeting criteria. Again, there was a significant difference between the SASRQ scores when comparing homicide events versus non-homicide events, with

homicide events being associated with higher SASRQ total scores, especially on the avoidance subscale.

In a descriptive study exploring the relationship between childhood trauma and violent youth offending, Welfare and Hollin, (2015) not only observed that all the 34 young male participants reported experiencing trauma, but that 50% of the eight who had murdered reported traumatic symptoms related to childhood or the act of murder above the cutoff score of 33 on the Impact of Events Scale-Revised (IES). Young men who had committed murder appeared to experience intrusive symptoms and distress more frequently than other youth who had perpetrated violent offenses (Welfare & Hollin, 2015).

For obvious legal, moral, and ethical reasons, it is not possible to conduct a randomized controlled study on the impact of killing. It would be unimaginable and horrific to propose a study in which ordinary people are assigned to an experimental group in which they kill someone. Instead, analogous experimental designs can be implemented to stand in for such behavior. One of the most famous and controversial studies in psychology (according to Blass, 2009), the obedience studies conducted by Stanley Milgram, do exactly this, deceiving participants into believing they had killed an innocent learner through the administration of increasingly severe electric shocks whenever the learner made a mistake on a simple memory task (Milgram, 1963). The experimenters were alarmed by the behavior of participants in these studies as the intensity of the experiments increased, “Subjects were observed to sweat, tremble, stutter, bite their lips, groan, and dig their fingernails into their flesh. These were characteristic rather than exceptional responses to the experiment,” “Full blown, uncontrollable seizures were observed from 3 subjects,” (Milgram, 1963, p. 375). Approximately 107 (78.1%) of the participants in a close-proximity version of the study rated their level of tension and nervousness

during the experiment as moderate to extreme, with 20 (14.6%) participants marking the highest rating on the 13-point scale (Milgram, 1965). Naturally, Milgram received criticism for the possible harm that was inflicted upon the participants by pressuring them to violate their own morals, to which Milgram responded by noting that only 1.7% of participants reported on a follow-up questionnaire that they felt sorry about participating in the experiment (Milgram, 1965). Milgram argues that participants did not internalize their behavior, i.e., take full ownership for harming another person, because they no longer perceived themselves as responsible when directed by an authority in a laboratory setting (Milgram, 1964b). However, it is clear in Milgram's reports that he appreciated the internal conflict of the participants. "Hurting a man is an action that for most people carries considerable psychological significance," (p.141) and one is "unable to dismiss the action by relegating it to the status of a trivial gesture, for a person's suffering and discomfort are at stake" (Milgram, 1964a, p. 142).

For good reason, studies such as those conducted by Milgram lead to the establishment of Institutional Review Boards to protect the wellbeing of participants, and placing an ethics check on study designs (Blass, 2009). Long before the terms 'perpetration-induced traumatic stress' and 'moral injury' were coined, psychologists realized that deceiving participants into thinking they had seriously harmed or killed someone produced emotional distress of such severity that it was not okay to subject people to it, even for the benefit of science.

Slater et al. (2006) replicated the Milgram obedience experiments using virtual humans as victims to examine how people would respond to the same type of extreme situation when they know that the victim is artificial. In this design, a computer-generated image of a learner was shown projected onto a wall, with whom the human participant interacted (Slater et al., 2006). The results indicated that when participants could see and hear the virtual human, they

essentially responded as if it were real, even refusing to administer shocks. These participant responses are surprising given that there was no consequence to following the procedure of the experiment and they were aware that no one was being harmed. Slater et al. (2006) suggested that the results shed light on the presence of a more instinctive aversion to harm-doing that is activated during even a virtual scenario.

Using this same immersive virtual environment, Cheetham et al. (2009) used fMRI imaging to examine differences in brain activation while witnessing the virtual human receive the shock and experience pain. Reaction times for participants pushing the shock button were significantly higher, indicating increased hesitance to shock an avatar (Cheetham et al., 2009). Brain imaging results showed evidence that the Milgram study paradigm evoked an aversive state of personal distress rather than empathic concern, though further study is necessary regarding the nature of the brain imaging findings (Cheetham et al., 2009).

Cushman, Gray, Gaffey, and Mendes (2012) tested the physiological response to simulated homicide and other forms of violence by comparing peripheral vasoconstriction in participants during either a 'neutral,' 'witnessing,' or 'harming' scenario. The 'neutral' scenario involved violence towards objects, such as hitting a nail with a hammer. The 'witnessing' scenario involved observing someone harm another person. Finally, the 'harming' scenario consisted of participants harming confederates with, for example, a hammer or stone, or shooting a confederate with a realistic fake gun (Cushman et al., 2012). Cushman et al. (2012) found that total peripheral resistance (TPR) was significantly higher in the 'harming' condition compared with the 'witnessing' condition and the 'neutral' condition. These results demonstrate that there is a physiological response to perpetrating harm that is significantly stronger than that of witnessing similar actions to non-human objects, as well as to witnessing that same harm carried

out by someone else. Thus, it would appear that the stress of *committing* violence is not due solely to the *exposure* to violence.

Whatever the mechanism for developing homicide-related posttraumatic stress may be, the present available research provides evidence of the following: That a large proportion of homicide-perpetrators experience traumatic stress; that the severity of the perpetration contributes to the severity of traumatic symptoms; that moral processing contributes to the severity of symptoms; and that perpetration itself is a driving factor, more so than merely witnessing someone experience harm.

**Combat-Related PITS and Moral Injury**

The National Vietnam Veterans Readjustment Study (NVVRS) was conducted in the mid-1980's and included a stratified random sample of Vietnam-era veterans. MacNair (2002a) reviewed responses of a sample of 1,638 combat veterans, including results of a self-rating scale, the Mississippi Scale for Combat-Related PTSD. Using a question in the survey about whether or not the respondent had killed or thought they had killed someone in Vietnam, MacNair was able to compare those who had killed in combat (n = 639) with a combat-exposed control group (n = 963). MacNair observed that the perpetration group – those who reported having killed or thought they had killed in Vietnam – had a mean score of 93.4 on the Mississippi scale, while the control group was significantly lower at 71.9. Similarly, for those who reported being directly involved in atrocities, the mean score on the Mississippi scale was 105.6, while for those who only witnessed atrocities it was significantly lower at 79.4. Excluding those involved in atrocities, the mean Mississippi scale score for those who killed was less elevated at 86.5. This study is critical to the understanding of PITS, as it demonstrates through comparison with combat-exposed and atrocity-exposed control groups that killing is uniquely associated with

trauma symptoms beyond those stemming from combat or atrocity exposure; the act of killing is itself a potential source of traumatic stress. Van Winkle and Safer (2011) looked at this same dataset and conducted a sequential multiple regression analysis controlling for the effect of witnessing others being killed. They found that self-reported killing significantly predicted PTSD scores, accounting for 22% of variability in PTSD symptoms.

Maguen et al. (2013) surveyed 227 veterans of Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF) who had met full or sub-threshold criteria for PTSD regarding their combat experience, particularly the impact of killing under different circumstances. Participants completed the PTSD Checklist (PCL), military version, the Deployment Risk and Resilience Inventory (DRRI), and answered questions specifically inquiring about the circumstances of killing (Maguen et al., 2013). Of the 39% who reported having killed or thought they may have killed in war, 50.7% reported having killed only enemy combatants, while 48.5% reported having killed both enemy combatants and other types of people, such as civilians, detainees, or American military personnel. Maguen et al. employed a latent class analysis to divide reported PTSD symptoms into four classes: High symptom class (34% or respondents), intermediate symptom class (41%), intermediate symptom class with low emotional numbing (10%), and low symptom class (15%). When compared with those who had not killed, killing was associated with twice the odds of being in the high symptom class, and more than four times the odds of being in the high symptom class for those who reported killing a woman, child, or elderly person or killing in the context of anger or revenge. Not only was killing associated with PTSD, but also with higher PTSD severity than veterans with PTSD who had not killed. In light of these findings, Maguen et al. argue that assessing for killing

experiences of veterans should be included in behavioral health assessments to inform targeted treatment planning.

Pitts et al. (2013) surveyed the experiences of 345 U.S. Army medics who had just returned from combat in Iraq or Afghanistan using combat experience scales and the PCL, military version. Witnessing, attempting to kill, and killing were all significantly correlated with elevated PTSD symptoms. However, a sequential multiple regression analysis revealed that witnessing trauma was no longer a significant predictor of PTSD symptoms when taking into account attempting to kill or killing (Pitts et al., 2013). Pitts et al. observed in this model that attempting to kill was the only significant independent predictor of PTSD symptoms, providing further support to the increased risk of traumatic stress from perpetrating and engaging in trauma above and beyond that of witnessing trauma.

Purcell et al. (2016) interviewed 26 U.S. combat veterans as part of a qualitative study on the impact of killing in combat. Through interviews and focus groups, several themes were revealed regarding the aftermath of killing (Purcell et al., 2016). The first theme was the complexity and sensitivity of talking about killing, with participants reporting that doing so can be taboo, especially when considering how the public might respond; though, the participants also noted that civilians frequently ask about killing. A similar theme involved a sense of alienation or difficulty relating to others who had not shared the experience. A third theme was that of the feelings around killing, with many participants reporting feelings of satisfaction during the event, but conflicted or ambivalent feelings arising later, sometimes not until after returning home from war. Some reported feelings of disgust or nausea after their first killing experience, which gradually decreased with subsequent killing experiences. A fourth theme revolved around the change in identity, a sense of not being the same person after having killed,

which many participants connected to the morally injurious nature of killing. A final theme was of the ways in which people cope after having killed, such as through social withdrawal, keeping busy, or use of drugs and alcohol. The qualitative approach of Purcell et al. (2016) revealed how killing was uniquely consequential to combat veterans. Though no known qualitative study has been completed with perpetrators of criminal homicide, if these themes are a result of killing itself and not unique to military experience, then it would be expected that perpetrators of criminal homicide would have similar experiences.

Jordan et al. (2017) surveyed OEF/OIF Marine veterans using the Moral Injury Events Scale (MIES), questionnaires regarding combat experience, and the PCL. They found that nearly one quarter (24.1%) of highly combat-exposed Marines reported experiencing potentially morally injurious events related to perpetration (Jordan et al., 2017). The indirect relationship between perpetration and PTSD was marginally mediated by guilt and shame, while perpetration was significantly correlated with guilt and shame, and guilt and shame were significantly correlated with PTSD. Jordan et al. (2017) observed that these results appeared to contradict current conceptualizations of PTSD being a result of danger or threat to self, which would also have implications for PTSD treatments that assume an anxiety or threat etiology.

Currier, McDermott, Farnsworth, and Borges (2019) examined the association between moral injury related outcomes and PTSD symptoms severity by comparing responses on the Expressions of Moral Injury Scale-Military Version (EMIS) and the PTSD Checklist for DSM-5 (PCL-5) at two time points 6-months apart, finding that when controlling for depressive symptoms, ‘moral injury by self’ (i.e., perpetration induced traumatic stress) predicted severity of PTSD symptoms at 6-month follow-up, while ‘moral injury by others’ did not.

To conclude this review of literature on moral injury, a non-combat related study is presented to demonstrate the phenomenon in a laboratory setting. A bug-killing paradigm was used to explore the impact of social validation on experienced guilt after killing as a way of exploring the role of social judgment on moral injury (Webber et al., 2013). Undergraduate students participating in the study were led to believe that they were exterminating bugs by placing them in a grinder. The students were then subjected to either social validation or invalidation (by a confederate) or to written documentation of past participant's (also confederates) willingness or refusal to participate (Webber at al., 2013). Social validation was associated with significantly less distress than the invalidation conditions and control conditions. Distress here was measured using a distress composite derived from the Trauma-Related Guilt Inventory (TRGI), the State Shame and Guilt Scale (SSGS), and by a measure of participant self-rewarding behavior (assumed to negatively correlate with feeling of guilt) (Webber et al., 2013). The results provide evidence that even in a low-stakes scenario, perpetration of killing can lead to feelings of guilt and distress, and that these symptoms are modulated by social judgment.

**Default Mode Network**

The default mode network (DMN) is an intrinsically organized set of related networks (Buckner & DiNicola, 2019; Fox et al., 2005) that represent a default mode of brain activity that is anti-correlated with task-positive networks, deactivating during goal-oriented tasks and activating while at rest (Liang et al., 2013; Raichle, 2001). The DMN consists of connections between several primary regional hubs, including the medial prefrontal cortex (mPFC), posterior cingulate cortex (PCC)/precuneus, and lateral parietal cortex (Buckner & DiNicola, 2019; Fox et al., 2005).

These networks have a common function related to internal representations (Buckner & DiNicola, 2019), autobiographical memory (Cabeza et al., 2004; Spreng et al., 2008), self-related processing (Engen et al., 2018), emotional understanding of others (Li et al., 2014), altruism (Hill et al., 2017), prospection (Spreng et al., 2008), theory of mind (Spreng et al., 2008), and mentalizing (van Buuren et al., 2021).

PTSD has been shown to result in a disruption in functional connectivity between the DMN and other neural networks (Dunkley et al., 2015), decoupling of prefrontal cortical regions involved in top-down regulation (Clancy et al., 2020, Spielberg et al., 2015), and increased activation of the hippocampus and amygdala (Palombo et al., 2016; Stevens et al., 2018), which in turn is associated with increased re-experiencing symptoms (Clancy et al., 2020; Spielberg et al., 2015). Trauma-related re-experiencing involves DMN regions associated with self-referential thought and autobiographical memory (Weis et al., 2018). In fact, default mode processing in combination with other specific brain networks was demonstrated by Clark et al. (2014) in a trauma-film paradigm to be predictive of which images would be experienced later as intrusive with 97% accuracy. There is strong evidence of the role of DMN disruption in the symptoms of PTSD, particularly re-experiencing.

Similarly, early brain imaging studies on moral injury have implicated disruptions in the DMN. Differences in brain activation while imagining justified or unjustified killing have been observed in the temporoparietal junction (TPF), orbitofrontal cortex (OFC), and precuneus, regions that overlap considerably with the DMN, both in region and function (empathy, theory of mind, moral judgments, guilt, and agency in morally sensitive situations; Molenberghs et al., 2015). Regions associated with self-referential processing, such as the left inferior parietal lobule (LIPL) and bilateral precuneus, have been shown to differentiate moral injury from PTSD

(Barnes et al., 2019; Sun et al., 2019), lending further evidence to both the overlap and differentiation between PTSD and moral injury.

Homicide-related PITS potentially presents a higher likelihood of disruption to the DMN compared with moral injury by the additional elements of aggression and violence. Aggression and violence have been associated with disruptions to the salience network, DMN, and executive network, with general decreased internetwork connectivity and impairment of connectivity within these networks (Morley et al., 2019). For example, higher levels of aggression have been associated with lower activation of the medial orbitofrontal cortex and increased activation in regions of the DMN, particularly the precuneus (Alia-Klein et al., 2014). These regions have been shown to differentiate aggressive from non-aggressive individuals while watching media violence (Alia-Klein et al., 2014).

Perpetration of homicide has been linked to decreased gray matter in the ventromedial/orbito-frontal cortex, anterior temporal cortex, regions of the PFC, insula, cerebellum, dorsal anterior and mid-cingulate, and PCC/precuneus, even when controlling for psychopathy (Johanson et al., 2020). Psychopathy itself has also been shown to be associated with the DMN, as well as the salience network (Hamilton et al., 2015). In a systematic review of neuroimaging studies of psychopathic traits, the DMN was identified as a key network that was often disrupted in individuals with psychopathy, showing decreased gray matter volume, decreased activity, and decreased functional connectivity (Johanson et al., 2020).

Thus, this study will operate under the hypothesis that the commission of violence, particularly homicide, would result in disrupted connectivity in the DMN by virtue of the aggression and violence itself, as well as the possible traumatic stress experienced by the perpetrator of violence.

Evidence of differences in DMN function and connectivity being associated with PTSD, aggression, moral injury, homicide, and re-experiencing symptoms provide a neuroscientific framework and biological support to the position that perpetrating harm results in traumatic symptoms.

# Chapter 3: Methods

## Sample Selection

A prison population is most appropriate for investigating homicide-related PITS due primarily to the rare frequency of reports of violence towards others in public surveys. For example, Bardeen and Benfer (2019) compared two samples of adults recruited through Amazon Mechanical Turk (MTurk) on their responses to the Life Events Checklist for Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (LEC-5). Endorsement of item 16 on the LEC indicates having seriously injured or caused the death of someone else (Weathers, 2013). Bardeen and Benfer (2019) observed no endorsements of item 16 in their first sample of participants who endorsed at least one PTSD Criterion A event ($n$ = 339), and only 2 (0.6%) out of 309 participants in their second sample. Similarly, Pugach et al. (2021) observed insufficient responses to item 16 in a sample of 379 college students. Surveying a public population would likely result in similar results: insufficient reports of violence towards others to draw statistically significant conclusions.

Individuals on parole or probation are a potential survey population; however, the significant differences in sentencing for nonviolent crimes, assaults, and homicide may create samples that vary considerably by subject age, or by time since the incident of concern. For example, in a U.S. Department of Justice review of time served in state prisons, the median time served for property crimes and drug related offenses was approximately one year and represented half of all releases in 2018, while the median time served for assault was 1.4 years (11.6% of releases), and the median time served for murder was 17.5 years, representing 1.7% of releases (Kaeble, 2021). These discrepancies in time served also point to an additional potential drawback of sampling individuals on probation or parole: the lengthy sentences for murder have the

practical effect of preventing many homicide perpetrators from ever being released. In other words, any individual effectively serving a life sentence for homicide would necessarily never be included in any sample of subjects taken from a population on probation or parole.

Lastly, the primary benefactors of this study are assumed to be incarcerated adults experiencing PITS. Increased understanding of the phenomenon could inform the development of new and more effective treatments, as well as rehabilitation interventions to reduce recidivism.

A direct survey of incarcerated adults would be preferred for investigating how PTSD symptoms correlate with types of offenses. However, significant limitations due to the COVID-19 pandemic made direct surveying of an incarcerated sample infeasible. Secondary analysis of existing data has the advantage of readily available and low-cost data (Bullock, 2007; Cheng & Phillips, 2014), and the possibility of accessing large sample sizes within limited time frames (Smith et al., 2011), but with the disadvantages of not being able to address specific research questions and confounding information not being collected (Cheng & Phillips, 2014). Therefore, with an appreciation for its inherent limitations, an investigation of PITS using an existing dataset is most appropriate.

**The Data Base**

The Survey of Prison Inmates (SPI) conducted by the United States Bureau of Justice Statistics (US BJS) is a 2016 nation-wide survey of male and female incarcerated adults in both state and federal correctional facilities in the United States (US BJS, 2021). The prisoner responses included in the dataset provide information on a variety of prisoner characteristics, including demographics, current offense information, criminal history, family background, drug and alcohol use treatment, mental and physical health treatment, rule violations, and participation

in facility programs (US BJS, 2021). Survey data were collected through face-to-face interviews using computer-assisted personal interviewing to guide automatic routing criteria and skip patterns (i.e., populating and omitting questions based on prior response to reduce the time burden of data collection). The average length of each of the interviews was approximately 50 minutes. Most interviews were conducted in English (94%); the remaining 6% were conducted in Spanish. Potential participants were identified through a stratified two-stage sample design, in which 385 prisons were selected from a universe of 2,001 unique prisons (1,808 state and 193 federal), and 37,058 prisoners were sampled from the selected prisons. Of the original sample, 364 prisons participated (306 state and 58 federal), and from those prisons, 24,848 prisoners participated (20,064 state and 4784 federal). The second stage response rate was 70.0% (69.3% state and 72.8% federal). Post-survey data cleaning included performing consistency checks, standardizing missing values, recoding responses, calculating derived variables, and checking for undocumented or out-of-range codes. The publicly available dataset is hosted by Inter-University Consortium for Political and Social Research (IUCPSR), and the data has been used in 33 published research articles (US BJS, 2021). The SPI represents a readily available large sample of incarcerated adults that includes participant responses sufficient to explore the relationship between perpetration of criminal harm and evidence of PITS.

The code book for the SPI includes 2,104 variables, of which 41 were selected for use in the present analysis. The combined federal and state data set was retrieved from the IUCPSR in SAS software format. Analysis was performed using JMP Pro 16.0.0.

**Participants and Exclusions**

Participants were incarcerated adults (age 18 and older) who participated in the SPI (2021). Respondents with sexual offenses ($n$ = 2158) were excluded from analysis. Crisford et al.

(2008) recommend excluding individuals with sex offenses from studies on offense-related PTSD due to poorly understood differences between perpetrators of sex offenses and perpetrators of other forms of violence in regard to guilt and blaming. Respondents without reported offenses (n = 370) were excluded from analysis due to the inability to assign them to a comparison group. Additionally, many of these respondents without reported offenses fell into the category of individuals being held in prison for non-criminal circumstances, such as psychiatric holds. Respondents with offenses described as "other" (n = 137) were excluded due to the uncertainty of the nature of their offense (i.e., is it violent or not?). In total, 2,665 respondents were excluded from the analysis.

One respondent reported only 2 total write ups in the prior 12 months but reported 240 write ups in the prior 12 months for assault on an inmate, representing both an extreme outlier and a contradiction of the stated 2 total write ups. Write up history for this respondent was omitted from write up analysis.

**Assignment to Comparison Group**

Included participants (*n* = 22,183) were assigned to one of three comparison groups based on variable rv0036, Controlling Offense Category, which coded the nature of the offense for which the participant was currently in prison, regardless of conviction or sentencing status. Assignments based on a most recent offense are both practical and reasonable for assessing PITS. In a study of offense related PTSD in which participants were asked to choose an offense they felt was most distressing, 88% chose their most recent offense (Crisford et al., 2007). Two additional variables were used for determining comparison group assignment: rv0131, which inquired about firearm use and whether the victim was shot and killed, and rv0497, which inquired about whether an injured victim died. In total, 97 inconsistencies were identified in

which the respondent endorsed having killed a victim, but their controlling offense was categorized as less than homicide (e.g., their arresting offense was listed as assault or weapons charges). These 97 respondents were assigned to the homicide group.

Participants with a Controlling Offense Category of "Homicide" were assigned to the homicide group ($n$ = 3,289; 24.14% female); "Robbery," "Assault," or "Other Violent" were assigned to the violent/non-lethal Group ($n$ = 5,582; 19.37% female); and "Burglary," "Other Property," "Drug Trafficking," "Drug Possession," "Other Drug," "Weapons," and "Other Public Order," were assigned to the nonviolent (control) group ($n$ = 13,312; 31.34% female). "Rape Sexual Assault" was coded for exclusion. See Appendix A for a full breakdown of demographic variables by offense group.

**Regression Model**

Nominal, ordinal, and continuous response variables were analyzed using a binomial logistic regression, ordinal logistic regression, and least squares general linear regression, respectively. Fitting of the regression models and selection of covariates was conducted using history of PTSD diagnosis as a target variable, as this single variable most closely reflected the underlying theoretical construct of perpetration induced traumatic stress. All regression models utilized the same list of covariates.

Determination of covariates to include in the regression model was first conducted based on a priori assumptions, followed by a review of correlations with demographic variables. Military combat experience was first identified as a covariate due to the degree of potential overlapping behavior history, such as having killed, though there would be significant differences in the nature and context of the killing. 'Serving in Combat or a War Zone' was

significantly associated with a history of PTSD diagnosis ($p < .001$), with those having served in combat being more likely to have endorsed a past PTSD diagnosis.

'Years in Prison' was identified as an important variable due to the nature of response variables that queried behavior "since admission to prison." Additionally, homicide is associated with longer sentences, necessitating controlling for differences between comparison groups based on how long they have been in prison. 'Years in Prison' was significantly associated with a history of PTSD diagnosis ($p < .001$), with more time in prison associated with decreasing likelihood of endorsing PTSD diagnosis. Age was similarly considered due to expected comparison group differences resulting from prison sentence length, and was also found to be significantly associated with PTSD diagnosis ($p < .001$), with younger respondents being more likely to endorse a history of PTSD diagnosis.

Lastly, sex differences in treatment utilization and exposure to traumatic events were anticipated to result in sex differences in endorsing past PTSD diagnosis, which was found to be the case: Female respondents were more likely to endorse a history of PTSD diagnosis ($p < .001$).

Remaining demographic variables were assessed for significant association with PTSD diagnosis, and all the following were found to be significantly associated ($p < .001$): Race/Hispanic origin, marital status, and highest year of education completed. Length of sentence was not included due to data inconsistencies resulting from the nature of long sentences, such as 'life' sentences that have no numeric value, and a high frequency of missing values.

Next, all variables were examined for possible collinearity. Age and years in prison were assumed to present issues related to collinearity, but the relationship between the remaining

variables was unclear. A general linear model with a binomial distribution was used to generate a table of correlation coefficients for all potential covariates. Correlation coefficients of 0.100 or higher were reviewed for potential collinearity; see Appendix B for list of correlation coefficients. Based on this analysis, age was omitted from the model due to concerns of collinearity with years in prison. The expected relationship between serving in combat, seeing combat, and being exposed to the wounded, dead, or dying was observed, providing further justification for only including 'serving in combat' in the model.

Finally, a forward stepwise regression analysis was used to fit the regression model. Individual covariates were added, using the lack of fit statistic and area under the curve of the receiver operator characteristic (AUC ROC) as a guide for whether adding additional covariates was contributing to improvement in the predictive power of the model. The resulting model included – in addition to offense type – the following covariates, in order of effect: sex, race, having served in combat, years in prison, marital status, and highest level of education completed (AUC = 0.7296; Lack of Fit, $p = 1.0$). See Appendix B for full results of stepwise analysis.

## Measures

### *Limitations*

A secondary analysis of existing data imposes limits on the selection of specific measures and investigating specific hypotheses (Cheng & Phillips, 2014). In this case, the dataset does not include responses to measures that are specific to PITS, moral injury, or PTSD, and therefore direct assessment of the correlation between offense type and any of these syndromes is not possible. A combination of measures from the SPI (US BJS, 2021) were utilized to investigate the incidence of PITS among respondents by examining known correlates with PITS in lieu of direct assessment of traumatic symptomatology. These correlate measures from the SPI included

participants' responses to questions about past mental health diagnoses, past mental health treatment, past substance use treatment, current mental health symptoms, current mental health treatment, current substance use treatment, and history of institutional infractions.

As the following measures are not specific to PITS, there is also the limitation of sensitivity. While these variables may have face validity and may be supported by existing studies on correlates with trauma syndromes, they may still have insufficient sensitivity to these syndromes to be detectable through a prisoner survey. In some cases, this limitation is overcome by the relatively large sample size. However, this highlights an additional limitation: some variables contain fewer responses, greatly reducing the available sample size when including those variables in analysis. For example, while nearly all included participants provided responses to a question about total write ups incurred since admission to prison (n = 21,736), only 5,146 participants' responses were available for analyzing history of violent write ups in the prior 12 months. Several questions regarding write ups, including write ups related to alcohol or drugs in the prior 12 months, were affected by a coding error, limiting interpretability of these variables (US BJS, 2021).

The measures employed in this analysis are not intended for clinical or diagnostic purposes. The intent of this analysis is not to diagnose or provide assessment of the presence of any particular syndrome, but rather to test the hypothesis that these measures will correlate with offense type. This study is relying on the available data, and is doing so without the availability of innumerable potentially confounding variables, such as history of past homicides, history of past trauma, history of mental illness prior to perpetration of an offense, history of substance misuse prior to perpetration of an offense, nature of past arrests, etc.

The SPI contains no validity measures, so it is not possible to gauge the truthfulness or accuracy of the information provided. Some outliers are easily recognized, such as a participant reporting 250 write ups in the prior 12 months, or reporting 900 lifetime arrests, but it is not possible to screen out more casual inaccuracies, such as respondents electing not to report symptoms or skipping questions, or inaccuracies that result from misunderstanding, such as language or reading barriers. The following measures were therefore selected and analyzed with appreciation for these limitations. All variables included in analysis are listed in Appendix A

***Diagnosed with a Mental or Emotional Condition***

Variables v1185 through v1191 coded responses about the history of being diagnosed by a medical doctor or mental health professional with a mental or emotional condition. Variable v1188 specifically inquired about a history of being diagnosed with PTSD; this variable was used to evaluate history of significant traumatic symptoms. However, diagnosis of PTSD was expected to be insufficient in detecting trauma symptoms, as there is evidence that PTSD is frequently undetected by health care providers or is frequently misdiagnosed. In a meta-analysis of PTSD detection in primary care settings, detection rates have been shown to vary from 0 to 46.5% (Greene et al., 2016). Taubman-Ben-Ari, Rabinowitz, and Feldman (2001) found that of 247 patients in a primary care setting who met full PTSD criteria, only six had been diagnosed with PTSD, while eight of 373 patients who did not meet full criteria were diagnosed with PTSD. Based on the low and variable detection rates of PTSD in health care settings, additional sources of information about symptoms were necessary to avoid excessive false negatives. Meltzer et al. (2012) found that 50% of patients meeting full criteria for PTSD were diagnosed with depression, and 23% were diagnosed with an anxiety disorder. In a meta-analysis of PTSD in prison settings, Facer-Irwin (2019) reported a significant association between PTSD and

comorbid depression and anxiety. PTSD is highly comorbid with depression and anxiety (Greene, 2016), and in health care settings it is more common for patients to receive depression or anxiety diagnoses instead of PTSD. Based on the higher frequency of diagnosing depression or anxiety disorders instead of or in addition to PTSD, variables v1186 and v1189 – history of being diagnosed with depression or an anxiety disorder, respectively (US BJS, 2021) – were included to measure evidence of PITS. History of other diagnoses was not included in the main analysis due to insufficient support for a correlation between other diagnoses and underlying PTSD. For example, Crisford (2008) found no relationship between offense-related traumatic symptoms and diagnosis of personality disorder. However, an analysis of other diagnoses was conducted for the purposes of detecting more general patterns that could provide alternative explanations for differences in the comparison groups.

***Kessler Psychological Distress Scale***

Kelley et al. (2019) observed an association between killing and depression and anxiety. Variables v1179 through v1184 inquired about the frequency of symptoms associated with depressed mood and anxiety during the prior 30 days (US BJS, 2021). The questions were based on the Kesseler Psychological Distress Scale-6 Item (K6), a tool designed for brief assessment of general psychopathology and derived from diagnostic criteria for depression and anxiety (Kessler et al., 2002). Frequency of symptoms in the past 30 days was rated as “All of the time,” “Most of the Time,” “Some of the Time,” “A Little of the Time,” or “None of the Time,” and included symptoms of nervousness, hopelessness, restlessness, depression, feeling that everything is an effort, and worthlessness. Validation of the K6 has shown that it is effective in identifying those who are experiencing clinically significant psychological distress, though it has not been validated for specifically detecting anxiety or depressive disorders (Lace et al., 2018).

While the K6 contains both a depression and anxiety factor, it is appropriately interpreted as a unidimensional measure (Carter et al., 2022). The sensitivity of the K6 can vary significantly depending on the type of disorder experienced by the respondent, producing potentially biased prevalence estimates (Veldhuizen et al., 2007). Therefore, Veldhuizen et la. (2007) recommend caution in interpreting population surveys using the K6. Responses were assigned scores based on Likert-scale scoring (e.g., "None of the Time" = 0, "All of the Time" = 4), and an aggregate "Total Score" was generated based on the sum of individual scale scores for v1179 through v1184. Recommended cut off scores for classifying risk have varied (Lace et al., 2018). For the purposes of this study a raw total-score association was measured rather than classifying respondents as at risk or not. Likert-scale scores were treated as ordinal, while the aggregate total score was treated as continuous.

***Mental Health Treatment***

Three variables are used to code history of mental health treatment, including whether the participant was taking prescribed psychiatric medication at the time of arrest (v1201), whether the participant had been prescribed psychiatric medication since admission to prison (v1202), and whether the participant had received counseling, treatment, or therapy from a mental health professional since admission to prison (v1204; US BJS, 2021). These variables did not provide specific insight into the nature of symptoms experienced but did provide a proximate detection of symptoms in general. Reviewing these variables based on endorsement of specific diagnoses provides better insight into the nature of the symptoms being treated, though still with a high level of uncertainty. For example, a respondent who endorses a diagnosis of depression and who reports taking psychiatric medication may be assumed – for the purpose of discussion – to be receiving pharmacological treatment for depression.

The variables v1201 and v1202 provided responses to the same question, differing only by point in time - the time of arrest - allowing for potential insight into how use of medications may have changed after admission to prison. When excluding respondents with multiple prison admissions, examination of v1201 and v1202 in combination provided insight into how treatment utilization changed after commission of an offense. First admission respondents who reported not taking medication at the time of arrest and who reported taking psychiatric medication after admission to prison were coded as having 'started' psychiatric medication after their offense; all others without multiple prison admissions were coded as not having 'started' psychiatric medication – either they were taking psychiatric medication before and after admission to prison, or they never took psychiatric medication in prison. Excluding multiple prison admissions removes potential instances of individuals taking psychiatric medication only in prison and not taking psychiatric medication when not in prison. This measure does not account for individuals who previously took psychiatric medication before admission to prison but for various reasons were not taking psychiatric medication at the time of their arrest, whether it was prescribed or not.

***Substance Use Treatment***

Hazardous alcohol use and use of drugs or alcohol as a coping mechanism have been correlated with a history of killing (Kelley et al., 2019; Purcell, 2016) and offense-related traumatic stress (Crisford, 2008). Three variables used to code history of substance use treatment were used for detecting potential substance misuse, including history of ever receiving substance use treatment (v1374), history of receiving substance use treatment in the community (v1378), and history of receiving substance use treatment since admission to prison (v1375; US BJS, 2021). Additionally, the number of write ups for drug or alcohol use since admission

(v1410) and in the prior 12 months (v1399) were examined for possible evidence of substance misuse regardless of history of accessing treatment; however, coding errors may have impacted the data in variable v1410 (US BJS, 2021).

Like the analysis of respondents who ‘started’ psychiatric medications after admission to prison, v1378 and v1375 provided similar measures that differed only by point in time when excluding respondents with multiple admissions to prison. For those who had been admitted to prison for the first time, community-based treatment would only have occurred prior to admission. Those who reported no community-based substance use treatment and reported receiving substance use treatment after admission to prison were coded as having ‘started’ substance use treatment. All others without multiple offenses were coded as not having 'started’ substance use treatment.

Sample sizes for v1378 and v1375 were reduced to only those who endorsed history of ever receiving treatment on v1374 ($n$ = 13,782), biasing the analysis towards only those with a history of substance use treatment. Therefore, for respondents who reported never having received substance use treatment on v1374, their responses were carried over to both v1378 and v1378, indicating that they had not received community-based treatment or treatment since admission, respectively. Only a subsample of the respondents ($n$ = 5,673) provided responses regarding specific types of write ups, which limited the interpretability of v1399 and write up history.

### *Write Up History*

The SPI (US BJS, 2021) included a series of questions about write up history since admission to prison. Within this set of responses were four variables, v1403 through v1406, that represented endorsement of verbal or physical violence within the prior 12 months, either against

an officer or against another inmate. PTSD and its symptoms are associated with a higher risk for aggression and violence (Collins & Bailey, 1990; Facer-Irwin, 2019; Howard et al., 2017; Wahlstrom et al., 2015). Therefore, evidence of ongoing aggression and violence could provide an indirect indicator of PITS. Homicide has been shown to be associated with the highest risk for recidivism (Liem, Zahn, and Tichavsky, 2014), though only 15% of the recidivism in that study was violent. Therefore, nonviolent write ups may be more common among homicide perpetrators, for which v1397, the number of write ups since admission to prison, and v1398, the number of write ups in the prior 12 months, were examined.

Responses to the four questions regarding write ups for assaultive behavior were combined. The number of verbal assaults against officers and inmates were combined into a total verbal assaults score. The number of physical assaults against officers and inmates were combined into a total physical assault score. Finally, the total verbal and physical assault scores were combined for a total assault score. These three aggregate assault scores were treated as continuous numeric variables.

## Procedures

### *Level 1 Analysis: All Respondents*

Binomial logistic regression analyses were conducted to examine the relationship between offense type and a history of endorsing a diagnosis of PTSD, depressive disorder, or anxiety disorder. Additionally, bipolar disorder, personality disorder, schizophrenia and ‘other’ diagnoses were examined to identify response patterns or alternative explanations for findings. The category of ‘Other’ diagnoses produced unstable results due to sample size and was therefore omitted from all analyses.

Ordinal logistic regression analyses were conducted to examine the relationship between offense type and responses to the K6. A least squares general linear regression analysis was conducted to examine these relationships with regards to an aggregate total mental health symptom score.

Binomial logistic regression analyses were conducted to examine the relationship between offense type and history of mental health treatment and substance use treatment. For mental health treatment, these analyses were repeated looking at only one diagnostic group at a time, using respondents' endorsements of past mental health diagnoses as a filter.

Least squares general linear regression analyses were conducted to examine the relationship between offense type and the number of write ups received, including general write ups, substance-related infractions, verbal assaults, physical assaults, and aggregate scores of total verbal assaults, total physical assaults, and total assaults.

***Level 2 Analysis: First Admission Respondents***

Further analyses required omitting respondents with multiple prison admissions. Level 1 analyses were repeated without respondents who reported multiple prison admissions to verify that the pattern of findings was generally retained with this subgroup, which will be referred to as first admission respondents. It was anticipated that there would be some differences between these analyses because of repeat admissions and multiple perpetrations. First admission respondents include individuals who reported one or zero total admissions to prison. Included in this group were 142 respondents awaiting trial. There was no significant association between awaiting trial and group assignment.

### *Level 3 Analysis: Starting Treatment Among First Admission Respondents*

Binomial logistic regression analyses were conducted to examine the relationship between offense type and 'starting' psychiatric medication and 'starting' substance use treatment after admission among only first admission respondents. Analysis of 'starting' psychiatric treatment looked at only one diagnostic group at a time, using respondents' endorsements of past mental health diagnoses as a filter. 'Other' diagnosis category was not included in results due to small sample size and instability of the results.

### *Follow-Up Analyses*

A review of results and limitations of the study produced additional possible analyses, which were conducted and presented as follow-up analyses. First, analyses of the associations between offense type and key outcome variables were repeated while excluding respondents who had endorsed being diagnosed with a personality disorder. These results were reported to inform discussion on the possible influence of ASPD on PTSD diagnosis and mental health treatment utilization. Second, the analysis of the association between offense type and 'starting' substance use treatment was repeated with offense type broken down into individual controlling offense types rather than pooling offense types into offense categories. Third, a regression analysis was conducted to examine the relationship between the number of times an individual had been admitted to prison and scores on the K6 to evaluate to inform discussion on the direction of relationship between emotional distress and violence. These results were reported to inform discussion on the possible influence of drug-related offenses on the odds of the nonviolent group utilizing substance use treatments. These results were included as complimentary to the main results, as they were not part of the original study design.

# Chapter 4: Results

## Level 1 and Level 2 Analyses

### *Diagnoses*

Odds of endorsing diagnoses were evaluated using binomial logistic regression analyses, setting each diagnosis as the outcome variable. The whole model test for PTSD diagnosis was significant ($p < .001$). Parameter estimates were significant for both the homicide ($\beta = .26$, $p < .001$) and violent/non-lethal groups ($\beta = .08$, $p = .018$; see Table 1). The odds of endorsing a diagnosis of PTSD were 80% higher for the homicide group ($p < .001$) compared with the nonviolent group and 19% higher ($p = .010$) compared with the violent/non-lethal group when all covariates were held constant. The odds of endorsing a diagnosis of PTSD were 51% higher ($p < .001$) for the violent/non-lethal group compared with the nonviolent group when all covariates were held constant.

These findings were similar when only comparing first admission respondents. However, the parameter estimate for the violent/non-lethal group only trended towards significance with this subsample ($\beta = .08$, $p = .063$), indicating the violent/non-lethal group did not significantly contribute to the overall likelihood of being diagnosed with PTSD for first admission respondents, while the homicide group did ($\beta = .28$, $p < .001$).

**Table 1**

*Regression Coefficients and Associations of Offense Type and PTSD*

| | | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| Level 1 | Homicide | | 0.26 | 0.04 | 0.17 | 0.34 | **<.001** |
| | Violent-NL | | 0.08 | 0.03 | 0.01 | 0.14 | **.018** |
| Level 2 | Homicide | | 0.28 | 0.05 | 0.18 | 0.39 | **<.001** |
| | Violent-NL | | 0.08 | 0.04 | -0.01 | 0.16 | .063 |
| Comparisons | | | Odds Ratio | | LL | UL | *p* |
| Level 1 | Homicide | Violent-NL | 1.19 | | 1.04 | 1.37 | **.010** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Homicide | Nonviolent | 1.80 | 1.58 | 2.05 | **<.001** |
| | Violent-NL | Nonviolent | 1.51 | 1.37 | 1.65 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.23 | 1.04 | 1.45 | **.016** |
| | Homicide | Nonviolent | 1.91 | 1.63 | 2.24 | **<.001** |
| | Violent-NL | Nonviolent | 1.56 | 1.37 | 1.77 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

For endorsement of a diagnosis of a depressive disorder, the whole model was significant ($p < .001$). Parameter estimates were significant for both the homicide ($\beta = .11$, $p < .001$) and violent/non-lethal groups ($\beta = .15$, $p < .001$; see Table 2). The odds of endorsing a diagnosis of a depressive disorder were 46% higher for the homicide group ($p < .001$) and 52% higher for the violent/non-lethal group ($p < .001$) compared with the nonviolent group when all covariates were held constant. There was no significant difference in odds when comparing the homicide and violent/non-lethal groups. These findings were similar when only comparing first admission respondents.

**Table 2**

*Regression Coefficients and Associations of Offense Type and Depressive Disorder*

| | | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| Level 1 | Homicide | | 0.11 | 0.04 | 0.05 | 0.18 | **<.001** |
| | Violent-NL | | 0.15 | 0.03 | 0.10 | 0.21 | **<.001** |
| Level 2 | Homicide | | 0.16 | 0.04 | 0.07 | 0.24 | **<.001** |
| | Violent-NL | | 0.15 | 0.04 | 0.09 | 0.23 | **<.001** |
| Comparisons | | | Odds Ratio | | LL | UL | *p* |
| Level 1 | Homicide | Violent-NL | 0.96 | | 0.86 | 1.07 | .464 |
| | Homicide | Nonviolent | 1.46 | | 1.31 | 1.63 | **<.001** |
| | Violent-NL | Nonviolent | 1.52 | | 1.41 | 1.64 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.00 | | 0.87 | 1.15 | .955 |
| | Homicide | Nonviolent | 1.60 | | 1.40 | 1.84 | **<.001** |
| | Violent-NL | Nonviolent | 1.60 | | 1.44 | 1.77 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

For endorsement of a diagnosis of an anxiety disorder, the whole model was significant ($p < .001$). Parameter estimates were significant for both the homicide ($\beta = .12$, $p = .001$) and violent/non-lethal groups ($\beta = .10$, $p = .001$; see Table 3). The odds of endorsing a diagnosis of an anxiety disorder were 39% higher for the homicide group ($p < .001$) and 38% higher for the violent/non-lethal group ($p < .001$) compared with the nonviolent group when all covariates were held constant. There was no significant difference in odds when comparing the homicide and violent/non-lethal groups. These findings were similar when only comparing first admission respondents.

**Table 3**

*Regression Coefficients and Associations of Offense Type and Anxiety Disorder*

| | | | Estimate | SE | 95% CI | | p |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| Level 1 | Homicide | | 0.12 | 0.04 | 0.04 | 0.19 | **.001** |
| | Violent-NL | | 0.10 | 0.03 | 0.05 | 0.16 | **.001** |
| Level 2 | Homicide | | 0.14 | 0.05 | 0.03 | 0.21 | **.004** |
| | Violent-NL | | 0.12 | 0.04 | 0.05 | 0.20 | **.002** |
| Comparisons | | | Odds Ratio | | LL | UL | p |
| Level 1 | Homicide | Violent-NL | 1.03 | | 0.91 | 1.16 | .654 |
| | Homicide | Nonviolent | 1.41 | | 1.26 | 1.59 | **<.001** |
| | Violent-NL | Nonviolent | 1.37 | | 1.27 | 1.49 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.02 | | 0.88 | 1.19 | .797 |
| | Homicide | Nonviolent | 1.48 | | 1.28 | 1.72 | **<.001** |
| | Violent-NL | Nonviolent | 1.45 | | 1.30 | 1.63 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

For comparison purposes, all available psychiatric diagnosis categories were compared by offense type, except for the "Other" category due to sample size. See Appendix B for a full listing of these results. For all diagnoses, offense type was significantly associated with the odds of endorsing a psychiatric diagnosis.

For most diagnoses, the odds of endorsing a given diagnosis were relatively equivalent when comparing the homicide and violent/non-lethal groups, with two exceptions. PTSD diagnosis was the only response variable for which the homicide group was associated with significantly higher odds of diagnosis endorsement than the violent/non-lethal group. Bipolar diagnosis was the only response variable for which the violent/non-lethal group was associated with significantly higher odds of a diagnosis endorsement than the homicide group. The nonviolent group was associated with significantly lower odds of a diagnosis endorsement across all diagnosis categories.

***Kessler Psychological Distress Scale***

Ordinal logistic regression analyses were conducted to investigate associations between offense type and reporting of various mental health symptoms over a prior 30-day period. See Appendix B for a full listing of the results of these analyses.

For the symptom of nervousness, the whole model was significant ($p < .001$). Parameter estimates were significant for both the homicide ($\beta = .09$, $p = .002$) and the violent/non-lethal groups ($\beta = .06$, $p = .004$). Excluding the violent/non-lethal group, the homicide group was associated with an 11% increase in nervousness score compared to the nonviolent group when all covariates were held constant ($p < .001$). Excluding the homicide group, the violent/non-lethal group was associated with 12% increase in nervousness score compared to the nonviolent group when all covariates were held constant ($p < .001$). When excluding the nonviolent group, there

was no significant difference between the homicide and violent/non-lethal groups. These findings were similar when comparing only first admission respondents.

For the symptom of hopelessness, the whole model was significant ($p < .001$). The parameter estimate for the homicide group was significant ($\beta = .21$, $p < .001$). Excluding the violent/non-lethal group, the homicide group was associated with a 24% increase in hopelessness score compared to the nonviolent group when all covariates were held constant ($p < .001$). Excluding the homicide group, the violent/non-lethal group was associated with a 13% increase in hopelessness score compared to the nonviolent group when all covariates were held constant ($p < .001$). When excluding nonviolent offenses, the homicide group was associated with a 9% increase in hopelessness score compared to the violent/non-lethal group ($p = .001$). These findings were similar when only comparing first admission respondents.

For the symptom of restlessness, the whole model was significant ($p < .001$). Parameter estimates were significant for both the homicide ($\beta = .08$, $p = .004$) and violent/non-lethal groups ($\beta = .085$, $p < .001$). Excluding the violent/non-lethal group, the homicide group was associated with a 13% increase in restlessness score compared to the nonviolent group when all covariates were held constant ($p < .001$). Excluding the homicide group, the violent/non-lethal group was associated with a 13% increase in restlessness score compared to the nonviolent group when all covariates were held constant ($p < .001$). When excluding the nonviolent group, there was no significant difference between the homicide and violent/non-lethal groups. These findings were similar when comparing only first admission respondents.

For the symptom of depression, the whole model was significant ($p < .001$). Parameter estimates were significant for both the homicide ($\beta = .14$, $p < .001$) and violent/non-lethal groups ($\beta = .08$, $p < .001$). Excluding the violent/non-lethal group, the homicide group was associated

with a 20% increase in depression score compared to the nonviolent group when all covariates were held constant ($p < .001$). Excluding the homicide group, the violent/non-lethal group was associated with an 18% increase in depression score compared to the nonviolent group when all covariates were held constant ($p < .001$). When excluding nonviolent offenses, there was no significant difference between the homicide and violent/non-lethal groups. These findings were similar when comparing only first admission respondents.

For the symptom of everything feeling like an effort, the whole model was significant ($p < .001$). Parameter estimates were significant for both the homicide ($\beta = .07$, $p = .010$) and violent/non-lethal groups ($\beta = .07$, $p = .001$). Excluding the violent/non-lethal group, the homicide group was associated with a 13% increase in everything feeling like an effort compared to the nonviolent group when all covariates were held constant ($p < .001$). Excluding the homicide group, the violent/non-lethal group was associated with an 11% increase in everything feeling like an effort compared to the nonviolent group when all covariates were held constant ($p < .001$). When excluding the nonviolent group, there was no significant difference between the homicide and violent/non-lethal groups. These findings were similar when comparing only first admission respondents.

For the symptom of worthlessness, the whole model was significant ($p < .001$). The parameter estimate for the homicide group was significant ($\beta = .14$, $p < .001$). Excluding the violent/non-lethal group, the homicide group was associated with a 17% increase in worthlessness score compared to the nonviolent group when all covariates were held constant ($p < .001$). Excluding the homicide group, the violent/non-lethal group was associated with a 12% increase in worthlessness score compared to the nonviolent group when all covariates were held constant ($p < .001$). When excluding the nonviolent group, there was no significant difference

between the homicide and violent/non-lethal groups. However, among first admission respondents, there was as significant difference between the homicide and violent/non-lethal groups, where the homicide group was associated with a 7% increase in worthlessness score compared to the violent/non-lethal group when all covariates were held constant ($p = .037$).

A least squares general linear regression analysis was conducted to evaluate the relationship between offense type and an aggregate mental health symptoms score based on the sum of Likert-scale responses (see Table 4). An analysis of variance (ANOVA) showed that the whole model was significant ($p < .001$). Effect test revealed that offense type was significant ($F < .001$). Parameter estimates were significant for both the homicide ($\beta = .40$, $p < .001$) and violent/non-lethal groups ($\beta = .25$, $p < .001$). Excluding the violent/non-lethal group, the homicide group was associated with an 69% increase, or an average 0.52-point increase, in aggregate mental health symptoms score compared to the nonviolent group when all covariates were held constant ($p < .001$). Excluding the homicide group, the violent/non-lethal group was associated with a 59% increase, or an average 0.46-point increase, in aggregate mental health symptoms score compared to the nonviolent group when all covariates were held constant ($p < .001$). When excluding the nonviolent group, there was no significant difference between the homicide and violent/non-lethal groups. These findings were similar when comparing only first admission respondents.

**Table 4**

*Regression Coefficients and Associations of Offense Type and Mental Health Symptoms*

| | | β | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|
| Parameter Effects | | | | LL | UL | |
| Level 1 | Homicide | 0.40 | 0.08 | 0.25 | 0.56 | **<.001** |
| | Violent-NL | 0.25 | 0.06 | 0.13 | 0.37 | **<.001** |
| Level 2 | Homicide | 0.43 | 0.10 | .24 | .62 | **<.001** |
| | Violent-NL | 0.23 | 0.08 | .08 | .39 | **.003** |

| Comparisons | | | Exp(β) | β | | LL | UL | *p* |
|---|---|---|---|---|---|---|---|---|
| Level 1 | Homicide | Violent-NL | 1.07 | 0.07 | .07 | -0.07 | 0.20 | .328 |
| | Homicide | Nonviolent | 1.69 | 0.52 | 0.06 | 0.40 | 0.65 | **<.001** |
| | Violent-NL | Nonviolent | 1.59 | 0.46 | 0.05 | 0.37 | 0.55 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.08 | 0.08 | 0.08 | -0.09 | 0.24 | .361 |
| | Homicide | Nonviolent | 1.69 | 0.53 | 0.08 | 0.37 | 0.68 | **<.001** |
| | Violent-NL | Nonviolent | 1.60 | 0.47 | 0.06 | 0.35 | 0.59 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent offender group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

***Mental Health Treatment***

Odds of endorsing a history of various mental health treatments were evaluated using binomial logistic regression analyses, setting each treatment history as the outcome variable. See Appendix B for a full list of the results broken down by each diagnostic category.

The whole model test for taking prescribed psychiatric medication at the time of arrest was significant ($p < .001$). The parameter estimate was significant for the violent/non-lethal group ($\beta = .13$, $p < .001$; see Table 5). The odds of taking prescribed psychiatric medication at the time of arrest were 26% higher for the homicide group ($p = .001$) and 37% higher for the violent/non-lethal group ($p < .001$) compared with the nonviolent group when all covariates were held constant. When only comparing first admission respondents, results were similar, except that the homicide group was no longer associated with significantly higher odds of taking psychiatric medication at the time of arrest compared to the nonviolent group.

When looking at each diagnostic category individually, there were no significant differences between the three comparison groups in terms of probability of taking psychiatric medication at the time of arrest. However, when omitting respondents with multiple admissions to prison, there was a significant effect of homicide offense on taking prescription medication at

the time of arrest for those who had endorsed a PTSD diagnosis, with the homicide group being associated with lower odds of taking medication than the violent/non-lethal group (OR = .72, $p$ = .038). See Appendix B for a full listing of results broken down by diagnosis.

**Table 5**

*Regression Coefficients and Associations of Offense Type and Psychiatric Medication at Arrest*

| | | | Estimate | SE | 95% CI | | $p$ |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| Level 1 | Homicide | | 0.05 | 0.05 | -0.05 | 0.13 | .293 |
| | Violent-NL | | 0.13 | 0.03 | 0.07 | 0.21 | **<.001** |
| Level 2 | Homicide | | 0.00 | 0.06 | -0.13 | 0.08 | .953 |
| | Violent-NL | | 0.14 | 0.04 | 0.07 | 0.24 | **.002** |
| | | | Odds Ratio | | LL | UL | $p$ |
| Comparisons | | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.92 | | 0.79 | 1.06 | .243 |
| | Homicide | Nonviolent | 1.26 | | 1.10 | 1.45 | **.001** |
| | Violent-NL | Nonviolent | 1.37 | | 1.25 | 1.50 | **<.001** |
| Level 2 | Homicide | Violent-NL | 0.87 | | 0.73 | 1.04 | .124 |
| | Homicide | Nonviolent | 1.14 | | 0.96 | 1.35 | .137 |
| | Violent-NL | Nonviolent | 1.31 | | 1.15 | 1.48 | **<.001** |

Note. $p$-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

The whole model test for taking prescribed psychiatric medication since admission to prison was significant ($p < .001$). Parameter estimates were significant for both the homicide (β = 0.20, $p < .001$) and violent/non-lethal groups (β = 0.22, $p < .001$; see Table 6). The odds of taking prescribed psychiatric medication since admission were 86% higher for the homicide group ($p < .001$) and 89% higher for the violent/non-lethal group ($p < .001$) compared with the nonviolent group when all covariates were held constant. These findings were similar when only comparing first admission respondents.

When looking at each diagnostic category individually, there were few significant differences between the three comparison groups in regard to probability of taking psychiatric medication since admission. One exception was that of the homicide group not contributing significantly to the model for just those respondents who endorsed a diagnosis of either personality disorder or schizophrenia. Among those without multiple prison admissions, only the homicide group contributed significantly to the model for those who endorsed a diagnosis of PTSD, anxiety disorder, depressive disorder, or bipolar disorder. However, the general pattern of the homicide and violent/non-lethal groups being associated with significantly higher odds of taking prescribed psychiatric medication since admission remained mostly consistent. The exception to this pattern was for those who had endorsed a diagnosis of depression: For those without multiple prison admissions, the odds of being prescribed psychiatric medication since admission were 38% higher for the homicide group compared to the violent/non-lethal group ($p$ = .0142). See Appendix B for a full listing of results broken down by diagnosis.

**Table 6**

*Regression Coefficients and Associations of Offense Type and Psychiatric Medication After Admission*

| | | | Estimate | SE | 95% CI | | $p$ |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| Level 1 | Homicide | | 0.20 | 0.03 | 0.13 | 0.27 | **<.001** |
| | Violent-NL | | 0.22 | 0.03 | 0.16 | 0.27 | **<.001** |
| Level 2 | Homicide | | 0.26 | 0.04 | 0.17 | 0.33 | **<.001** |
| | Violent-NL | | 0.19 | 0.04 | 0.12 | 0.26 | **<.001** |
| Comparisons | | | Odds Ratio | | LL | UL | $p$ |
| Level 1 | Homicide | Violent-NL | 0.98 | | 0.88 | 1.10 | .781 |
| | Homicide | Nonviolent | 1.86 | | 1.67 | 2.07 | **<.001** |
| | Violent-NL | Nonviolent | 1.89 | | 1.74 | 2.04 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.07 | | 0.93 | 1.23 | .350 |
| | Homicide | Nonviolent | 2.02 | | 1.76 | 2.32 | **<.001** |
| | Violent-NL | Nonviolent | 1.89 | | 1.70 | 2.11 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent offender group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit.

The whole model test for receiving counseling since admission to prison was significant ($p < .001$). Parameter estimates were significant for both the homicide ($\beta = 0.22$, $p < .001$) and violent/non-lethal groups ($\beta = 0.16$, $p < .001$; see Table 7). The odds of receiving counseling since admission to prison were 84% higher for the homicide group ($p < .001$) and 72% higher for the violent/non-lethal group ($p < .001$) compared with the nonviolent group when all covariates were held constant. These findings were similar when only comparing first admission respondents, with a notable adjustment: The difference between the homicide group and the violent/non-lethal group trended towards significance.

When looking at each diagnostic category individually, the homicide group contributed significantly to the model for those who endorsed diagnoses of PTSD, anxiety disorder, depressive disorder, or bipolar disorder, while the violent/non-lethal group contributed significantly to the model for those who had endorsed a diagnosis of personality disorder. Among first admission respondents, the violent/non-lethal group no longer contributed significantly to the model. The general pattern of the homicide and violent/non-lethal groups being associated with significantly higher odds of receiving counseling since admission remained mostly consistent, with two exceptions: There was a trend towards significance comparing the homicide and violent/nonviolent groups (OR = 1.28, $p = .071$); and the odds of receiving counseling since admission for those with a diagnosis of a depressive disorder were 27% higher for the homicide group compared to a the violent/non-lethal group ($p = .048$). See Appendix B for a full listing of results broken down by diagnosis.

**Table 7**

*Regression Coefficients and Associations of Offense Type and Counseling After Admission*

| | | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| Level 1 | Homicide | | 0.21 | 0.03 | 0.14 | 0.27 | **<.001** |
| | Violent-NL | | 0.17 | 0.03 | 0.12 | 0.22 | **<.001** |
| Level 2 | Homicide | | 0.26 | 0.04 | 0.18 | 0.34 | **<.001** |
| | Violent-NL | | 0.15 | 0.03 | 0.08 | 0.22 | **<.001** |
| Comparisons | | | Odds Ratio | | LL | UL | *p* |
| Level 1 | Homicide | Violent-NL | 1.04 | | 0.93 | 1.16 | .499 |
| | Homicide | Nonviolent | 1.80 | | 1.62 | 2.00 | **<.001** |
| | Violent-NL | Nonviolent | 1.74 | | 1.61 | 1.88 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.12 | | 0.98 | 1.28 | 0.095 |
| | Homicide | Nonviolent | 1.96 | | 1.72 | 2.24 | **<.001** |
| | Violent-NL | Nonviolent | 1.75 | | 1.57 | 1.95 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

***Substance Use Treatment***

Odds of endorsing a history of substance use treatment were evaluated using binomial logistic regression analyses, setting each treatment history as the outcome variable. See Appendix B for a full listing of the results of these analyses.

The whole model test for having ever received substance use treatment in any setting was significant ($p < .001$). The parameter estimate was significant for the homicide group ($\beta = -.27$, $p < .001$; see Table 8). The odds of ever receiving substance use treatment were 72% lower for the homicide group ($p < .001$) and 32% lower for the violent/non-lethal group ($p < .001$) compared with the nonviolent group when all covariates were held constant. These findings remained similar when only comparing first admission respondents.

**Table 8**

*Regression Coefficients and Associations of Offense Type and Substance Use Treatment (Ever)*

| | | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| Level 1 | Homicide | | -0.27 | 0.03 | -0.33 | -0.21 | **<.001** |
| | Violent-NL | | 0.00 | 0.02 | -0.05 | 0.05 | .912 |
| Level 2 | Homicide | | -0.25 | 0.04 | -0.33 | -0.17 | **<.001** |
| | Violent-NL | | -0.02 | 0.03 | -0.09 | 0.04 | .524 |
| Comparisons | | | Odds Ratio | | LL | UL | *p* |
| Level 1 | Homicide | Violent-NL | 0.76 | | 0.69 | 0.85 | **<.001** |
| | Homicide | Nonviolent | 0.58 | | 0.53 | 0.64 | **<.001** |
| | Violent-NL | Nonviolent | 0.76 | | 0.71 | 0.81 | **<.001** |
| Level 2 | Homicide | Violent-NL | 0.80 | | 0.70 | 0.91 | **<.001** |
| | Homicide | Nonviolent | 0.60 | | 0.52 | 0.68 | **<.001** |
| | Violent-NL | Nonviolent | 0.75 | | 0.68 | 0.82 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent offender group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

The whole model test for having received substance use treatment in the community was significant ($p < .001$). Parameter estimates were significant for both the homicide ($\beta = -0.13$, $p = .007$) and violent/non-lethal groups ($\beta = 0.11$, $p = .001$; see Table 9). The odds of reporting receiving substance use treatment in the community were 27% lower for the homicide group compared with the violent/non-lethal group when all covariates were held constant ($p < .001$). The odds of reporting ever receiving substance use treatment were 10% higher for the violent/non-lethal group compared with the nonviolent group when all covariates were held constant ($p = .045$).

Among first admission respondents, parameter estimates for both the homicide and violent/non-lethal groups were non-significant, and there were no significant differences in odds when comparing the three offense types.

**Table 9**

*Regression Coefficients and Associations of Offense Type and Community Substance Use Treatment*

| | | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| Level 1 | Homicide | | -0.13 | 0.05 | -0.22 | -0.03 | **.007** |
| | Violent-NL | | 0.11 | 0.03 | 0.04 | 0.18 | **.001** |
| Level 2 | Homicide | | -0.09 | 0.06 | -0.21 | 0.03 | .138 |
| | Violent-NL | | 0.05 | 0.05 | -0.04 | 0.15 | .265 |
| Comparisons | | | Odds Ratio | | LL | UL | *p* |
| Level 1 | Homicide | Violent-NL | 0.79 | | 0.68 | 0.92 | **.002** |
| | Homicide | Nonviolent | 0.87 | | 0.75 | 1.00 | .050 |
| | Violent-NL | Nonviolent | 1.10 | | 1.00 | 1.21 | **.045** |
| Level 2 | Homicide | Violent-NL | 0.87 | | 0.72 | 1.05 | .152 |
| | Homicide | Nonviolent | 0.88 | | 0.74 | 1.06 | .182 |
| | Violent-NL | Nonviolent | 1.02 | | 0.89 | 1.16 | .804 |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

The whole model test for having received substance use treatment since admission to prison was significant ($p < .001$). The parameter estimate was significant for the homicide group ($\beta = -0.39$, $p < .001$; see Table 10). The odds of receiving substance use treatment since admission were 120% lower for the homicide group ($p < .001$) and 51% lower for the violent/non-lethal group ($p < .001$) compared with the nonviolent group when all covariates were held constant. The odds of receiving substance use treatment since admission were 46% lower for the homicide group compared to the violent/non-lethal group when all covariates were held constant ($p < .001$). These findings remained consistent when comparing only those without multiple prison admissions.

**Table 10**

*Regression Coefficients and Associations of Offense Type and Substance Use Treatment After Admission*

| | | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| Level 1 | Homicide | | -0.39 | 0.04 | -0.47 | -0.31 | **<.001** |
| | Violent-NL | | -0.01 | 0.03 | -0.07 | 0.05 | .685 |
| Level 2 | Homicide | | -0.37 | 0.05 | -0.46 | -0.27 | **<.001** |
| | Violent-NL | | -0.02 | 0.04 | -0.10 | 0.06 | .669 |
| Comparisons | | | Odds Ratio | | LL | UL | *p* |
| Level 1 | Homicide | Violent-NL | 0.69 | | 0.61 | 0.78 | **<.001** |
| | Homicide | Nonviolent | 0.46 | | 0.40 | 0.51 | **<.001** |
| | Violent-NL | Nonviolent | 0.66 | | 0.61 | 0.72 | **<.001** |
| Level 2 | Homicide | Violent-NL | 0.70 | | 0.60 | 0.83 | **<.001** |
| | Homicide | Nonviolent | 0.47 | | 0.40 | 0.55 | **<.001** |
| | Violent-NL | Nonviolent | 0.67 | | 0.60 | 0.75 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent offender group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

***Write Up History***

Least squares general linear regression analyses were conducted to examine the association between offense type and history of write-up infractions. See Appendix B for a full listing of all write up analyses.

For total write ups since admission to prison, an ANOVA showed that the whole model was significant ($p < .001$). The effect test revealed that offense type was significant ($F < .001$). The parameter estimate was significant for the violent/non-lethal group ($\beta = 1.76$, $p < .001$; see Table 11). Excluding the violent/non-lethal group, the homicide group was associated with 260% more total write ups since admission, or about 1.28 write ups, compared to the nonviolent group ($p < .001$). Excluding the homicide group, the violent/non-lethal group was associated with 285% more total write ups since admission, or about 1.31 write ups, compared to the nonviolent

group when all covariates were held constant ($p < .001$). Excluding the nonviolent group, the homicide group was associated with 65% fewer total write ups since admission, or about 1.05 write ups, compared to the violent/non-lethal group when all covariates were held constant ($p = .015$). Among first admission respondents, there were not significant intergroup differences.

The general linear regression model was not significant for an association between offense type and drug and alcohol write ups, both for all such write ups since admission ($p < .973$), and all such write ups in the prior 12-month period ($p = .250$). There were no significant intergroup differences, even when limiting analysis to just first admission respondents.

For all write ups in the prior 12 months, an ANOVA showed that the whole model was significant ($p < .001$). An effect test revealed that the offense type was significant ($F = .003$). The parameter estimate was significant for the violent/non-lethal group ($\beta = 0.26$, $p = .006$; see Table 11). Excluding the nonviolent group, there was no significant difference between the homicide and violent/non-lethal groups. Similarly, excluding the violent/non-lethal group, there was no significant difference between the homicide and nonviolent groups. Excluding the homicide group, the violent/non-lethal group was associated with 31% more write ups in the prior 12 months, or about 0.27 more write ups when compared with the nonviolent group and all covariates were held constant ($p = .001$), though this significance was not observed among first admission respondents.

**Table 11**

*Regression Coefficients and Associations of Offense Type and Write Ups*

| Parameter | Effects | β | SE | 95% CI LL | 95% CI UL | *p* |
|---|---|---|---|---|---|---|
| Total Write Ups Since Admission | | | | | | |
| Level 1 | Homicide | -0.44 | 0.32 | -1.07 | 0.18 | .163 |
| | Violent-NL | 1.76 | 0.25 | 1.28 | 2.24 | **<.001** |
| Level 2 | Homicide | -0.64 | 0.40 | -1.42 | 0.14 | .110 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Violent-NL | | 1.98 | 0.33 | 1.34 | 2.62 | **<.001** |
| | | Total Write Ups in the Prior 12 Months | | | | | |
| Level 1 | Homicide | | 0.00 | 0.11 | -0.22 | 0.22 | .970 |
| | Violent-NL | | 0.26 | 0.09 | 0.08 | 0.44 | **.006** |
| Level 2 | Homicide | | -0.08 | 0.15 | -0.37 | 0.21 | .604 |
| | Violent-NL | | 0.13 | 0.13 | -0.12 | 0.39 | .305 |

| Comparisons | | | Exp(β) | β | SE | LL | UL | *p* |
|---|---|---|---|---|---|---|---|---|
| | | Total Write Ups Since Admission | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.35 | -1.05 | 0.37 | -1.77 | -0.33 | **.015** |
| | Homicide | Nonviolent | 3.60 | 1.28 | 0.24 | 0.81 | 1.75 | **<.001** |
| | Violent-NL | Nonviolent | 3.85 | 1.35 | 0.16 | 1.04 | 1.65 | **<.001** |
| Level 2 | Homicide | Violent-NL | 0.29 | -1.22 | 0.45 | -2.10 | -0.34 | **.007** |
| | Homicide | Nonviolent | 2.93 | 1.07 | 0.31 | 0.47 | 1.68 | **.001** |
| | Violent-NL | Nonviolent | 4.47 | 1.50 | 0.21 | 1.08 | 1.91 | .451 |
| | | Total Write Ups in Prior 12 Months | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.90 | -0.10 | 0.10 | -0.29 | 0.09 | .287 |
| | Homicide | Nonviolent | 1.08 | 0.08 | 0.09 | -0.10 | 0.26 | .387 |
| | Violent-NL | Nonviolent | 1.31 | 0.27 | 0.08 | 0.11 | 0.42 | **.001** |
| Level 2 | Homicide | Violent-NL | 0.93 | -0.07 | 0.11 | -0.29 | 0.15 | .523 |
| | Homicide | Nonviolent | 0.92 | -0.08 | 0.13 | -0.34 | 0.18 | .541 |
| | Violent-NL | Nonviolent | 1.10 | 0.09 | 0.12 | -0.15 | 0.33 | .451 |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

Regarding verbal and physical assaults, only the ANOVA for physical assaults against inmates was significant for the whole model ($p < .001$), and offense type significantly contributed to the model ($F = .001$). Excluding the homicide group, the violent/non-lethal group was associated with 8% more physical assaults against inmates in the prior 12 months, or about 0.08 write ups, compared to the nonviolent group when all covariates were held constant ($p < .001$); this finding was relatively consistent among first admission respondents.

For verbal assaults against officers, the whole model was not significant, though it was the only other form of assault for which offense type contributed significantly to the model ($F = .015$). Excluding the violent/non-lethal group, the homicide group was associated with 23% more verbal assaults against officers in the prior 12 months, or about 0.21 more write ups, compared to

the nonviolent group when all covariates were held constant ($p = .006$), though this significance was reduced to only a trend among first admission respondents ($p = .070$).

The general linear regression model for write ups for physical assault against an officer and verbal assault against an inmate were not significant ($p = .628$; $p = .126$, respectively). Only one group comparison, that of the violent/non-lethal and nonviolent groups (excluding the homicide group), revealed a significant association, with the violent/non-lethal group being associated with 4% more verbal assaults against inmates in the prior 12 months, or about 0.04 write ups ($p = .041$). There were no other significant differences between comparison groups, even among first admission respondents.

For aggregate verbal assault write ups (both on officers and inmates) an ANOVA showed that the whole model trended towards significance ($p = .055$). The effect test revealed that the offense type was significant ($F = .010$). The parameter estimate was significant for the homicide group ($\beta = 0.24$, $p = .017$). Excluding the violent/non-lethal group, the homicide group was associated with 29% more verbal assaults in the prior 12 months, or about 0.25 more write ups, compared with the nonviolent group when all covariates were held constant ($p = .005$). Excluding the homicide group, the violent/non-lethal group was associated with 12% more verbal assaults in the prior 12 months, or about 0.11 more write ups, compared to the nonviolent group when all covariates were held constant ($p = .020$). These associations were not present among first admission respondents, though the comparison between violent/non-lethal and the nonviolent group trended towards significance ($p = .079$).

For aggregate physical assault write ups (both on officers and inmates) an ANOVA showed that the whole model was significant ($p < .001$). The effect test revealed that the offense type was significant ($F = .009$). Excluding the homicide group, the violent/non-lethal group was

associated with 9% more physical assaults in the prior 12 months, or about 0.09 more write ups, compared with the nonviolent group when all covariates were held constant ($p = .001$). This association only trended towards significance among first admission respondents ($p = .083$).

The combined aggregate of verbal and physical assault write ups (both on officers and inmates) showed a significant whole model effect ($p < .001$) and significant effect of offense type ($F = .009$). Excluding the violent/non-lethal group, there was only a trend towards significance when comparing the homicide and nonviolent groups ($p = .070$). Excluding the homicide group, the violent/non-lethal group was associated with 22% more total assaults in the prior 12 months, or about 0.20 more write ups, compared with the nonviolent group when all covariates were held constant ($p = .001$). The significance of this association was maintained when excluding respondents with multiple prison admissions.

**Level 3 Analysis**

***Starting New Treatments After Arrest***

Binomial logistic regression analyses were conducted to examine the association between offense type and starting treatments after the commission of an offense.

The binomial logistic regression analysis for starting psychiatric medication – those without multiple admissions to prison who reported not taking medication at the time of arrest and taking medication since admission to prison - was significant ($p < .001$). Parameter estimates were significant for both the homicide ($\beta = 0.28$, $p < .001$) and violent/non-lethal groups ($\beta = 0.14$, $p < .001$; see Table 12). The odds of starting psychiatric medication after arrest were 103% higher for the homicide group ($p < .001$) and 76% higher for the violent/non-lethal group ($p < .001$) compared with the nonviolent group when all covariates were held constant. The

difference in odds of starting psychiatric medication after arrest when comparing the homicide and violent/non-lethal groups trended towards significance (OR = 1.15, $p$ = .064).

**Table 12**

*Regression Coefficients and Associations of Offense Type and Starting Psychiatric Medication After Arrest*

| | | | Estimate | SE | 95% CI | | $p$ |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| Level 3 | Homicide | | 0.28 | 0.05 | 0.19 | 0.37 | **<.001** |
| | Violent-NL | | 0.15 | 0.04 | 0.06 | 0.22 | **<.001** |
| Comparisons | | | Odds Ratio | | LL | UL | $p$ |
| Level 3 | Homicide | Violent-NL | 1.15 | | 0.99 | 1.34 | .064 |
| | Homicide | Nonviolent | 2.03 | | 1.75 | 2.36 | **<.001** |
| | Violent-NL | Nonviolent | 1.76 | | 1.55 | 1.99 | **<.001** |

Note. $p$-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

When looking at each diagnostic category individually, there were several variations in the significance of the parameters. Among respondents with a history of anxiety or personality disorder diagnoses, there was no longer a trend towards significance between the homicide and violent/non-lethal groups. Among respondents with a history of schizophrenia diagnosis, only the homicide group was associated with significantly increased odds of starting medication after arrest, while the violent/non-lethal and nonviolent groups were relatively similar in odds (OR = 1.10, $p$ = .630). Among respondents with a history of PTSD diagnosis, only the homicide group was associated with a significant increase in odds of starting psychiatric medication after arrest when compared with the nonviolent group (OR 1.58, $p$ = .001), while there was only a trend towards significance when comparing violent/non-lethal to the nonviolent group (OR = 1.22, $p$ = .091) or homicide to the violent/non-lethal group (OR = 1.29, $p$ = .075). Among respondents

with a history of being diagnosed with a depressive disorder, the odds of starting psychiatric medication after arrest were 70% higher for the homicide group ($p < .001$) and 30% higher for violent/non-lethal group ($p = .003$) compared with the nonviolent group when all covariates were held constant. The difference in odds of starting psychiatric medication after arrest were 31% higher for the homicide group compared to the violent/non-lethal group ($p = .019$). See Appendix B for a full list of results by diagnosis.

The binomial logistic regression analysis for starting substance use treatment after arrest – those without multiple prison admissions who reported not receiving treatment in the community and receiving substance use treatment since admission to prison - was significant ($p < .001$). The parameter estimate was significant for the homicide group ($\beta = -0.31$, $p < .001$; see Table 13) The odds of starting substance use treatment after arrest were, for the nonviolent group, 95% higher compared with the homicide group ($p < .001$) and 51% higher compared with the violent/non-lethal group ($p < .001$) when all covariates were held constant. The odds of starting substance use treatment after arrest were 30% higher for the violent/non-lethal group compared with the homicide group when all covariates were held constant ($p < .001$) .

**Table 13**

*Regression Coefficients and Associations of Offense Type and Starting Substance Use Treatment After Arrest*

| | | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| Level 2 | Homicide | | -0.31 | 0.06 | -0.42 | -0.20 | **<.001** |
| | Violent-NL | | -0.05 | 0.05 | -0.14 | 0.04 | .264 |
| Comparisons | | | Odds Ratio | | LL | UL | *p* |
| Level 2 | Homicide | Violent-NL | 0.77 | | 0.64 | 0.92 | **.005** |
| | Homicide | Nonviolent | 0.51 | | 0.43 | 0.61 | **<.001** |
| | Violent-NL | Nonviolent | 0.66 | | 0.58 | 0.76 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent offender group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

**Follow-Up Analyses**

***Exclusion of Personality Disorders***

The SPI did not include direct assessment of psychopathy or ASPD, limiting the ability to exclude respondents with confounding antisocial traits. Respondents who endorsed a history of a personality disorder diagnosis were excluded as part of a follow-up analysis to investigate if excluding individuals possibly diagnosed with ASPD would affect associations between offense type and PTSD diagnosis, general mental health symptoms, and odds of 'starting' psychiatric medication after admission.

The whole model test for PTSD diagnosis, excluding personality disorders, was significant ($p < .001$). Parameter estimates were significant for only the homicide group ($\beta = .29$, $p < .001$; see Table 14). This differed from the original analysis in which both the homicide and violent/non-lethal group parameters were significant. The odds of endorsing a diagnosis of PTSD were 88% higher for the homicide group compared with the nonviolent group ($p < .001$), up from 80% in the original analysis, and 27% higher compared with the violent/non-lethal group ($p = .004$), up from 19% in the original analysis, when all covariates were held constant. The odds of endorsing a diagnosis of PTSD were 48% higher for the violent/non-lethal group compared with the nonviolent group when all covariates were held constant ($p < .001$), similar to the difference in the original analysis, 51% higher.

These findings were similar when only comparing first admission respondents.

**Table 14**

*Regression Coefficients and Associations of Offense Type and PTSD, Excluding Respondents Who Endorsed Being Diagnosed with a Personality Disorder*

| | | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| Level 1 | Homicide | | 0.29 | 0.05 | 0.19 | 0.39 | **<.001** |
| | Violent-NL | | 0.05 | 0.04 | 0.03 | 0.13 | .190 |
| Level 2 | Homicide | | 0.31 | 0.06 | 0.20 | 0.43 | **<.001** |
| | Violent-NL | | 0.03 | 0.05 | -0.07 | 0.13 | .545 |
| Comparisons | | | Odds Ratio | | LL | UL | *p* |
| Level 1 | Homicide | Violent-NL | 1.27 | | 1.08 | 1.49 | **.004** |
| | Homicide | Nonviolent | 1.88 | | 1.62 | 2.20 | **<.001** |
| | Violent-NL | Nonviolent | 1.48 | | 1.33 | 1.66 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.32 | | 1.09 | 1.61 | **.005** |
| | Homicide | Nonviolent | 1.92 | | 1.60 | 2.31 | **<.001** |
| | Violent-NL | Nonviolent | 1.45 | | 1.25 | 1.69 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

A least squares general linear regression analysis was conducted to evaluate the relationship between offense type, excluding personality disorders, and an aggregate mental health symptoms score based on the sum of Likert-scale responses (see Table 15). An analysis of variance (ANOVA) showed that the whole model was significant ($p < .001$). Effect test revealed that offense type was significant ($F < .001$). Parameter estimates were significant for both the homicide ($\beta = .37$, $p < .001$) and violent/non-lethal groups ($\beta = .23$, $p < .001$). Excluding the violent/non-lethal group, the homicide group was associated with an 59% increase, or an average 0.47-point increase, in aggregate mental health symptoms score compared to the nonviolent group when all covariates were held constant ($p < .001$). This was down from 69%, or a 0.52-point increase, in the original analysis. Excluding the homicide group, the violent/non-lethal group was associated with a 53% increase, or an average 0.42-point increase, in aggregate

mental health symptoms score compared to the nonviolent group when all covariates were held constant ($p < .001$). This was down from a 59% increase, or an average 0.46-point increase, in the original analysis. When excluding the nonviolent group, there was no significant difference between the homicide and violent/non-lethal groups. These findings were similar when comparing only first admission respondents.

**Table 15**

*Regression Coefficients and Associations of Offense Type and Mental Health Symptoms, Excluding Respondents Who Endorsed Being Diagnosed with a Personality Disorder*

| | | | | β | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | | LL | UL | |
| Level 1 | Homicide | | | 0.37 | 0.08 | 0.21 | 0.52 | **<.001** |
| | Violent-NL | | | 0.23 | 0.06 | 0.10 | 0.35 | **<.001** |
| Level 2 | Homicide | | | 0.36 | 0.10 | .17 | .56 | **<.001** |
| | Violent-NL | | | 0.20 | 0.08 | .04 | .36 | **.013** |
| Comparisons | | | Exp(β) | β | | LL | UL | *p* |
| Level 1 | Homicide | Violent-NL | 1.06 | 0.05 | .07 | -0.08 | 0.19 | .438 |
| | Homicide | Nonviolent | 1.59 | 0.47 | 0.07 | 0.34 | 0.60 | **<.001** |
| | Violent-NL | Nonviolent | 1.53 | 0.42 | 0.05 | 0.33 | 0.51 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.06 | 0.08 | 0.08 | -0.09 | 0.24 | .361 |
| | Homicide | Nonviolent | 1.56 | 0.53 | 0.08 | 0.37 | 0.68 | **<.001** |
| | Violent-NL | Nonviolent | 1.52 | 0.47 | 0.06 | 0.35 | 0.59 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

The binomial logistic regression analysis for starting psychiatric medication, excluding personality disorders, was significant ($p < .001$). Parameter estimates were significant for both the homicide ($\beta = 0.27$, $p < .001$) and violent/non-lethal groups ($\beta = 0.13$, $p < .001$; see Table 16). The odds of starting psychiatric medication after arrest were 97% higher for the homicide group ($p < .001$) and 70% higher for the violent/non-lethal group ($p < .001$) compared with the nonviolent group when all covariates were held constant. In the original analysis these odds were

103% and 76% higher, respectively. The difference in odds of starting psychiatric medication after arrest when comparing the homicide and violent/non-lethal groups trended towards significance (OR = 1.15, $p$ = .098), just as it had in the original analysis (OR = 1.15; $p$ = .064).

**Table 16**

*Regression Coefficients and Associations of Offense Type and Starting Psychiatric Medication After Arrest, Excluding Respondents Who Endorsed Being Diagnosed with a Personality Disorder*

| | | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| Level 2 | Homicide | | 0.27 | 0.05 | 0.17 | 0.38 | **<.001** |
| | Violent-NL | | 0.13 | 0.04 | 0.04 | 0.22 | **.003** |
| Comparisons | | | Odds Ratio | | LL | UL | *p* |
| Level 2 | Homicide | Violent-NL | 1.15 | | 0.97 | 1.37 | .098 |
| | Homicide | Nonviolent | 1.97 | | 1.66 | 2.32 | **<.001** |
| | Violent-NL | Nonviolent | 1.70 | | 1.48 | 1.96 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

***Association of Drug Offenses with 'Starting' Substance Use Treatment***

The pattern of association between the comparison groups for 'starting' substance use treatment was the reverse of the pattern observed on other measures. To investigate the possible explanations for the difference, a follow-up analysis was conducted to determine if the association between nonviolent offenses and higher likelihood of 'starting' substance use treatment was being driven primarily by drug-related offenses. The binomial regression analysis for those who 'started' substance use treatment for the first time after admission was adjusted to include all individual offense types rather than grouping offense types into comparison groups. This variation of the analysis revealed that the largest parameter effects were observed among

individuals incarcerated for drug trafficking (β = 0.46, *SE* = 0.07, 95% CI [0.33, 0.59], *p* <.001), drug possession (β = 0.43, *SE* = 0.12, 95% CI [0.20, 0.67], *p* < .001), and other drug (β = 0.42, *SE* = 0.21, 95% CI [0.01, 0.82], *p* = .043). No other parameters contributed significantly towards increased probability of 'starting' substance use treatment after admission. Removing these three drug-related offenses from the original model for 'starting' substance use treatment did not affect the nature of the association between the offense types: The nonviolent group had a higher likelihood of 'starting' substance use treatment than the homicide (*OR* = 1.63, 95% CI [1.35, 1.97], *p* <.001) and violent/non-lethal (*OR* = 1.27, 95% CI [1.10, 1.48], *p* = .002) groups.

### *Association of Prison Admissions and K6 Total Score*

The linear regression analysis comparing the number of total prison admissions and the total score on the K6 was significant when including all offense types (*p* = .005), showing a 0.05 point increase on the K6 total score for each additional prison admission (*SE* = .02, 95% CI [0.01, 0.08]). When limiting the analysis to only the homicide group, there was a trend towards significance (*p* = .062), and when limiting the analysis to only the violent/non-lethal group, the association was not significant (*p* = .239). When limiting the analysis to only the nonviolent group, there was a significant association between prison admissions and the K6 total score (*p* =.007), showing a 0.06 point increase on the K6 total score for each additional prison admission (*SE* = 0.02, 95% CI [0.02, 0.10]).

# Chapter 5: Discussion

## Diagnoses

Among incarcerated adults who participated in the SPI, there was a consistent pattern of association between being in one of the violent offense groups, both lethal and non-lethal, and greater odds of endorsing being diagnosed with any psychiatric disorder. This was true for both diagnoses acting as stand-in diagnoses for PITS – PTSD, Depression, and Anxiety – and for other diagnoses that were not expected to be associated with PITS. Therefore, the general pattern is more likely attributable to a third factor other than PITS. For the most part, the adults incarcerated for homicide offenses were just as likely as those incarcerated for non-lethal violent offenses to be diagnosed with a psychiatric disorder with two exceptions. First, adults incarcerated for non-lethal violent offenses had significantly greater odds of being diagnosed with bipolar disorder than those incarcerated for homicide offenses. Bipolar diagnosis was not one of the primary outcomes associated with this study, but the presence of a departure from the general pattern provides evidence that not all associations between offense type and diagnoses were identical. Second, adults incarcerated for a homicide offense were most likely to report having been diagnosed with PTSD compared to those incarcerated for other forms of violence or nonviolence.

Adults incarcerated for nonviolent offenses were the least likely to report having been diagnosed with PTSD. This supports the position that among perpetration events, killing is uniquely associated with greater risk for being affected by traumatic stress. This effect was held when excluding respondents with multiple prison admissions. As the PTSD diagnosis represents the closest analogue of the available measures to the construct of PITS, these findings are supportive of rejecting the Level 1 and Level 2 null hypotheses. If homicide, non-lethal violence,

and nonviolence are viewed as representing a spectrum of severity, then these findings suggest a dose-dependent association between severity of violence and the likelihood of being diagnosed with PTSD, replicating the dose-dependent association observed by Crisford, Dare, and Evangeli (2007), and the difference between homicide and nonhomicide offenses observed by Pham and Willocq (2013).

**Kessler Psychological Distress Scale**

On ratings of emotional distress over the prior 30-day period, a consistent pattern of association was again observed, where adults incarcerated for violent offenses were associated with higher levels of psychological distress than nonviolent offenses. This pattern was observed on all individual symptom scales as well as on a total symptom score, and there were no significant differences between the homicide offense group and the non-lethal violent offense group, except for the following exceptions: Adults incarcerated for homicide offenses were more likely to endorse higher symptom severity than both non-lethal violent offenses and nonviolent offenses on the symptoms of hopelessness and worthlessness, though for worthlessness this effect was only observed among first admission respondents.

Hopelessness and worthlessness have been shown to be indirectly associated with PITS. They have been shown to correlate with depressive symptoms of self-blame (Harrison et al., 2022). Negative cognitions related to self, negative hindsight-bias, and sense of wrongdoing have been specifically tied to moral injury (Litz et al., 2018; Stein, 2012) and self-blame is one of two primary factors of the Perpetration-Induced Distress Scale (Steinmetz et al., 2019). Additionally, hopelessness has been shown to be associated with posttraumatic stress among health care workers, mediated by death anxiety (Aguglia et al., 2021).

The association of perpetration of violence and emotional distress does not by itself reveal directionality or causality. For example, it is both possible that an individual's perpetration of harm contributes to the development of PTSD and that the development of PTSD contributes to the perpetration of harm. PTSD has been found to be associated with increased odds for violent offending (Collins & Bailey, 1990; Howard et al., 2017) and violence was included as possible evidence of PITS in the present analysis, so to some degree there was an expectation of elevated emotional distress among adults incarcerated for violent offenses. While this study has approached the measures of emotional distress as being possible evidence of PITS, it could also be argued that the results of the present study support a hypothesis of opposite causation: Individuals with higher levels of emotional distress are more likely to employ violence in their offending. Childhood emotional dysfunction – such as low distress tolerance and poor emotion regulation - has been shown to be predictive of violent crime (Kalvin & Bierman, 2017), as has non-severe psychopathology, emotional problems, and behavioral problems (Basto-Pereira & Farrington, 2022). Adverse experiences such as exposure to violence have been shown to be predictive of risk for homicide (DeLisi et al., 2016). If the effect of perpetration on emotional distress were higher than the effect of emotional distress on the odds of perpetrating, then it would be expected that more perpetration would be associated with elevations in emotional distress. In a follow-up analysis, a significant correlation was shown between the number of admissions to prison - an approximate measure of frequency of perpetration - and total K6 scores, suggesting a cumulative effect of perpetration. However, when looking at offense groups individually, it was revealed that this association was only significant among the nonviolent group, while merely approaching significance among the

homicide group. Therefore, it is still not clear to what degree violence and perpetration influence one another.

There are multiple complex and interacting factors that contribute to the likelihood of perpetrating violence. Evidence of general emotional distress in a population of individuals arrested for violent offenses is not unexpected. This may explain the consistency of the differences between violent and the nonviolent groups. Though it should be noted that emotional distress does not wholly account for the likelihood of engaging in acts of violence or perpetrating criminal offenses.

There is a clear association between the violent offense groups and elevated general psychological distress. However, adults incarcerated for a homicide offense were more likely than those incarcerated for both non-lethal violent and nonviolent offenses to have elevated scores on measures of hopelessness and worthlessness: symptoms indirectly connected to PITS. Increased odds of reporting higher general emotional distress among adults incarcerated for violent crimes does not provide sufficient evidence to accept or reject the Level 1 or Level 2 null hypotheses. However, the specific elevations associated with homicide offenses on hopelessness and worthlessness, especially given the possible connection between these two specific symptoms and trauma, does lend support - when combined with other findings - to rejecting the null hypotheses.

**Mental Health Treatment**

Adults incarcerated for violent offenses had a higher likelihood of taking prescribed psychiatric medication after admission to prison and at the time of arrest, even among individuals who had not been admitted to prison before. Irrespective of the moment of perpetration, violent offenses were associated with higher odds of taking prescribed psychiatric

medication. This implies that the commission of a violent act does not fully explain the higher likelihood of taking medications, and only limited conclusions can be drawn based on differences in odds of taking prescribed psychiatric medication. This calls into question the interpretability of the Level 3 analysis comparing those who were not taking medication to those who started after admission to prison. Among those who were not taking prescribed psychiatric medication at the time of arrest, incarceration for a violent offense was associated with a higher likelihood of 'starting' to take prescribed psychiatric medication after admission to prison. However, there are possible alternative explanations for this. If an individual has higher odds of needing psychiatric medication, there may be barriers to accessing it, such as lack of access to treatment, being pre-contemplative regarding starting treatment, or lacking health insurance. Experiences around a perpetration event or admission to prison may increase an individual's motivation to address an untreated psychological disorder or may grant them access to health care for the first time. Individuals with untreated psychiatric needs who engage in violent offenses may be more pressured to start receiving psychiatric treatment.

There was no significant difference between those with a history of perpetrating homicide and those with a history of perpetrating non-lethal violence in terms of taking prescribed psychiatric medication after admission to prison. However, for those who reported having been diagnosed with a depressive disorder, homicide was associated with a higher likelihood of starting psychiatric medication.

The odds of an individual receiving other forms of mental health treatment, such as counseling, were similar to those of receiving psychiatric medication. Perpetrating violence was associated with a greater likelihood of receiving counseling after admission to prison compared to those who had perpetrated nonviolence. Again, there was no significant difference between

those who had perpetrated homicide and those who had perpetrated non-lethal violence, with one exception: Among only those who had been diagnosed with a depressive disorder and had not been admitted to prison before, a history of perpetrating homicide was associated with a greater likelihood of receiving counseling compared to those with a history of either non-lethal violence or nonviolence.

In general, those who have perpetrated violence are more likely to receive psychiatric medication before and after the commission of an offense, limiting the ability to draw any conclusions about the impact of perpetrating violence on needing psychiatric treatment. The overall findings of these measures contribute little to determining if perpetration directly impacts a need for mental health treatment. However, there was agreement between two measures – that adults incarcerated for a homicide offense and diagnosed with a depressive disorder are more likely to start receiving 1) psychiatric treatment and 2) counseling. Once again, the direction of subtle but significant differences between comparison groups points towards homicide being associated with a particularly elevated risk for PITS, assuming that treatment for a depressive disorder is evidence of possible PITS. These measures related to mental health treatment provide modest support for rejecting the Level 1, Level 2, and Level 3 null hypotheses.

**Substance Use Treatment**

Incarcerated adults who have not experienced previous prison admissions do not significantly differ in their likelihood of having received community-based substance use treatment. Once individuals experience multiple prison admissions, a significant association arises between offense type and history of treatment, in which those incarcerated for a non-lethal violent offense had the highest likelihood of having received community-based treatment, and those incarcerated for a homicide offense had the lowest likelihood. Possible explanations for

this change in association include conditions of release that require the returning citizens to participate in substance use treatment, or an increase in needing substance use treatment resulting from experiences of incarceration or release from prison.

For those reporting having received prison-based substance use treatment, a reverse pattern emerges compared with diagnostic history, general emotional distress, and mental health treatment. That is, adults incarcerated for nonviolence had the highest likelihood of receiving substance use treatment since admission to prison, those incarcerated for non-lethal violence had significantly lower likelihood, and those incarcerated for homicide had a significantly lower likelihood still. This same pattern was observed among individuals who had not received substance use treatment prior to their first admission to prison, but did receive it for the first time while in prison. This pattern runs counter to the hypothesis that PITS, being associated with increased risk for problematic substance use, would be evidenced in elevated rates of substance use treatment utilization. In this case, there is a reverse dose-dependent association between severity of violence and odds of receiving substance use treatment.

Although the logistic regression model controlled for years in prison, it is possible that differences in how long respondents have been in prison affect their likelihood of having received substance use treatment. A review of intake screenings from a prison in British Columbia, Canada found an increase over time in the percentage of individuals being admitted with substance use disorders, with a change from 15% of admissions in 2009 to 32% in 2017 for co-occurring disorders, 6% to 29% for methamphetamine use disorders, and 11% to 26% for opioid use disorders (Butler et al., 2022). The average number of years spent in prison for individuals who were incarcerated for homicide was nearly 13 years, placing their date of admission around 2003, while those incarcerated for nonviolence, on average, would have been

admitted around 2012. If the trend observed by Butler et al. (2022) reflected a broader North American trend, then it would be expected that those admitted later would be more likely to need substance use treatment, and more likely to have been arrested for a nonviolent offense. However, Butler et al. (2022) also observed rising rates of co-occurring disorders, so an increase in mental health utilization would also be expected if there was such a cohort effect.

Another possible explanation would be the methods by which individuals are determined to be eligible for participation in substance use treatment. Therapeutic communities have received much attention from policy makers and have grown in their use as a model for substance use treatment in prisons (Burdon, 2002). In California, more than 7,500 beds were designated for these residential styled treatment programs in 2002 (Burdon, 2002). However, eligibility to participate in such treatment is based on release date: Individuals enter therapeutic communities one to two years before their release in order to help with transitioning back to the community (Burdon, 2002). Such a policy would have an effect of preferentially admitting individuals with shorter sentences and put off treatment for individuals with longer sentences.

Lastly, the nonviolent offense group includes individuals who were arrested specifically for drug-related offenses. To investigate whether this was affecting the model, a follow-up analysis was conducted assessing the association between ‘starting’ substance use treatment and offense type, but with specific offense types rather than pooling offense types into comparison groups. The top three contributing parameters to the likelihood of ‘starting’ substance use treatment were all drug-related offenses, and they were the only positive associations that were also statistically significant. Adults incarcerated for other nonviolent offenses were not significantly more likely to ‘start’ substance use treatment after admission in this model. This would suggest that the inclusion of drug-related offenses was a driving factor in the elevated

odds of 'starting' substance use treatment among adults incarcerated for nonviolent offenses. However, even when excluding drug-related offenses, the nonviolent group as a whole was still more likely to 'start' substance use treatment after admission to prison.

Adults incarcerated for nonviolent offenses are most likely to utilize substance use treatment after admission to prison when compared with adults incarcerated for homicide or other violent offenses. The reverse dose-dependent association between offense severity and likelihood of utilizing substance use treatments may be in part explained by cohort differences stemming from differences in sentence lengths, availability of treatment programs to adults with shorter sentences, and from the inclusion of substance-related offenses within the nonviolent comparison group. Measures related to substance use treatment utilization provide evidence that supports rejecting the Level 1, Level 2, and Level 3 null hypotheses, but does not provide evidence to support a hypothesized association between PITS and increased substance misuse.

**Write Ups**

Total estimated write ups since admission to prison were highest among individuals incarcerated for non-lethal violent offenses and lowest for those with nonviolent offenses. This pattern of association was less pronounced among individuals admitted to prison for the first time, suggesting an effect of multiple prison admissions on subsequent rule violations in prison, which is consistent with past findings that prior incarceration is associated with higher risk for prison misconduct (Cunningham et al., 2005; Kuanliang & Sorensen, 2008). Limiting the scope of this survey question to the prior 12-month period revealed no difference in write up history between individuals incarcerated for homicide and those incarcerated for nonviolence, while non-lethal violence was still associated with significantly higher probability of receiving a write up than nonviolence. For verbal assault write ups, nonviolence was associated with significantly

lower probability of receiving a write up than both homicide and non-lethal violence. For physical assaults, non-lethal violence was significantly higher than nonviolence, but only for those with multiple prison admissions. This runs counter to the findings of Cunningham and Sorensen (2006) that violent offenses were not associated with higher risk for prison violence.

Several factors could explain variations in write up history between the comparison groups. The risk for violating prison rules has been shown to correlate with classification status – medium custody is associated with more low-level write ups than close custody (Tahamon, 2019) – mental health issues, history of physical abuse, family history of incarceration, younger age, non-married marital status, and lack of prior employment (Kuanliang & Sorensen, 2008). Sentence length may explain lower levels among perpetrators of homicide. A common viewpoint held is that individuals given life sentences have 'nothing to lose' and therefore are less deterred from misconduct. In reality, shorter sentences are more associated with risk for prison violence than longer sentences (Cunningham and Sorensen, 2006) and a comparison of the effect of life sentences without parole to life sentences with parole found no higher risk of misconduct for those serving life without parole, with the exception of during the first 18 months of incarceration (Sorensen & Reidy, 2019).

The results of the analysis of write ups conflicted with prior studies on misconduct in prison, and there was no significant evidence that perpetration of homicide was associated with higher risk for violence. Rather, there was more evidence to support prior studies' findings – that individuals with long sentences, such as those typically associated with homicide, are actually at lower risk for prison misconduct. Additionally, interpretation of the write up analyses is limited by variations in sample size between the multiple measures, so only a strong and clear pattern of

association would be considered evidence of an offense-related relationship. These results do not provide sufficient evidence to support rejecting the Level 1 or Level 2 null hypotheses.

**Summary**

The clearest evidence that perpetrating homicide is associated with the highest severity of PITS was observed in the odds of being diagnosed with PTSD. This measure was one of the few that showed a clear dose-dependent association by which increased severity of violence was associated with increased severity of symptoms. This association was more pronounced when excluding those with repeated admissions to prison, and follow-up analysis demonstrated a yet more pronounced association when excluding personality disorders, such as ASPD.

Several parameters were affected by omitting respondents with multiple prison admissions, but the general patterns of association were maintained. In some cases, associations became less pronounced, such as those for taking medication at arrest or the number of write ups reported, but in most cases, associations became slightly more pronounced for the homicide comparison group. The Level 2 null hypothesis was rejected, supporting the subsequent Level 3 analysis comparing only respondents without multiple admissions. However, the findings of both Level 3 analyses failed to fully reject the Level 3 null hypothesis.

Less-clear evidence of homicide being associated with the highest severity of PITS was observed in higher elevations on symptoms of hopelessness and worthlessness, as well as higher odds of those diagnosed with depression receiving mental health treatment after admission. These less-clear findings by themselves do not provide sufficient evidence to draw conclusions, but in combination they provide consensus that subtle but significant differences favor homicide perpetration as being associated with the highest severity of PITS.

## Limitations

### *Psychopathy*

Psychopathy is a term that, broadly speaking, refers to a tendency of an individual to engage in unusual harmful behaviors towards others with little, if any, remorse or regard for the other, and is often defined by the diagnostic criteria for ASPD (Levenson, 1992). There are two variants of psychopathy: primary psychopathy, which is a largely innate affective deficit with reduced fear response and decreased psychopathology, and secondary psychopathy, which is thought to stem largely from environmental factors, such as childhood abuse or trauma (Sellbom & Drislane, 2020).

Primary psychopathy, and its associated affective deficits, presents a possible confounding variable when investigating PITS. Affective deficits associated with psychopathy have been observed to negatively correlate with PTSD symptoms (Pham, 2012; Willemsen, Ganck, and Verhaeghe, 2012). The diminished experience of fear, anxiety, guilt, or remorse could potentially preclude traumatization. In fact, in a study of homicide-related PTSD, only 5% of homicides that led to PTSD were associated with instrumental violence compared with reactive violence (Pollock, 1999), and instrumental violence is most associated with primary psychopathy (Sellbom & Drislane, 2020).

Secondary psychopathy, or ASPD, also presents a possible confounding variable if it is serving as a protective adaptation against traumatization. While secondary psychopathy is associated with stronger negative emotions, guilt, withdrawal, alcohol use, reactive aggression, and comorbid psychopathology (Sellbom & Drislane, 2020), Harnisch and Pfeiffer (2018) noted that the development of appetitive aggression and the urge to kill among forcefully recruited child soldiers acted as a protective factor against emotional dysregulation and the development

of PTSD. In the case of ASPD as a trauma response, the presence of perpetration-induced trauma would not be detected by questions worded to detect more typical PTSD-like symptoms. In the case of ASPD as a protective factor, the impact of perpetration-induced stress would be effectively reduced and prevent the development of PITS.

The SPI did not include direct assessment of psychopathy or ASPD, limiting the quality of any efforts to control for or screen out such confounds. To some degree, the omission of respondents with multiple prison admissions was designed to account for the dynamic of respondents becoming less traumatized over the course of multiple perpetration events, but this method of accounting for repeat trauma is far from precise. Respondents who endorsed a history of a personality disorder diagnosis might have been diagnosed with ASPD, so removing these respondents from the analysis could reduce the impact of psychopathy on the analysis, though this would require both that respondents had been diagnosed with ASPD and that the respondent was aware they had been so diagnosed. As ASPD is negatively correlated with PTSD but still associated with greater psychopathology and treatment use, removing ASPD-diagnosed respondents would be expected to impact the odds of respondents having been diagnosed with PTSD, but would not be likely to impact other indicators that are based on symptoms or treatment use. The results of a follow-up analysis did in fact reveal an increased risk for being diagnosed with PTSD for individuals incarcerated for a homicide offense compared to those incarcerated for violent non-lethal and nonviolent offenses, while there was no notable change in mental health symptoms or odds of ‘starting’ psychiatric medication. This suggests that the use of other variables might have been feasible for screening out psychopathy and ASPD.

### *Measures*

Diagnostic history, general symptom ratings, and treatment usage are limited in their ability to describe underlying trauma symptomatology. Diagnostic history was collected via self-report, subjecting these data to respondent recollection, familiarity with diagnostic terminology, and history of access to health services that would provide such diagnoses. Respondents may not have recalled if they had been diagnosed and, if they had been, they may not have recalled this information accurately. The survey did not collect data on when a diagnosis was made, so it is not known if the respondent met criteria for the diagnosis at the time of the survey or if they had previously met criteria and since recovered. In the case that they did recall the information accurately, it is possible that the diagnosis was made in error due to provider factors, such as being unfamiliar with the condition or a lack of adequate information to make a diagnosis. In the case of PTSD, health care providers frequently do not detect its symptoms, and it is frequently misdiagnosed (Taubman-Ben-Ari et al., 2001). Educational, socioeconomic, and cultural factors may affect a respondent's understanding of questions about diagnoses, such as whether they understand what the terms mean, whether they use the terms to describe the same conditions, or whether they understand that a diagnosis comes from a health professional, as opposed to a family member or friend casually opining about the state of the respondent's mental status. These limitations regarding the collection of diagnostic history are all contingent upon the respondent's past access to health care. Access to health care has been shown to negatively correlate with violent crime rates (Vogler, 2020). Respondents who have had limited or no access to health care – or who do not trust healthcare providers - are not likely to have been assessed, diagnosed, or treated for an emotional problem.

Likert-scale responses to questions about present mental health symptoms provide a more accurate assessment of a respondent's emotional state at the time of the survey compared to diagnostic history. Problematic response patterns, such as marking all responses the same for the sake of expediency, are generally overcome through averaging and group comparison. The primary limitation of these scales is their face-validity. They do not assess for specific trauma symptoms or evidence of moral injury. Symptoms of rumination, avoidance, suicidal ideation, and reexperiencing were not included. In a study by Zerach and Levi-Belz (2021) on moral injury among Israeli health and social care workers, K6 scores correlated most strongly with scores on the patient health questionnaire ($r$ = .68) and general anxiety disorder questionnaire ($r$ = .67) and least strongly (though still significantly) – with the MIES ($r$ = .31), suggesting that the K6 is most effective at detecting general distress associated with depression and anxiety rather than having a specific sensitivity to moral injury.

Indicators of treatment usage are the vaguest of the mental health variables included in the analysis. Whether or not an individual receives counseling, medication, or other treatment speaks nothing of the reasons for seeking or participating in such treatment. Similar to the use of the K6, these indicators are at best evidence of general distress, not specifically PITS. Similar to the limitations of diagnostic history, reporting of treatment history is subject to the limits of a respondent's recollection, familiarity with terminology, and history of access to health services. These indicators do differ from the question of diagnostic history in that the information is gathered with respect to both community-based and prison-based services. However, limited access to health care applies both to community-based and prison-based care. Incarcerated adults experience barriers to accessing health care in prison, including punishment for seeking health care, costs, long waits, disrespectful treatment, and poor health outcomes (Wennerstrom et al.,

2021). Just because an individual is incarcerated and there are healthcare providers, does not mean that they have or perceive access to healthcare.

The present study utilized two measures of possible change in treatment-usage after arrest: starting psychiatric medication or starting substance use treatment. These could be interpreted to indicate a temporal relationship between perpetration and treatment utilization, and support more causal interpretations, but even these measures do not strongly support directionality. While such behavior could be interpreted as evidence that these respondents experienced a change in health status around the time of their arrest that precipitated the need for psychiatric intervention or substance use treatment, such behavior could also be explained by individuals having pre-existing needs that, for whatever reasons, were not being treated at the time. Alternatively, treatment-seeking behavior could be motivated by other priorities, such as legal defense strategies, gaining institutional privileges or preferred classification, preparing for parole or probation, or complying with legal mandates, i.e., court ordered evaluations or involuntary treatment.

Write up history presented the most significant limitations among the response variables, primarily due to incongruencies between sample sizes and coding errors that spoiled some of the variables (e.g., substance use write ups). The use of write ups as a measure of behavior limits measurement to only behavior that is both observed and reported. It does not capture behaviors that go undetected by prison personnel. Additionally, the frequency of write ups for any given individual was quite low, most often zero. The significant effect of time in prison and age resulted in variation in write up rates, limiting the ability to compare respondents of different ages and sentence lengths. The result was a collection of variables with limited power, sensitivity, and reliability.

Write up history is confounded by the potential subjectivity by which disciplinary measures are executed. Write up practices may vary considerably between institutions and individual prison personnel. Personnel may be affected by biases – overt or not – towards individuals based on offense history or notoriety. For example, an individual with a history of violence may be more likely to be monitored by security, and may therefore be more likely to be observed during a behavior resulting in a write up. Or, an individual with no history of violence may receive leniency for the same behavior.

***Analysis***

Lastly, while the large number of available response variables and the large sample size are strengths of the SPI, they are also, in a sense, the curse, as this arrangement lends itself to inflation bias, colloquially known as "*p*-hacking." Head et al. (2015) describe several types of inflation bias, such as gathering many response variables, but only reporting those that are significant, dropping outliers post-analysis, including or excluding covariates post-analysis, or splitting, excluding, or combining treatment groups post-analysis. The sample size of the study allows for strong assertions of statistical significance for differences that are quite small in effect. For example, a group difference of only 0.27 write ups in a 12-month period, or about one write up every four years, was detected in this study with a probability of being due to random chance of .001. Such results were common in this analysis, and the decision to review effects by diagnostic category produced yet more significant effects. There exists the potential to select from the abundance of significant associations a pattern of effects to support a variety of conflicting conclusions. For this reason, the onus is on the investigator to exercise clinical and theoretical knowledge in interpreting the results rather than leaning on the power of the *p*-value.

## Implications

### *Support to Existing and Future Research*

This study addresses the association between criminal offenses and the types of mental distress that are reported on a national survey of inmates. Multiple studies have examined the prevalence of offense-related trauma in incarcerated populations. However, the present study represents, to the knowledge of this writer, the first to include both a violent comparison group and a nonviolent control group to compare with the impact of killing. Pham and Willocq (2013) contrasted homicide offenses with non-homicide offenses but did not delineate between nonviolence and other forms of non-lethal violence. The design of Crisford, Dare, and Evangeli (2007) is most similar in terms of comparison groups. Crisford, Dare, and Evangeli (2007) rated participants' offense severity and found an association with PTSD symptoms. The present study bolsters the conclusions of Crisford, Dare, and Evangeli (2007), reassuring that their outcomes were not likely significantly affected by limitations in their study, such as sampling methods and rates of psychosis at the time of offense.

The addition of a control group reduces the influence of potential population factors, such as risk factors for general criminal behavior or stress factors associated with remand and incarceration. The study design partially mirrors that of the study of U.S. Vietnam combat veterans that provided early evidence for the existence of PITS through the comparison of combat veterans who had killed to combat veterans who had not killed (MacNair, 2002a). Through contrasting with a control group, MacNair (2002a) was able to assert more definitively that perpetration of killing was associated with differences between these groups' PTSD symptoms. Leading studies on the prevalence of PTSD associated with homicide perpetration have exclusively surveyed individuals who have committed homicide offenses (e.g., Di, Chung,

and Wan, 2018; Papanastassiou et al., 2004; Pollock, 1999), looking only at those who have killed without comparing to those who have not killed. The present study did compare those who killed with those who did not kill, providing needed data to support that the findings of these leading studies were not simply due to incarceration-related factors.

A control group also reduces the impact of possible response patterns influenced by a prison setting or prison culture. A hypothetical example is if incarcerated adults are more likely in general to endorse higher ratings on questionnaires when asked to consider the impact of the crime for which they were arrested, particularly if those questionnaires frame the crime as having a negative impact or portray the individual as negatively impacted by their present status. In this hypothetical example, a participant may be motivated by personal validation to endorse higher levels of distress. However, in the present study, survey questions were not explicitly tied to the impact of committing an offense, reducing such hypothetical motivations.

Contrasting homicide and non-lethal violence with nonviolence provides clarity to the present results. It supports the conclusions of prior studies that the phenomenon of PITS within an incarcerated population is not merely an artifact of more general factors shared by the population, as there is evidence that incarcerated adults do identify non-homicide offenses as traumatic index events (Gray et al., 2003; Spitzer et al., 2001). Had the present results shown no differences between the violent perpetration groups and the nonviolent group, it would have called into question the results of similar studies that have investigated PITS in incarcerated populations, and suggested that previously observed prevalence of offense-related trauma was not specific to acts of violence. Instead, the present results suggest that violence *is* associated with higher levels of traumatic stress, and homicide perpetration in particular is associated with

higher levels of traumatic stress, hopelessness and worthlessness, and mental health treatment utilization after arrest when compared to other violent and nonviolent perpetration.

The congruence of these findings with past studies supports the conclusions of those past studies, encourages the acceptance of the validity of PITS, and promotes curiosity in better understanding PITS' etiology, course, and treatments. Reflectively, the congruence of these findings also provides support for interpreting the present results as evidence of PITS, as the prevalence of PITS among perpetrators of homicide and other forms of violence has repeatedly been observed.

### *Treatment of PITS*

The growing body of research on topics such as PITS and moral injury helps to broaden both academic and clinical understandings of trauma. If trauma is too narrowly defined, this may impact access to trauma treatments for those who need it. Limited healthcare resources impose a necessary priority on essential healthcare, but with the consequence that if individuals do not fall neatly into existing diagnostic criteria, then they may be refused needed treatment. Efforts to lobby for access to such care may face an uphill battle if the official diagnostic manuals exclude syndromes without sufficient research to support their inclusion. Therefore, the future of treatment access hinges upon continued study of the phenomenon of PITS and how it differs from PTSD.

At a theoretical level, Farnsworth (2019) and Nash (2019) have proposed models that attempt to explain the difference between moral injury and PTSD. At a treatment level, Nash (2019) and Farnsworth et al. (2017) have called into question the applicability of PTSD treatments, grounded in the fear model, to the treatment of moral injury. van der Kolk (2014) observed that when treating combat veterans, there were some who inexplicably were not

responding to antidepressants like other PTSD patients. van der Kolk (2014) suggested that it could possibly be because of different etiologies involved in life-threat trauma and moral injury trauma.

Maguen and Burkman (2013) argue that there is a need for adaptation of current treatments for instances of killing in combat and moral injury. Many of the proposed treatment models incorporate spiritual interventions (Drescher et al., 2011; Nwoye, 2021; Wortmann et al., 2017), asking for forgiveness (Drescher et al., 2011), finding self-forgiveness (Bryan et al., 2015; Keenan et al., 2014; Maguen et al., 2017; Maguen & Burkman, 2013), restoring social bonds (Drescher et al., 2011; Keenan et al., 2014), meaning making (Kopacz et al., 2019), and emotion regulation (Ray et al., 2020). Farnsworth et al. (2017) argue specifically for the use of Acceptance and Commitment Therapy (ACT) for the treatment of moral injury. Challenging of maladaptive beliefs has been suggested, but not to the point of accepting or justifying wrongs committed; rather, it is important to validate that an action was wrong, but to also separate past actions from an overarching view of self (Litz et al., 2009, Maguen & Burkman, 2013). Nwoye (2021) notes the limitations of Eurocentric approaches to treating moral injury, such as focus on the individual and emphasis on words and reason, and contrasts these with endogenously generated rituals of Africans that give more attention to the social-cultural wounds of moral injury, and healing through cultural and spiritual cleansing and repossession. Research, such as the present study, that provides evidence that these perpetration-based syndromes are not specific to military populations, would smooth the way for developing treatments to be studied in their application to prison populations, community-based populations, and cross-cultural applications.

The benefits of treating PITS among adults who have perpetrated homicide or other forms of offenses are not restricted to prison settings, as most incarcerated adults will be released

to the community. DeCaro et al. (2022) explored the experience of morally injurious events (MIEs) in a sample of formerly incarcerated adults who had had life sentences. About three quarters of the sample (75.6%) identified their life-sentence crime as a morally injurious index event (DeCaro et al., 2022). Higher levels of MIE-related shame were associated with decreased flourishing after release (DeCaro et al., 2022). DeCaro et al. (2022) recognized the rationality of condemning violent acts and encouraging guilt, but emphasized the deleterious nature of shame and the potential consequences of propagating it. If PITS is not treated in prison, then returning citizens with PITS may fail to thrive in the community. Beyond just the individual's suffering, it would be placing an additional burden on the community.

## Suggestions for Future Research

A general recommendation for research on PITS is simple: More. More research is needed to better understand its construct, in order to develop a consensus around its definition – both for consistency in research and to prevent concept creep – to develop reliable valid measurement and assessment tools, and to establish external validity beyond specific populations. The following are suggestions for continued research.

### *Direct Survey of Homicide-Related Traumatic Stress*

The present study demonstrated the potential utility of contrasting homicide offenses against other forms of violence and nonviolence, but it suffered from a lack of adequate controls and specificity in its measurements. Further research could improve the design through the use of standardized tools to control for factors that might contribute to traumatic stress (other than perpetration of harm) and assess specifically for traumatic stress. The Life Events Checklist for Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (LEC-5; Weathers, 2013) and the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5; Weathers et al., 2013) are

examples of tools that could be used for this purpose. The Perpetration-Induced Distress Scale (PIDS; Steinmetz et al., 2019) could be employed as an alternative to or in combination with the PCL-5. All three of these measures are based on self-report. Self-report measures for PTSD have some limitations when compared with structured or semi-structured interviews, but also some advantages. For example, participants may be unable to discuss trauma and related symptoms with an interviewer, but feel more comfortable completing a self-report measure (Gray et al., 2003).

The LEC-5 would be administered to control for trauma history when evaluating the impact of PITS on measures of PTSD. Gunter et al. (2012) found 64% of an incarcerated sample reported having experienced at least one potentially traumatic event and lifetime prevalence of PTSD was 31% (67% of women, 25% of men). The high prevalence of PTSD within incarcerated populations necessitates taking into consideration the frequency of lifetime traumatic-event exposure when evaluating PITS.

Incarcerated adults would complete the LEC-5, the PCL-5, and possibly the PIDS, with questions regarding killing/injuring split out into multiple questions. These measures would provide enough information to determine the current level of distress experienced by respondents associated with the perpetration of a criminal act, while controlling for the effect of past trauma and contrasting homicide-related PITS with that of non-homicide violence and nonviolence.

### *Virtual Homicide*

Studies have demonstrated the feasibility and acceptability of utilizing virtual simulations and avatars to simulate harm doing (Cheetham et al., 2009; Slater et al., 2006). Continuing this line of research could shed light on cognitive, affective, physiological, and neural responses to harm-doing. Qualitative studies using a virtual paradigm could serve to better understand what

people experience as they see themselves perpetrating crimes. Laboratory studies allow for assessing how a wide variety of people, not just people with risk factors that predispose them to criminal involvement, would respond to perpetration acts without submitting any individual to actual harmful perpetration-induced stress. Various elements of the studies could be altered to evaluate the role of different variables and factors on the experience of perpetration-based stress.

One factor that would be of interest is agency. Much of the research on mechanisms of PITS has focused on moral injury and, as a byproduct of the way the concept is defined, on the underlying moral emotions and explicit cognitive appraisals of wrongdoing. But other factors besides emotions may contribute to the development of PITS. Agency refers to the awareness that one's actions are contributing to an observed effect. Agency can refer to explicit awareness, but also an implicit sense of awareness (Saito et al., 2015). It may be that in some cases individuals are affected not by an explicit moral processing of an event, but by an implicit understanding of having caused harm, or a sudden loss of implicit agency in situations where harm cannot be undone. Agency in a situation can enhance some types of memory (Ruiz et al., 2023), which perhaps contributes to a lasting impact of transgressions. Agency has been shown to contribute to the variance in PTSD symptoms among combat veterans, though less than perceived threat in combat and feelings of guilt (Huang & Kashubeck-West, 2015). The use of virtual simulations could allow for developing laboratory designs to tease out the role of agency, or other factors of interest, in perpetration-induced stress.

***Replicative Dream Frequency***

Correlations between severity of PTSD and nightmares provide evidence that trauma exposure is linked to subsequent distressing dreaming. The number of traumas experienced in life and the severity of traumas has been shown to impact dream content and psychopathology

(Yu, 2014). Trauma-related sleep problems and nightmares have been shown to increase as a function of trauma severity, with the highest level of disturbance among those with combat related PTSD (Shore et al., 2009).

Although frequency of nightmares and their relative severity have been shown to be linked to trauma-specific psychopathology, only *replicative* nightmares - those that replicate actual past experiences - have been shown to be predictive of a PTSD diagnosis (De Dassel et al., 2017). Thus, any difference in replicative nightmare frequency in homicide perpetrators versus non-homicide perpetrators would support that homicide is uniquely associated with higher risk for PTSD.

There are no known studies on dream content of perpetrators of homicide or whether they experience replicative nightmares related to the act of killing. There is evidence of an elevation in the frequency of dreams involving harming others among combat-veterans. However, the mere presence of killing in dreams would not necessarily implicate a history of homicide, as aggressive dreams are relatively common, with one study finding that 19% of a university student sample reported having had dreams of killing someone (Schredl & Mathes, 2014). However, there does appear to be a connection between violent dreams and violent history, as nightmares involving harming others are associated with a more violent past history (Mathes et al., 2018). This correlation between perpetration nightmares and violent history could be evidence of replicative nightmares among perpetrators of violence, though there remains no direct evidence of such experiences resulting from non-combat related perpetration of harm. Thus, quantifying the frequency of replicative nightmares among perpetrators of homicide would fill a void in the current literature describing the phenomenon of homicide-related PITS.

### *Dream Intensity and Central Image*

Hartmann et al. (2001a) describe the *central image* of a dream as "a striking, arresting, or compelling image […] which stands out by virtue of being especially powerful, vivid, bizarre, or detailed" (p. 99). Central imagery is strongly associated with the emotional intensity of a dream (Bilsborrow et al., 2009), and has proven a useful way of detecting the impact of trauma exposure on dreaming. It has been shown to be associated with a history of abuse (Hartmann et al., 2001b), and is correlated with the reported severity of a past traumatic experience even when not correlating with total PCL score (Bilsborrow et al., 2013). The intensity of central images, but not the content of dreams, has been shown to increase after a traumatic event (Hartmann & Basile, 2003).

Hartmann's central image presents an accessible approach to quantifying dream content in a way that is sensitive to past traumatic experiences. It has been shown to provide sensitivity to trauma history regardless of present trauma symptoms reported by the dreamer, indicating that central imagery could prove a valuable tool in detecting evidence of PITS even when symptoms are not evident or explicitly reported. Surveying the dream content of individuals who have perpetrated homicide could provide insight into the degree of the unreported traumatic impact of past experiences. Additional surveying of past trauma exposure would help to control for the level of non-perpetration trauma experienced, and would help to better isolate the effect of perpetration.

### *Longitudinal Study*

A longitudinal study design would be necessary to demonstrate change in traumatic stress as a result of an event. Such a study design would be preferable for clearly demonstrating how an act of perpetration contributes to change in mental wellbeing. However, homicides are rare and

unwanted events. It would not be feasible to evaluate enough of the population in order to later have a large enough sample of participants who had perpetrated homicide. One could attempt to select individuals at heightened risk for perpetrating homicide, but it would be unethical to not attempt to divert them from such behavior. Identifying a population that already undergoes routine screening would be an alternative. Members of that population who later become incarcerated could be assessed with the same measures as the routine screening to assess for differences. Again, the use of a control group would be necessary to control for the various impacts of incarceration.

**Conclusions**

This study does not seek to introduce, define, or prove the existence of PITS among adults who are in prison. The existing body of literature has already provided substantial evidence over the decades that perpetrating harm on others is associated with emotional distress that both shares similarities with the construct of PTSD, and differs in its presentation and treatment needs. Rather the results of this study reveal a pattern in which violent offenses are associated with higher levels of distress and treatment utilization – with the exception of substance use treatment – than nonviolent offenses. There were a few incidences of all three comparison groups differing significantly, but in all cases where they did, homicide emerged as the offense most likely to be associated with higher levels of emotional distress, and nonviolent offenses were associated with the lowest likelihood. The overarching hypothesis that the perpetration of violence, especially homicide, is associated with a higher likelihood of experiencing negative mental and behavioral health outcomes known to correlate with PTSD is supported by the present study.

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# Appendix A

## Supplemental Data

### Table A1

*Respondent Demographics*

| | Homicide | | Violent-NL | | Nonviolent | | Total | |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % |
| Respondents | 3,289 | 14.83 | 5,582 | 25 | 13,312 | 1.00 | 22,183 | 100 |
| Average Years in Prison | 12.79 | | 5.19 | | 2.59 | | 4.71 | |
| | | | Sex | | | | | |
| Male | 2,495 | 75.86 | 4,501 | 80.63 | 9,140 | 68.66 | 16,136 | 72.74 |
| Female | 794 | 24.14 | 1,081 | 19.37 | 4,172 | 31.34 | 6,047 | 27.26 |
| | | | Race/Ethnicity | | | | | |
| American Indian/AK Native | 52 | 1.58% | 91 | 1.63 | 157 | 1.18 | 300 | 1.35 |
| Asian/ Pacific Islander | 36 | 1.09 | 37 | 0.66 | 136 | 1.02 | 209 | 0.94 |
| Black | 1,313 | 39.92 | 2,222 | 39.81 | 3,421 | 25.70 | 6,956 | 31.36 |
| Hispanic | 556 | 16.90 | 1,142 | 20.46 | 3,113 | 23.38 | 4,811 | 21.69 |
| White | 904 | 27.49 | 1,385 | 24.81 | 4,982 | 37.42 | 7,271 | 32.78 |
| 2+ Races | 386 | 11.74 | 626 | 11.21 | 1,347 | 10.12 | 2,359 | 10.63 |
| Uncategorized (Missing) | 42 | 1.28 | 79 | 1.42 | 156 | 1.17 | 277 | 1.25 |
| | | | Age | | | | | |
| 18 to 24 | 173 | 5.26 | 836 | 14.98 | 1,173 | 8.81 | 2,182 | 9.84 |
| 25 to 34 | 799 | 24.29 | 2,019 | 36.17 | 4,395 | 33.02 | 7,213 | 32.52 |
| 35 to 44 | 939 | 28.55 | 1,333 | 23.88 | 3,994 | 30.00 | 6,266 | 28.25 |
| 45 to 54 | 762 | 23.17 | 940 | 16.84 | 2,550 | 19.16 | 4,252 | 19.17 |
| 55 to 64 | 455 | 13.83 | 365 | 6.54 | 971 | 7.29 | 1,791 | 8.07 |
| 65+ | 161 | 4.90 | 89 | 1.59 | 229 | 1.72 | 479 | 2.16 |
| | | | Highest Level of Education Completed Prior to Prison | | | | | |
| Less than High School | 2,056 | 62.51 | 3,505 | 62.79 | 7,347 | 55.19 | 12,908 | 58.19 |
| High School Graduate | 726 | 22.07 | 1,261 | 22.59 | 3,003 | 22.56 | 4,990 | 22.49 |
| Some College | 328 | 9.97 | 598 | 10.71 | 1,994 | 14.98 | 2,920 | 13.16 |
| College Degree or More | 146 | 4.44 | 164 | 2.94 | 813 | 6.11 | 1,123 | 5.06 |
| | | | Marital Status | | | | | |
| Married | 391 | 11.90 | 679 | 12.17 | 2,407 | 18.09 | 3,477 | 15.68 |
| Widowed | 236 | 7.18 | 106 | 1.90 | 330 | 2.48 | 672 | 3.03 |
| Separated | 109 | 3.32 | 268 | 4.80 | 926 | 6.96 | 1,303 | 5.88 |
| Divorced | 635 | 19.32 | 920 | 16.49 | 2,527 | 18.99 | 4,082 | 18.41 |
| Never Married | 1,916 | 58.29 | 3,605 | 64.63 | 7,117 | 53.48 | 12,638 | 57.00 |
| | | | Other | | | | | |
| Served in Combat | 71 | 2.16% | 73 | 1.31 | 172 | 1.29 | 316 | 1.42 |
| First Admission | 2504 | 76.13 | 3,206 | 57.43 | 6,635 | 49.84 | 12,387 | 55.84 |

*Note: Violent-NL* = violent/non-lethal

**Table A2**

*Variables from the Survey of Prison Inmates (SPI) Used in the Study Analysis*

| Variable | SPI Label | Study Label |
|---|---|---|
| V0037 | Serve in combat/war zone | Serve in Combat |
| *Text*: | *While serving in the U.S. Armed Forces did you ever serve in a combat or war zone?* | |
| *Values:* | Yes/No | |
| V0038 | See combat in a line/combat unit | See Combat |
| *Text*: | *While serving in the U.S. Armed Forces, did you see combat in a line or combat unit?* | |
| *Values:* | Yes/No | |
| V0046 | Exposed to dead/dying/wounded while serving? | Exposed to dead/dying/wounded |
| *Text*: | *While serving in the U.S. Armed Forces were you ever exposed to dead, dying, or wounded people?* | |
| *Values:* | Yes/No | |
| V0056Y | Admission Date – Year | Years in Prison [a] |
| *Text*: | *(No Text)* | |
| *Values:* | Year | |
| V0497 | List of Victim Injuries – Victim Died | Comparison Group assignment [a] |
| *Text*: | *What were the injuries? Any other injuries? (MARK ALL THAT APPLY)* | |
| *Values:* | Endorsed "Victim Died" or not | |
| V0909 | # of times sentenced/served in state/federal prison | Multiple Admissions [a] |
| *Text*: | *Altogether, how many different times in your life have you been sentenced to serve time in a state or federal prison?* | |
| *Values:* | Numeric | |
| V1179 | Frequency of nervousness past 30 days | Nervousness; Total MH Score [a] |
| *Text*: | *About how often during the past 30 days did you feel nervous?* | |
| *Values:* | Likert Scale [b] | |
| V1180 | Frequency of hopelessness past 30 days | Hopelessness; Total MH Score [a] |
| *Text*: | *During the past 30 days, about how often did you feel hopeless?* | |
| *Values:* | Likert Scale [b] | |
| V1181 | Frequency of restlessness past 30 days | Restlessness; Total MH Score [a] |
| *Text*: | *During the past 30 days, about how often did you feel restless or fidgety?* | |
| *Values:* | Likert Scale [b] | |
| V1182 | Frequency of depression past 30 days | Depression; Total MH Score [a] |
| *Text*: | *How often during the past 30 days did you feel so depressed that nothing could cheer you up? Would you say all the time, most of the time, some of the time, a little of the time, or none of the time?* | |
| *Values:* | Likert Scale [b] | |
| V1183 | Felt everything was an effort past 30 days | Everything was an effort; Total MH Score [a] |
| *Text*: | *About how often during the past 30 days did you feel that everything was an effort?* | |
| *Values:* | Likert Scale [b] | |
| V1184 | Frequency of worthlessness past 30 days | Worthlessness; Total MH Score [a] |
| *Text*: | *About how often during the past 30 days did you feel worthless?* | |
| *Values:* | Likert Scale [b] | |

| | | |
|---|---|---|
| V1185 | MD diagnosed manic depression/bipolar disorder/mania | Bipolar Disorder; Total MH Score [a] |
| *Text*: | *Have you ever been told by a medical doctor or a mental health professional, such as a psychiatrist or psychologist that you had manic depression, a bipolar disorder, or mania?* | |
| *Values:* | Yes/No | |
| V1186 | MD diagnosed depressive disorder | Depressive disorder |
| *Text*: | *Have you ever been told by a medical doctor or a mental health professional, such as a psychiatrist or psychologist that you had a depressive disorder?* | |
| *Values:* | Yes/No | |
| V1187 | MD diagnosed schizophrenia/other psychotic disorder | Schizophrenia |
| *Text*: | *Have you ever been told by a medical doctor or a mental health professional, such as a psychiatrist or psychologist that you had schizophrenia or another psychotic disorder?* | |
| *Values:* | Yes/No | |
| V1188 | MD diagnosed post-traumatic stress disorder (PTSD) | PTSD |
| *Text*: | *Have you ever been told by a medical doctor or a mental health professional, such as a psychiatrist or psychologist that you had post-traumatic stress disorder, also known as PTSD?* | |
| *Values:* | Yes/No | |
| V1189 | MD diagnosed anxiety disorder | Anxiety disorder |
| *Text*: | *Have you ever been told by a medical doctor or a mental health professional, such as a psychiatrist or psychologist that you had an anxiety disorder, such as a panic disorder or obsessive-compulsive disorder, also known as OCD?* | |
| *Values:* | Yes/No | |
| V1190 | MD diagnosed personality disorder | Personality disorder |
| *Text*: | *Have you ever been told by a medical doctor or a mental health professional, such as a psychiatrist or psychologist that you had a personality disorder, such as antisocial or borderline personality?* | |
| *Values:* | Yes/No | |
| V1191 | MD diagnosed another mental or emotional condition | Other diagnosis |
| *Text*: | *Have you ever been told by a medical doctor or a mental health professional, such as a psychiatrist or psychologist that you had a mental or emotional condition other than those I just asked you about?* | |
| *Values:* | Yes/No | |
| V1201 | Taking prescription medicines at time or arrest | Psychiatric medication at arrest; Started psychiatric medication after admission [a] |
| *Text*: | *At the time of the [OFFENSE], were you taking prescription medicine for any problem you were having with your emotions, nerves, or mental health (IF RESPONDENT INDICATES THEY HAD A PRESCRIPTION BUT WAS NOT TAKING THE MEDICATION, MARK "NO")* | |
| *Values:* | Yes/No | |
| V1202 | Taken prescription meds since admitted to prison | Psychiatric medication since admission; Started psychiatric medication after admission [a] |

| | | |
|---|---|---|
| *Text*: | *Since you were admitted to prison [DATE_ADMIT], have you taken prescription medicine for any problem you were having with your emotions, nerves, or mental health?* | |
| *Values:* | Yes/No | |
| V1204 | Received professional help since admitted to prison | Counseling |
| *Text*: | *Since you were admitted to prison [DATE_ADMIT], have you received counseling, treatment, or therapy from a mental health professional such as a psychiatrist, psychologist, social worker, or nurse for any problem you were having with your emotions, nerves, or mental health?* | |
| *Values:* | Yes/No | |
| V1374 | Ever received treatment for alcohol/drug usage | Ever received drug or alcohol treatment |
| *Text*: | *These next questions deal with treatment for alcohol and drug problems, not including cigarettes. Please report treatment or counseling designed to help you cut down or stop your alcohol or drug use. Please include detoxification and any other treatment for medical problems associated with your alcohol or drug use. Have you ever received treatment for counseling for your use of alcohol or any drug, not counting cigarettes?* | |
| *Values:* | Yes/No | |
| V1375 | Received treatment for alcohol/drug usage since admission to prison | Drug or alcohol treatment since admission; Started substance use treatment after admission [a] |
| *Text*: | *Have you received any kind of treatment or counseling for your use of alcohol or any drug since your admission to prison [DATE_ADMIT]?* | |
| *Values:* | Yes/No | |
| V1378 | Received treatment for alcohol/drug usage while living in the community | Drug or alcohol treatment while in the community; Started substance use treatment after admission [a] |
| *Text*: | *Have you received any kind of treatment or counseling for your use of alcohol or any drug while living in the community and not on probation or parole?* | |
| *Values:* | Yes/No | |
| V1397 | # of write ups since admission to prison | Write ups since admission |
| *Text*: | *Prisons have a lot of rules that inmates are expected to follow. This next set of questions is about any prison rules that you may have broken. Since you were admitted to prison [DATE_ADMIT], how many times have you been written up for or found guilty of breaking any prison rules?* | |
| *Values:* | Numeric | |
| V1398 | # of write ups in past 12 months | Write ups in prior 12 months |
| *Text*: | *During the past 12 months, how many times have you been written up for or found guilty of breaking any prison rules?* | |
| *Values:* | Numeric | |
| V1399 | # of write ups for drug/alcohol violation in past 12 months | Drug or alcohol write ups in prior 12 months |
| *Text*: | *The next set of questions will ask you how many times you have been written up or found guilty of breaking specific types of prison rules during the past 12 months. During the past 12 months, how many times have you been written up for or found guilty of a drug or alcohol violation, such as possession, use, or selling?* | |
| *Values:* | Numeric | |

| | | |
|---|---|---|
| V1403 | # of write ups for verbal assault on an officer in past 12 months | Verbal assault on an officer in prior 12 months; Total verbal assaults in prior12 months [a], Total Verbal and Physical Assaults in prior 12 months [a] |
| *Text*: | *During the past 12 months, how many times have you been written up for or found guilty of verbal assault on a correctional officer or other staff person?* | |
| *Values:* | Numeric | |
| V1404 | # of write ups for physical assault on an officer in past 12 months | Physical assault on an officer in prior 12 months; Total physical assaults in prior 12 months [a]; Total Verbal and Physical Assaults in prior 12 months [a] |
| *Text*: | *During the past 12 months, how many times have you been written up for or found guilty of physical assault on a correctional officer or other staff person?* | |
| *Values:* | Numeric | |
| V1405 | # of write ups for verbal assault on an inmate in past 12 months | Verbal assault on an inmate in prior 12 months; Total verbal assaults in prior 12 months [a]; Total Verbal and Physical Assaults in prior 12 months [a] |
| *Text*: | *During the past 12 months, how many times have you been written up for found guilty of verbal assault on another inmate?* | |
| *Values:* | Numeric | |
| V1406 | # of write ups for physical assault on an inmate in past 12 months | Physical assault on an inmate in prior 12 months; Total physical assaults in prior 12 months [a]; Total Verbal and Physical Assaults in prior 12 months [a] |
| *Text*: | *During the past 12 months, how many times have you been written up for or found guilty of physical assault on another inmate?* | |
| *Values:* | Numeric | |
| V1410 [c] | # of write ups for drug/alcohol violation since admission to prison | Drug or alcohol write ups since admission |
| *Text*: | *Since your admission to prison [DATE_ADMIT], how many times have you been written up for or found guilty of a drug or alcohol violation, such as possession, use, or selling?* | |
| *Values:* | Numeric | |
| RV0001 | Current age (continuous – years) | Current age |
| *Text*: | *(No Text)* | |
| *Values:* | Numeric | |
| RV0002 | Current age (Categorical – 6 levels) | Current age (for demographics) |
| *Text*: | *(No Text)* | |
| *Values:* | 18-24; 25-34; 35-44; 45-54; 55-64; 65+ | |
| RV0005 | Sex for analysis | Sex |
| *Text*: | *(No Text)* | |
| *Values:* | Male/Female | |
| RV0036 | Controlling Offense Category (13 Levels) – for analysis | Controlling offense; Comparison group assignment [a] |
| *Text*: | *(No Text)* | |

| | | |
|---|---|---|
| *Values:* | Homicide; Rape Sexual Assault; Robbery; Assault; Other Violent; Burglary; Other Property; Drug Trafficking; Drug Possession; Other Drug; Weapons; Other Public Order; Other Unspecified | |
| RV0051 | Marital status | Marital status |
| *Text*: | *(No Text)* | |
| *Values:* | Married; Widowed; Separated; Divorced; Never Married | |
| RV0052 | Educational attainment (Continuous) – highest year of education completed prior to prison | Highest year of education completed prior to prison |
| *Text*: | *(No Text)* | |
| *Values:* | Numeric | |
| RV0054 | Educational attainment (4 levels) – highest year of education completed prior to prison | Highest year of education completed prior to prison (for demographics) |
| *Text*: | *(No Text)* | |
| *Values:* | L*ess Than High School; High School Graduate; Some College; College Degree or More* | |
| RV0131 | How firearm was discharged | Comparison group assignment [a] |
| *Text*: | *(No Text)* | |
| *Values:* | Killed Victim; Shot but Not Killed; Discharged but Did Not Shoot; Did Not Discharge; Possessed but Did Not Use; Missed if Used | |

[a] Study variable was determined based on the listed SPI variable value

[b] 5-point Likert scale based on the following values, in order: All of the time, Most of the time, Some of the time, A little of the time, None of the time

[c] Codebook note: "Proceed with caution: Variables V1410-1420 were subject to a CAPI programming error."

# Appendix B

## Supplemental Tables and Results

**Table B1**

*Forward Stepwise Regression for Analysis Model*

| Step | Parameter | Lack of Fit (*p*) | ROC AUC |
|---|---|---|---|
| 1 | Offense Type | - | 0.516 |
| 2 | Sex | 0.001 | 0.67 |
| 3 | Race/Hispanic Origin | 0.003 | 0.712 |
| 4 | Years in Prison | 0.015 | 0.718 |
| 5 | Served in Combat | 0.001 | 0.728 |
| 6 | Marital Status | 0.021 | 0.729 |
| 7 | Highest Year of Education Completed Prior to Prison | 1.00 | 0.73 |

*Note*. *ROC AUC* = receiver operating characteristic area under the curve

**Table B2**

*Correlation Coefficients Matrix - Part 1 of 2*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Homicide | - | | | | | | | | | |
| 2. Violent/Non-lethal | **-0.74** | - | | | | | | | | |
| 3. Male | 0.09 | **-0.13** | - | | | | | | | |
| 4. White | 0.02 | 0.03 | 0.09 | - | | | | | | |
| 5. Black | 0.00 | -0.03 | -0.04 | **0.59** | - | | | | | |
| 6. Hispanic | 0.01 | 0.02 | -0.04 | **0.58** | **0.50** | - | | | | |
| 7. American Indian/Alaska Native | -0.03 | 0.00 | 0.03 | **-0.13** | **-0.14** | **-0.14** | - | | | |
| 8. Asian/Pacific Islander | 0.01 | 0.00 | -0.02 | **-0.69** | **-0.65** | **-0.64** | **-0.43** | - | | |
| 9. Years in Prison | **-0.28** | **0.10** | -0.09 | 0.03 | -0.03 | -0.01 | 0.02 | -0.01 | - | |
| 10. Married | 0.04 | -0.01 | -0.01 | 0.01 | 0.01 | -0.01 | 0.04 | -0.03 | 0.02 | - |
| 11. Widowed | **-0.10** | 0.06 | 0.06 | 0.01 | 0.02 | 0.00 | -0.04 | 0.01 | 0.00 | **-0.43** |
| 12. Separated | 0.06 | -0.04 | 0.03 | 0.01 | 0.01 | -0.02 | 0.02 | -0.01 | 0.03 | **-0.23** |
| 13. Divorced | 0.04 | -0.03 | -0.03 | -0.08 | 0.01 | 0.00 | 0.01 | 0.02 | -0.01 | **-0.02** |
| 14. Served in Combat | 0.00 | 0.01 | -0.04 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | -0.01 |
| 15. Saw Combat | 0.00 | 0.01 | -0.01 | 0.00 | 0.00 | 0.00 | -0.01 | 0.01 | 0.00 | 0.00 |
| 16. Exposed to Dead/Dying/Wounded | 0.02 | -0.04 | -0.06 | -0.01 | 0.00 | 0.00 | 0.01 | -0.01 | -0.01 | -0.01 |
| 17. Current Age | 0.05 | 0.05 | -0.06 | 0.00 | -0.02 | 0.05 | -0.02 | 0.01 | **-0.23** | 0.01 |
| 18. Highest Year of Education Completed After Prison | -0.01 | 0.01 | **0.11** | -0.03 | 0.00 | **0.11** | 0.02 | -0.04 | 0.05 | -0.02 |
| 19. Length of Sentence (Years) | **-0.17** | 0.06 | -0.03 | -0.02 | -0.03 | 0.00 | 0.02 | 0.01 | **-0.34** | 0.01 |

*Note*. Coefficients of 0.10 or higher in bold.

**Table B2**

*Correlation Coefficients Matrix - Part 2 of 2*

| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|
| 11. Widowed | - | | | | | | | |
| 12. Separated | **-0.43** | - | | | | | | |
| 13. Divorced | **-0.39** | **-0.22** | - | | | | | |
| 14. Served in Combat | -0.01 | 0.00 | -0.01 | - | | | | |
| 15. Saw Combat | 0.01 | -0.01 | 0.01 | **-0.60** | - | | | |
| 16. Exposed to Dead/Dying/Wounded | -0.01 | 0.01 | -0.01 | **-0.37** | **-0.33** | - | | |
| 17. Current Age | **-0.18** | 0.03 | **-0.10** | 0.02 | -0.04 | -0.06 | - | |
| 18. Highest Year of Education Completed After Prison | -0.01 | 0.05 | -0.04 | -0.03 | -0.01 | -0.07 | -0.08 | - |
| 19. Length of Sentence (Years) | 0.01 | -0.01 | -0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |

*Note*. Coefficients of 0.10 or higher in bold.

**Table B3**

*Regression Coefficients and Associations of Offense Type and Psychiatric Disorders*

| | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|
| Parameter Effects | | | | LL | UL | |
| Bipolar Disorder | | | | | | |
| Homicide | | 0.04 | 0.04 | -0.03 | 0.12 | .355 |
| Violent-NL | | 0.22 | 0.03 | 0.16 | 0.27 | **<.001** |
| Personality Disorder | | | | | | |
| Homicide | | 0.14 | 0.05 | 0.05 | 0.23 | **.002** |
| Violent-NL | | 0.14 | 0.04 | 0.71 | 0.21 | **<.001** |
| Schizophrenia | | | | | | |
| Homicide | | 0.07 | 0.06 | -0.04 | 0.17 | .213 |
| Violent-NL | | 0.20 | 0.04 | 0.12 | 0.28 | **<.001** |
| Comparisons | | Odds Ratio | | LL | UL | *p* |
| Bipolar Disorder | | | | | | |
| Homicide | Violent-NL | 0.83 | | 0.73 | 0.93 | **.002** |
| Homicide | Nonviolent | 1.34 | | 1.20 | 1.51 | **<.001** |
| Violent-NL | Nonviolent | 1.62 | | 1.50 | 1.76 | **<.001** |
| Personality Disorder | | | | | | |
| Homicide | Violent-NL | 1.00 | | 0.86 | 1.15 | 0.690 |
| Homicide | Nonviolent | 1.53 | | 1.32 | 1.77 | **<.001** |
| Violent-NL | Nonviolent | 1.53 | | 1.38 | 1.70 | **<.001** |
| Schizophrenia | | | | | | |
| Homicide | Violent-NL | 0.87 | | 0.74 | 1.04 | .124 |
| Homicide | Nonviolent | 1.41 | | 1.18 | 1.67 | **.001** |
| Violent-NL | Nonviolent | 1.61 | | 1.43 | 1.81 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

**Table B4**

*Regression Coefficients of Offense Type and Mental Health Symptoms*

| Parameter Effects | | Estimate | SE | 95% CI LL | 95% CI UL | *p* |
|---|---|---|---|---|---|---|
| Nervousness | | | | | | |
| Level 1 | Homicide | 0.04 | 0.04 | -0.03 | 0.12 | .355 |
| | Violent-NL | 0.22 | 0.03 | 0.16 | 0.27 | **<.001** |
| Level 2 | Homicide | 0.04 | 0.04 | -0.03 | 0.12 | .355 |
| | Violent-NL | 0.22 | 0.03 | 0.16 | 0.27 | **<.001** |
| Hopelessness | | | | | | |
| Level 1 | Homicide | 0.04 | 0.04 | -0.03 | 0.12 | .355 |
| | Violent-NL | 0.22 | 0.03 | 0.16 | 0.27 | **<.001** |
| Level 2 | Homicide | 0.14 | 0.05 | 0.05 | 0.23 | **.002** |
| | Violent-NL | 0.14 | 0.04 | 0.71 | 0.21 | **<.001** |
| Restlessness | | | | | | |
| Level 1 | Homicide | 0.04 | 0.04 | -0.03 | 0.12 | .355 |
| | Violent-NL | 0.22 | 0.03 | 0.16 | 0.27 | **<.001** |
| Level 2 | Homicide | 0.14 | 0.05 | 0.05 | 0.23 | **.002** |
| | Violent-NL | 0.14 | 0.04 | 0.71 | 0.21 | **<.001** |
| Depression | | | | | | |
| Level 1 | Homicide | 0.04 | 0.04 | -0.03 | 0.12 | .355 |
| | Violent-NL | 0.22 | 0.03 | 0.16 | 0.27 | **<.001** |
| Level 2 | Homicide | 0.14 | 0.05 | 0.05 | 0.23 | **.002** |
| | Violent-NL | 0.14 | 0.04 | 0.71 | 0.21 | **<.001** |
| Everything is an Effort | | | | | | |
| Level 1 | Homicide | 0.04 | 0.04 | -0.03 | 0.12 | .355 |
| | Violent-NL | 0.22 | 0.03 | 0.16 | 0.27 | **<.001** |
| Level 2 | Homicide | 0.14 | 0.05 | 0.05 | 0.23 | **.002** |
| | Violent-NL | 0.14 | 0.04 | 0.71 | 0.21 | **<.001** |
| Worthlessness | | | | | | |
| Level 1 | Homicide | 0.04 | 0.04 | -0.03 | 0.12 | .355 |
| | Violent-NL | 0.22 | 0.03 | 0.16 | 0.27 | **<.001** |
| Level 2 | Homicide | 0.07 | 0.06 | -0.04 | 0.17 | .213 |
| | Violent-NL | 0.20 | 0.04 | 0.12 | 0.28 | **<.001** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent offender group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

**Table B5**

*Regressions of Associations between Offense Type and Mental Health Symptoms*

| Comparisons | | | Exp(β) | β | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|---|---|
| | | | | | | LL | UL | |
| Nervousness | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.01 | 0.01 | 0.02 | -0.04 | 0.05 | .716 |
| | Homicide | Nonviolent | 1.11 | 0.11 | 0.02 | 0.06 | 0.15 | **<.001** |
| | Violent-NL | Nonviolent | 1.12 | 0.11 | 0.02 | 0.08 | 0.14 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.00 | 0.00 | 0.03 | -0.06 | 0.05 | .931 |
| | Homicide | Nonviolent | 1.12 | 0.12 | 0.03 | 0.06 | 0.17 | **<.001** |
| | Violent-NL | Nonviolent | 1.15 | 0.14 | 0.02 | 0.10 | 0.18 | **<.001** |
| Hopelessness | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.09 | 0.08 | 0.02 | 0.04 | 0.13 | **.001** |
| | Homicide | Nonviolent | 1.25 | 0.22 | 0.02 | 0.17 | 0.27 | **<.001** |
| | Violent-NL | Nonviolent | 1.13 | 0.12 | 0.02 | 0.09 | 0.16 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.11 | 0.10 | 0.03 | 0.05 | 0.16 | **.001** |
| | Homicide | Nonviolent | 1.24 | 0.22 | 0.03 | 0.16 | 0.27 | **<.001** |
| | Violent-NL | Nonviolent | 1.12 | 0.12 | 0.02 | 0.07 | 0.16 | **<.001** |
| Restlessness | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.00 | 0.00 | 0.02 | -0.05 | 0.04 | .910 |
| | Homicide | Nonviolent | 1.14 | 0.13 | 0.02 | 0.09 | 0.17 | **<.001** |
| | Violent-NL | Nonviolent | 1.13 | 0.13 | 0.02 | 0.10 | 0.16 | **<.001** |
| Level 2 | Homicide | Violent-NL | 0.98 | -0.02 | 0.03 | -0.07 | 0.04 | .547 |
| | Homicide | Nonviolent | 1.15 | 0.14 | 0.03 | 0.08 | 0.19 | **<.001** |
| | Violent-NL | Nonviolent | 1.16 | 0.15 | 0.02 | 0.11 | 0.19 | **<.001** |
| Depression | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.01 | 0.01 | 0.02 | -0.04 | 0.06 | .590 |
| | Homicide | Nonviolent | 1.20 | 0.18 | 0.02 | 0.13 | 0.23 | **<.001** |
| | Violent-NL | Nonviolent | 1.18 | 0.16 | 0.02 | 0.13 | 0.20 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.02 | 0.02 | 0.03 | -0.04 | 0.08 | .453 |
| | Homicide | Nonviolent | 1.19 | 0.18 | 0.03 | 0.12 | 0.24 | **<.001** |
| | Violent-NL | Nonviolent | 1.17 | 0.16 | 0.02 | 0.11 | 0.20 | **<.001** |
| Everything is an Effort | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.00 | 0.00 | 0.02 | -0.05 | 0.04 | .832 |
| | Homicide | Nonviolent | 1.13 | 0.12 | 0.02 | 0.07 | 0.16 | **<.001** |
| | Violent-NL | Nonviolent | 1.11 | 0.11 | 0.02 | 0.08 | 0.14 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.01 | 0.01 | 0.03 | -0.05 | 0.06 | .832 |
| | Homicide | Nonviolent | 1.13 | 0.12 | 0.03 | 0.06 | 0.18 | **<.001** |
| | Violent-NL | Nonviolent | 1.11 | 0.10 | 0.02 | 0.06 | 0.14 | **<.001** |
| Worthlessness | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.04 | 0.04 | 0.03 | -0.02 | 0.09 | .158 |
| | Homicide | Nonviolent | 1.17 | 0.16 | 0.03 | 0.10 | 0.21 | **<.001** |
| | Violent-NL | Nonviolent | 1.12 | 0.12 | 0.02 | 0.08 | 0.15 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.07 | 0.07 | 0.03 | 0.00 | 0.14 | **.037** |
| | Homicide | Nonviolent | 1.19 | 0.18 | 0.03 | 0.11 | 0.24 | **<.001** |
| | Violent-NL | Nonviolent | 1.12 | 0.12 | 0.03 | 0.07 | 0.17 | **<.001** |

Note. *p*-values less than .05 in bold; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

**Table B6**

*Regression Coefficients of Offense Type and Psychiatric Medication at Arrest*

| | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|
| Parameter Effects | | | | LL | UL | |
| PTSD | | | | | | |
| Level 1 | Homicide | -0.13 | 0.08 | -0.28 | 0.03 | .106 |
| | Violent-NL | 0.11 | 0.06 | -0.01 | 0.23 | .062 |
| | Homicide | -0.19 | 0.09 | -0.37 | -0.01 | **.039** |
| Level 2 | Violent-NL | 0.13 | 0.08 | -0.02 | 0.28 | .092 |
| Anxiety Disorder | | | | | | |
| Level 1 | Homicide | -0.02 | 0.07 | -0.16 | 0.11 | .716 |
| | Violent-NL | 0.01 | 0.05 | -0.09 | 0.11 | .811 |
| | Homicide | -0.07 | 0.08 | -0.23 | 0.09 | .408 |
| Level 2 | Violent-NL | -0.01 | 0.07 | -0.14 | 0.12 | .860 |
| Depressive Disorder | | | | | | |
| Level 1 | Homicide | -0.05 | 0.06 | -0.17 | 0.08 | .464 |
| | Violent-NL | 0.08 | 0.05 | -0.02 | 0.17 | .102 |
| | Homicide | -0.10 | 0.07 | -0.24 | 0.05 | .196 |
| Level 2 | Violent-NL | 0.05 | 0.06 | -0.07 | 0.16 | .434 |
| Bipolar Disorder | | | | | | |
| Level 1 | Homicide | -0.09 | 0.07 | -0.22 | 0.04 | .188 |
| | Violent-NL | 0.07 | 0.05 | -0.02 | 0.17 | .138 |
| | Homicide | -0.13 | 0.08 | -0.30 | 0.03 | .117 |
| Level 2 | Violent-NL | 0.00 | 0.07 | -0.12 | 0.13 | .945 |
| Personality Disorder | | | | | | |
| Level 1 | Homicide | -0.10 | 0.09 | -0.28 | 0.09 | .301 |
| | Violent-NL | 0.06 | 0.07 | -0.08 | 0.19 | .429 |
| | Homicide | -0.19 | 0.12 | -0.43 | 0.05 | .125 |
| Level 2 | Violent-NL | 0.01 | 0.10 | -0.19 | 0.20 | .944 |
| Schizophrenia | | | | | | |
| Level 1 | Homicide | -0.10 | 0.11 | -0.31 | 0.12 | .388 |
| | Violent-NL | 0.08 | 0.08 | -0.08 | 0.24 | .306 |
| | Homicide | -0.23 | 0.15 | -0.52 | 0.07 | .132 |
| Level 2 | Violent-NL | 0.09 | 0.12 | -0.15 | 0.32 | .467 |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

**Table B7**

*Regressions of Associations between Offense Type and Psychiatric Medication at Arrest*

| Comparisons | | | Odds Ratio | 95% CI | | *p* |
|---|---|---|---|---|---|---|
| | | | | LL | UL | |
| PTSD | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.79 | 0.61 | 1.01 | .062 |
| | Homicide | Nonviolent | 0.87 | 0.68 | 1.10 | .246 |
| | Violent-NL | Nonviolent | 1.10 | 0.93 | 1.30 | .248 |
| Level 2 | Homicide | Violent-NL | 0.72 | 0.53 | 0.98 | **.038** |
| | Homicide | Nonviolent | 0.78 | 0.58 | 1.03 | .084 |
| | Violent-NL | Nonviolent | 1.07 | 0.85 | 1.35 | .545 |
| Anxiety Disorder | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.96 | 0.78 | 1.20 | .739 |
| | Homicide | Nonviolent | 0.96 | 0.78 | 1.18 | .723 |
| | Violent-NL | Nonviolent | 1.00 | 0.87 | 1.15 | .997 |
| Level 2 | Homicide | Violent-NL | 0.95 | 0.73 | 1.23 | .677 |
| | Homicide | Nonviolent | 0.86 | 0.67 | 1.11 | .251 |
| | Violent-NL | Nonviolent | 0.91 | 0.76 | 1.10 | .340 |
| Depressive Disorder | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.89 | 0.73 | 1.08 | .228 |
| | Homicide | Nonviolent | 0.98 | 0.81 | 1.19 | .874 |
| | Violent-NL | Nonviolent | 1.11 | 0.98 | 1.26 | .106 |
| Level 2 | Homicide | Violent-NL | 0.87 | 0.68 | 1.10 | .243 |
| | Homicide | Nonviolent | 0.86 | 0.69 | 1.09 | .217 |
| | Violent-NL | Nonviolent | 1.00 | 0.84 | 1.19 | .972 |
| Bipolar Disorder | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.85 | 0.68 | 1.05 | .135 |
| | Homicide | Nonviolent | 0.90 | 0.73 | 1.11 | .319 |
| | Violent-NL | Nonviolent | 1.06 | 0.92 | 1.21 | .410 |
| Level 2 | Homicide | Violent-NL | 0.87 | 0.67 | 1.14 | .318 |
| | Homicide | Nonviolent | 0.77 | 0.59 | 1.00 | .052 |
| | Violent-NL | Nonviolent | 0.88 | 0.73 | 1.07 | .205 |
| Personality Disorder | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.86 | 0.64 | 1.15 | .312 |
| | Homicide | Nonviolent | 0.87 | 0.65 | 1.17 | .352 |
| | Violent-NL | Nonviolent | 1.01 | 0.83 | 1.24 | .892 |
| Level 2 | Homicide | Violent-NL | 0.82 | 0.55 | 1.22 | .329 |
| | Homicide | Nonviolent | 0.69 | 0.47 | 1.02 | .063 |
| | Violent-NL | Nonviolent | 0.84 | 0.62 | 1.13 | .250 |
| Schizophrenia | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.84 | 0.59 | 1.18 | .312 |
| | Homicide | Nonviolent | 0.90 | 0.63 | 1.27 | .536 |
| | Violent-NL | Nonviolent | 1.07 | 0.85 | 1.35 | .551 |
| Level 2 | Homicide | Violent-NL | 0.73 | 0.45 | 1.18 | .199 |
| | Homicide | Nonviolent | 0.69 | 0.43 | 1.12 | .132 |
| | Violent-NL | Nonviolent | 0.95 | 0.66 | 1.35 | .764 |

Note. *p*-values less than .05 in bold; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

**Table B8**

*Regression Coefficients of Offense Type and Psychiatric Medication After Admission*

| | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|
| Parameter Effects | | | | LL | UL | |
| PTSD | | | | | | |
| Level 1 | Homicide | 0.20 | 0.08 | 0.04 | 0.36 | **.014** |
| | Violent-NL | 0.07 | 0.06 | -0.05 | 0.20 | .241 |
| | Homicide | 0.19 | 0.10 | 0.01 | 0.38 | **.044** |
| Level 2 | Violent-NL | 0.08 | 0.08 | -0.08 | 0.24 | .330 |
| Anxiety Disorder | | | | | | |
| Level 1 | Homicide | 0.15 | 0.07 | 0.01 | 0.29 | **.032** |
| | Violent-NL | 0.18 | 0.05 | 0.07 | 0.28 | **.001** |
| | Homicide | 0.19 | 0.09 | 0.02 | 0.35 | **.030** |
| Level 2 | Violent-NL | 0.12 | 0.07 | -0.01 | 0.26 | .071 |
| Depressive Disorder | | | | | | |
| Level 1 | Homicide | 0.22 | 0.07 | 0.09 | 0.35 | **.001** |
| | Violent-NL | 0.12 | 0.05 | 0.03 | 0.22 | **.012** |
| | Homicide | 0.33 | 0.08 | 0.18 | 0.49 | **<.001** |
| Level 2 | Violent-NL | 0.01 | 0.06 | -0.11 | 0.13 | .846 |
| Bipolar Disorder | | | | | | |
| Level 1 | Homicide | 0.23 | 0.07 | 0.09 | 0.38 | **.002** |
| | Violent-NL | 0.12 | 0.05 | 0.02 | 0.23 | **.020** |
| | Homicide | 0.30 | 0.09 | 0.12 | 0.48 | **.001** |
| Level 2 | Violent-NL | 0.04 | 0.07 | -0.09 | 0.18 | .543 |
| Personality Disorder | | | | | | |
| Level 1 | Homicide | 0.10 | 0.09 | -0.08 | 0.29 | .265 |
| | Violent-NL | 0.26 | 0.07 | 0.12 | 0.40 | **<.001** |
| | Homicide | 0.22 | 0.12 | -0.02 | 0.47 | .070 |
| Level 2 | Violent-NL | 0.18 | 0.10 | -0.02 | 0.38 | .073 |
| Schizophrenia | | | | | | |
| Level 1 | Homicide | 0.15 | 0.13 | -0.10 | 0.40 | .252 |
| | Violent-NL | 0.23 | 0.09 | 0.05 | 0.41 | **.015** |
| | Homicide | 0.31 | 0.18 | -0.03 | 0.66 | .075 |
| Level 2 | Violent-NL | -0.09 | 0.13 | -0.35 | 0.17 | .494 |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent offender group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

**Table B9**

*Regressions of Associations between Offense Type and Psychiatric Medication After Admission*

| Comparisons | | | Odds Ratio | 95% CI | | *p* |
|---|---|---|---|---|---|---|
| | | | | LL | UL | |
| PTSD | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.14 | 0.87 | 1.48 | .341 |
| | Homicide | Nonviolent | 1.61 | 1.25 | 2.06 | **<.001** |
| | Violent-NL | Nonviolent | 1.41 | 1.19 | 1.68 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.12 | 0.82 | 1.54 | .476 |
| | Homicide | Nonviolent | 1.59 | 1.18 | 2.14 | **.002** |
| | Violent-NL | Nonviolent | 1.42 | 1.12 | 1.80 | **.004** |
| Anxiety Disorder | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.97 | 0.78 | 1.22 | .820 |
| | Homicide | Nonviolent | 1.62 | 1.31 | 2.00 | **<.001** |
| | Violent-NL | Nonviolent | 1.66 | 1.44 | 1.91 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.07 | 0.81 | 1.41 | .653 |
| | Homicide | Nonviolent | 1.64 | 1.26 | 2.13 | **<.001** |
| | Violent-NL | Nonviolent | 1.54 | 1.27 | 1.87 | **<.001** |
| Depressive Disorder | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.10 | 0.90 | 1.36 | .351 |
| | Homicide | Nonviolent | 1.76 | 1.44 | 2.15 | **<.001** |
| | Violent-NL | Nonviolent | 1.59 | 1.39 | 1.82 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.38 | 1.07 | 1.79 | **.014** |
| | Homicide | Nonviolent | 1.98 | 1.54 | 2.54 | **<.001** |
| | Violent-NL | Nonviolent | 1.43 | 1.19 | 1.72 | **.001** |
| Bipolar Disorder | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.11 | 0.88 | 1.40 | .360 |
| | Homicide | Nonviolent | 1.79 | 1.43 | 2.24 | **<.001** |
| | Violent-NL | Nonviolent | 1.61 | 1.40 | 1.85 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.29 | 0.97 | 1.73 | .083 |
| | Homicide | Nonviolent | 1.90 | 1.43 | 2.53 | **<.001** |
| | Violent-NL | Nonviolent | 1.47 | 1.21 | 1.79 | **<.001** |
| Personality Disorder | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.85 | 0.63 | 1.15 | .293 |
| | Homicide | Nonviolent | 1.60 | 1.20 | 2.15 | **.002** |
| | Violent-NL | Nonviolent | 1.88 | 1.52 | 2.32 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.04 | 0.70 | 1.55 | .832 |
| | Homicide | Nonviolent | 1.88 | 1.26 | 2.80 | **.002** |
| | Violent-NL | Nonviolent | 1.80 | 1.31 | 2.47 | **<.001** |
| Schizophrenia | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.92 | 0.62 | 1.38 | .688 |
| | Homicide | Nonviolent | 1.69 | 1.14 | 2.50 | **.009** |
| | Violent-NL | Nonviolent | 1.83 | 1.41 | 2.37 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.50 | 0.86 | 2.61 | .152 |
| | Homicide | Nonviolent | 1.71 | 0.98 | 2.98 | .059 |
| | Violent-NL | Nonviolent | 1.14 | 0.77 | 1.70 | .520 |

Note. *p*-values less than .05 in bold; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

**Table B10**

*Regression Coefficients of Offense Type and Counseling After Admission*

| Parameter Effects | | Estimate | SE | 95% CI LL | 95% CI UL | *p* |
|---|---|---|---|---|---|---|
| PTSD | | | | | | |
| Level 1 | Homicide | 0.20 | 0.08 | 0.05 | 0.36 | **.011** |
| | Violent-NL | 0.05 | 0.06 | -0.07 | 0.17 | .397 |
| | Homicide | 0.22 | 0.09 | 0.04 | 0.40 | **.018** |
| Level 2 | Violent-NL | 0.05 | 0.08 | -0.10 | 0.20 | .520 |
| Anxiety Disorder | | | | | | |
| Level 1 | Homicide | 0.14 | 0.07 | 0.00 | 0.27 | **.044** |
| | Violent-NL | 0.09 | 0.05 | -0.01 | 0.19 | .086 |
| | Homicide | 0.25 | 0.08 | 0.09 | 0.41 | **.003** |
| Level 2 | Violent-NL | 0.01 | 0.06 | -0.12 | 0.13 | .936 |
| Depressive Disorder | | | | | | |
| Level 1 | Homicide | 0.21 | 0.06 | 0.09 | 0.33 | **.001** |
| | Violent-NL | 0.08 | 0.05 | -0.01 | 0.17 | .093 |
| | Homicide | 0.30 | 0.07 | 0.15 | 0.44 | <.001 |
| Level 2 | Violent-NL | 0.05 | 0.06 | -0.06 | 0.17 | .363 |
| Bipolar Disorder | | | | | | |
| Level 1 | Homicide | 0.16 | 0.07 | 0.02 | 0.30 | **.021** |
| | Violent-NL | 0.07 | 0.05 | -0.03 | 0.17 | .167 |
| | Homicide | 0.17 | 0.09 | 0.00 | 0.33 | .054 |
| Level 2 | Violent-NL | 0.07 | 0.07 | -0.06 | 0.20 | .264 |
| Personality Disorder | | | | | | |
| Level 1 | Homicide | 0.07 | 0.09 | -0.11 | 0.25 | .469 |
| | Violent-NL | 0.18 | 0.07 | 0.04 | 0.31 | **.012** |
| | Homicide | 0.11 | 0.12 | -0.12 | 0.34 | .356 |
| Level 2 | Violent-NL | 0.13 | 0.10 | -0.05 | 0.32 | .165 |
| Schizophrenia | | | | | | |
| Level 1 | Homicide | 0.14 | 0.12 | -0.10 | 0.39 | .248 |
| | Violent-NL | 0.12 | 0.09 | -0.06 | 0.29 | .188 |
| | Homicide | 0.29 | 0.17 | -0.05 | 0.62 | .100 |
| Level 2 | Violent-NL | -0.01 | 0.13 | -0.26 | 0.25 | .961 |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

**Table B11**

*Regressions of Associations between Offense Type and Counseling After Admission*

| Comparisons | | | Odds Ratio | 95% CI | | *p* |
|---|---|---|---|---|---|---|
| | | | | LL | UL | |
| PTSD | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.16 | 0.90 | 1.51 | .245 |
| | Homicide | Nonviolent | 1.58 | 1.24 | 2.02 | **<.001** |
| | Violent-NL | Nonviolent | 1.36 | 1.15 | 1.61 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.18 | 0.87 | 1.61 | .278 |
| | Homicide | Nonviolent | 1.63 | 1.22 | 2.17 | **.001** |
| | Violent-NL | Nonviolent | 1.38 | 1.10 | 1.73 | **.006** |
| Anxiety Disorder | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.05 | 0.85 | 1.31 | .651 |
| | Homicide | Nonviolent | 1.43 | 1.17 | 1.76 | **.001** |
| | Violent-NL | Nonviolent | 1.36 | 1.19 | 1.56 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.28 | 0.98 | 1.66 | .071 |
| | Homicide | Nonviolent | 1.65 | 1.29 | 2.13 | **<.001** |
| | Violent-NL | Nonviolent | 1.30 | 1.08 | 1.56 | **.006** |
| Depressive Disorder | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.14 | 0.93 | 1.39 | .197 |
| | Homicide | Nonviolent | 1.64 | 1.35 | 1.98 | **<.001** |
| | Violent-NL | Nonviolent | 1.44 | 1.27 | 1.63 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.27 | 1.00 | 1.62 | **.048** |
| | Homicide | Nonviolent | 1.91 | 1.51 | 2.41 | **<.001** |
| | Violent-NL | Nonviolent | 1.50 | 1.26 | 1.78 | **<.001** |
| Bipolar Disorder | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.10 | 0.88 | 1.36 | .413 |
| | Homicide | Nonviolent | 1.48 | 1.19 | 1.83 | **<.001** |
| | Violent-NL | Nonviolent | 1.35 | 1.18 | 1.54 | **<.001** |
| Level 2 | Homicide | Violent-NL | 1.10 | 0.84 | 1.44 | .506 |
| | Homicide | Nonviolent | 1.50 | 1.15 | 1.96 | **.003** |
| | Violent-NL | Nonviolent | 1.37 | 1.13 | 1.65 | **.001** |
| Personality Disorder | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.90 | 0.67 | 1.20 | .457 |
| | Homicide | Nonviolent | 1.36 | 1.02 | 1.81 | **.034** |
| | Violent-NL | Nonviolent | 1.52 | 1.24 | 1.86 | **<.001** |
| Level 2 | Homicide | Violent-NL | 0.98 | 0.67 | 1.42 | .897 |
| | Homicide | Nonviolent | 1.42 | 0.97 | 2.08 | .069 |
| | Violent-NL | Nonviolent | 1.46 | 1.08 | 1.97 | **.014** |
| Schizophrenia | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.03 | 0.70 | 1.52 | .893 |
| | Homicide | Nonviolent | 1.50 | 1.02 | 2.20 | **.038** |
| | Violent-NL | Nonviolent | 1.46 | 1.15 | 1.86 | **.002** |
| Level 2 | Homicide | Violent-NL | 1.34 | 0.78 | 2.31 | .295 |
| | Homicide | Nonviolent | 1.76 | 1.02 | 3.02 | **.042** |
| | Violent-NL | Nonviolent | 1.31 | 0.89 | 1.93 | .165 |

Note. *p*-values less than .05 in bold; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

**Table B12**

*Regression Coefficients of Offense Type and Write Ups*

| | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|
| Parameter Effects | | | | LL | UL | |
| Drug and Alcohol Since Admission | | | | | | |
| Level 1 | Homicide | -0.08 | 0.38 | -0.82 | 0.67 | .840 |
| | Violent-NL | -0.01 | 0.25 | -0.50 | 0.48 | .975 |
| Level 2 | Homicide | -0.11 | 0.59 | -1.26 | 1.05 | .857 |
| | Violent-NL | -0.04 | 0.41 | -0.84 | 0.76 | .928 |
| Drug and Alcohol in Prior 12 Months | | | | | | |
| Level 1 | Homicide | 0.02 | 0.05 | -0.08 | 0.13 | .684 |
| | Violent-NL | 0.04 | 0.04 | -0.04 | 0.12 | .324 |
| Level 2 | Homicide | 0.04 | 0.09 | -0.13 | 0.20 | .674 |
| | Violent-NL | 0.06 | 0.07 | -0.08 | 0.20 | .406 |
| Verbal Assault on Officer in Prior 12 Months | | | | | | |
| Level 1 | Homicide | 0.20 | 0.08 | 0.04 | 0.36 | **.012** |
| | Violent-NL | -0.03 | 0.06 | -0.15 | 0.09 | .646 |
| Level 2 | Homicide | 0.13 | 0.07 | -0.01 | 0.28 | .064 |
| | Violent-NL | -0.03 | 0.06 | -0.14 | 0.09 | .676 |
| Physical Assault on Officer in Prior 12 Months | | | | | | |
| Level 1 | Homicide | 0.02 | 0.03 | -0.03 | 0.08 | .438 |
| | Violent-NL | 0.00 | 0.02 | -0.04 | 0.04 | .998 |
| Level 2 | Homicide | 0.05 | 0.04 | -0.03 | 0.14 | .223 |
| | Violent-NL | -0.04 | 0.04 | -0.11 | 0.03 | .280 |
| Verbal Assault on Inmate in Prior 12 Months | | | | | | |
| Level 1 | Homicide | 0.04 | 0.04 | -0.04 | 0.11 | .325 |
| | Violent-NL | 0.02 | 0.03 | -0.03 | 0.08 | .412 |
| Level 2 | Homicide | -0.03 | 0.04 | -0.10 | 0.05 | .490 |
| | Violent-NL | 0.05 | 0.03 | -0.01 | 0.12 | .121 |
| Physical Assault on Inmate in Prior 12 Months | | | | | | |
| Level 1 | Homicide | 0.02 | 0.03 | -0.05 | 0.09 | .585 |
| | Violent-NL | 0.07 | 0.03 | 0.01 | 0.12 | **.014** |
| Level 2 | Homicide | 0.01 | 0.04 | -0.06 | 0.09 | .722 |
| | Violent-NL | 0.07 | 0.03 | 0.00 | 0.13 | **.037** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent offender group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

**Table B13**

*Regressions of Associations between Offense Type and Write Ups*

| Comparisons | | | Exp(β) | β | SE | 95% CI LL | 95% CI UL | *p* |
|---|---|---|---|---|---|---|---|---|
| Drug and Alcohol Since Admission | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.94 | -0.06 | 0.06 | -0.19 | 0.06 | .317 |
| | Homicide | Nonviolent | 0.93 | -0.08 | 0.32 | -0.70 | 0.55 | .811 |
| | Violent-NL | Nonviolent | 0.95 | -0.05 | 0.14 | -0.32 | 0.23 | .742 |
| Level 2 | Homicide | Violent-NL | 0.89 | -0.12 | 0.09 | -0.30 | 0.06 | .202 |
| | Homicide | Nonviolent | 0.90 | -0.11 | 0.51 | -1.10 | 0.88 | .827 |
| | Violent-NL | Nonviolent | 0.91 | -0.09 | 0.25 | -0.59 | 0.41 | .724 |
| Drug and Alcohol in Prior 12 Months | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.01 | 0.01 | 0.06 | -0.11 | 0.12 | .920 |
| | Homicide | Nonviolent | 1.05 | 0.04 | 0.04 | -0.02 | 0.11 | .200 |
| | Violent-NL | Nonviolent | 1.05 | 0.05 | 0.03 | -0.01 | 0.11 | .092 |
| Level 2 | Homicide | Violent-NL | 1.00 | 0.00 | 0.09 | -0.17 | 0.18 | .962 |
| | Homicide | Nonviolent | 1.07 | 0.07 | 0.06 | -0.04 | 0.18 | .221 |
| | Violent-NL | Nonviolent | 1.08 | 0.08 | 0.06 | -0.03 | 0.19 | .157 |
| Verbal Assault on Officer in Prior 12 Months | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.13 | 0.12 | 0.07 | -0.02 | 0.27 | .094 |
| | Homicide | Nonviolent | 1.23 | 0.21 | 0.08 | 0.06 | 0.36 | **.006** |
| | Violent-NL | Nonviolent | 1.07 | 0.07 | 0.04 | -0.01 | 0.15 | .084 |
| Level 2 | Homicide | Violent-NL | 1.09 | 0.09 | 0.07 | -0.06 | 0.23 | .242 |
| | Homicide | Nonviolent | 1.14 | 0.13 | 0.07 | -0.01 | 0.27 | .070 |
| | Violent-NL | Nonviolent | 1.04 | 0.04 | 0.03 | -0.02 | 0.10 | .163 |
| Physical Assault on Officer in Prior 12 Months | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.01 | 0.01 | 0.03 | -0.04 | 0.07 | .637 |
| | Homicide | Nonviolent | 1.03 | 0.03 | 0.03 | -0.03 | 0.08 | .349 |
| | Violent-NL | Nonviolent | 1.01 | 0.01 | 0.01 | -0.01 | 0.03 | .367 |
| Level 2 | Homicide | Violent-NL | 1.05 | 0.05 | 0.04 | -0.03 | 0.13 | .253 |
| | Homicide | Nonviolent | 1.04 | 0.04 | 0.05 | -0.05 | 0.12 | .438 |
| | Violent-NL | Nonviolent | 0.99 | -0.01 | 0.02 | -0.04 | 0.02 | .461 |
| Verbal Assault on Inmate in Prior 12 Months | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.01 | 0.01 | 0.04 | -0.07 | 0.08 | .821 |
| | Homicide | Nonviolent | 1.04 | 0.04 | 0.03 | -0.01 | 0.09 | .102 |
| | Violent-NL | Nonviolent | 1.04 | 0.04 | 0.02 | 0.00 | 0.08 | **.041** |
| Level 2 | Homicide | Violent-NL | 0.96 | -0.04 | 0.04 | -0.12 | 0.04 | .314 |
| | Homicide | Nonviolent | 0.99 | -0.01 | 0.02 | -0.05 | 0.02 | .452 |
| | Violent-NL | Nonviolent | 1.04 | 0.04 | 0.03 | -0.02 | 0.10 | .203 |
| Physical Assault on Inmate in Prior 12 Months | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.98 | -0.02 | 0.03 | -0.08 | 0.04 | .556 |
| | Homicide | Nonviolent | 1.04 | 0.04 | 0.03 | -0.02 | 0.09 | .213 |
| | Violent-NL | Nonviolent | 1.08 | 0.08 | 0.02 | 0.04 | 0.12 | **<.001** |
| Level 2 | Homicide | Violent-NL | 0.97 | -0.03 | 0.03 | -0.09 | 0.04 | .460 |
| | Homicide | Nonviolent | 1.04 | 0.04 | 0.03 | -0.02 | 0.10 | .171 |
| | Violent-NL | Nonviolent | 1.08 | 0.07 | 0.03 | 0.02 | 0.13 | **.005** |

Note. *p*-values less than .05 in bold; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

**Table B14**

*Regression Coefficients and Associations of Offense Type and Aggregated Write Ups*

| Parameter Effects | | Estimate | SE | 95% CI LL | 95% CI UL | *p* |
|---|---|---|---|---|---|---|
| Total Verbal Assaults in Prior 12 Months | | | | | | |
| Level 1 | Homicide | 0.24 | 0.10 | 0.04 | 0.43 | **.017** |
| | Violent-NL | -0.01 | 0.08 | -0.16 | 0.15 | .947 |
| Level 2 | Homicide | 0.11 | 0.09 | -0.06 | 0.28 | .209 |
| | Violent-NL | 0.03 | 0.07 | -0.11 | 0.17 | .707 |
| Total Physical Assaults in Prior 12 Months | | | | | | |
| Level 1 | Homicide | 0.04 | 0.05 | -0.06 | 0.13 | .429 |
| | Violent-NL | 0.07 | 0.04 | -0.01 | 0.14 | .075 |
| Level 2 | Homicide | 0.04 | 0.05 | -0.06 | 0.19 | .429 |
| | Violent-NL | 0.07 | 0.04 | -0.08 | 0.13 | .075 |
| Total Assaults in Prior 12 Months | | | | | | |
| Level 1 | Homicide | 0.12 | 0.11 | -0.10 | 0.34 | .278 |
| | Violent-NL | 0.13 | 0.09 | -0.04 | 0.30 | .125 |
| Level 2 | Homicide | 0.17 | 0.13 | -0.08 | 0.43 | .183 |
| | Violent-NL | 0.05 | 0.11 | -0.16 | 0.27 | .615 |

| Comparisons | | | Exp(β) | β | SE | LL | UL | *p* |
|---|---|---|---|---|---|---|---|---|
| Total Verbal Assaults in Prior 12 Months | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.14 | 0.13 | 0.10 | -0.06 | 0.32 | .172 |
| | Homicide | Nonviolent | 1.29 | 0.25 | 0.09 | 0.08 | 0.43 | **.005** |
| | Violent-NL | Nonviolent | 1.12 | 0.11 | 0.05 | 0.02 | 0.20 | **.020** |
| Level 2 | Homicide | Violent-NL | 1.05 | 0.05 | 0.09 | -0.12 | 0.22 | .581 |
| | Homicide | Nonviolent | 1.12 | 0.12 | 0.07 | -0.03 | 0.26 | .116 |
| | Violent-NL | Nonviolent | 1.08 | 0.08 | 0.05 | -0.01 | 0.17 | .079 |
| Total Physical Assaults in Prior 12 Months | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 0.99 | -0.01 | 0.04 | -0.09 | 0.08 | .880 |
| | Homicide | Nonviolent | 1.06 | 0.06 | 0.04 | -0.02 | 0.14 | .166 |
| | Violent-NL | Nonviolent | 1.09 | 0.09 | 0.03 | 0.04 | 0.14 | **.001** |
| Level 2 | Homicide | Violent-NL | 1.02 | 0.02 | 0.06 | -0.09 | 0.14 | .701 |
| | Homicide | Nonviolent | 1.08 | 0.08 | 0.06 | -0.04 | 0.20 | .196 |
| | Violent-NL | Nonviolent | 1.06 | 0.06 | 0.04 | -0.01 | 0.13 | .083 |
| Total Assaults in Prior 12 Months | | | | | | | | |
| Level 1 | Homicide | Violent-NL | 1.00 | 0.00 | 0.10 | -0.20 | 0.20 | .988 |
| | Homicide | Nonviolent | 1.18 | 0.17 | 0.09 | -0.01 | 0.35 | .070 |
| | Violent-NL | Nonviolent | 1.22 | 0.20 | 0.06 | 0.08 | 0.32 | **.001** |
| Level 2 | Homicide | Violent-NL | 1.07 | 0.07 | 0.13 | -0.18 | 0.32 | .584 |
| | Homicide | Nonviolent | 1.21 | 0.19 | 0.12 | -0.04 | 0.43 | .101 |
| | Violent-NL | Nonviolent | 1.15 | 0.14 | 0.07 | 0.01 | 0.28 | **.039** |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit

**Table B15**

*Regression Coefficients and Associations of Offense Type and Starting Psychiatric Medication*

| | | | Estimate | SE | 95% CI | | *p* |
|---|---|---|---|---|---|---|---|
| Parameter Effects | | | | | LL | UL | |
| PTSD | Homicide | | 0.24 | 0.09 | 0.07 | 0.41 | **.005** |
| | Violent-NL | | -0.02 | 0.08 | -0.17 | 0.13 | .785 |
| Anxiety Disorder | Homicide | | 0.15 | 0.08 | 0.00 | 0.31 | .051 |
| | Violent-NL | | 0.09 | 0.06 | -0.04 | 0.21 | .176 |
| Depressive | Homicide | | 0.27 | 0.07 | 0.13 | 0.40 | **<.001** |
| Disorder | Violent-NL | | 0.00 | 0.06 | -0.11 | 0.11 | .966 |
| Bipolar Disorder | Homicide | | 0.27 | 0.08 | 0.11 | 0.43 | **.001** |
| | Violent-NL | | 0.04 | 0.06 | -0.09 | 0.16 | .550 |
| Personality | Homicide | | 0.28 | 0.11 | 0.06 | 0.50 | **.011** |
| Disorder | Violent-NL | | 0.09 | 0.09 | -0.10 | 0.27 | .361 |
| Schizophrenia | Homicide | | 0.35 | 0.15 | 0.06 | 0.63 | **.018** |
| | Violent-NL | | -0.13 | 0.12 | -0.36 | 0.11 | .286 |
| Comparisons | | | Odds Ratio | | LL | UL | p |
| PTSD | Homicide | Violent-NL | 1.15 | | 0.99 | 1.34 | .064 |
| | Homicide | Nonviolent | 2.03 | | 1.75 | 2.36 | **<.001** |
| | Violent-NL | Nonviolent | 1.76 | | 1.55 | 1.99 | **<.001** |
| Anxiety Disorder | Homicide | Violent-NL | 1.07 | | 0.83 | 1.38 | .609 |
| | Homicide | Nonviolent | 1.48 | | 1.16 | 1.88 | **.002** |
| | Violent-NL | Nonviolent | 1.38 | | 1.15 | 1.67 | **.001** |
| Depressive | Homicide | Violent-NL | 1.31 | | 1.05 | 1.64 | **.019** |
| Disorder | Homicide | Nonviolent | 1.70 | | 1.37 | 2.12 | **<.001** |
| | Violent-NL | Nonviolent | 1.30 | | 1.09 | 1.55 | **.003** |
| Bipolar Disorder | Homicide | Violent-NL | 1.26 | | 0.98 | 1.62 | .076 |
| | Homicide | Nonviolent | 1.78 | | 1.38 | 2.29 | **<.001** |
| | Violent-NL | Nonviolent | 1.41 | | 1.16 | 1.71 | **.001** |
| Personality | Homicide | Violent-NL | 1.22 | | 0.85 | 1.75 | .275 |
| Disorder | Homicide | Nonviolent | 1.92 | | 1.33 | 2.78 | **.001** |
| | Violent-NL | Nonviolent | 1.58 | | 1.17 | 2.13 | **.003** |
| Schizophrenia | Homicide | Violent-NL | 1.61 | | 1.01 | 2.57 | **.046** |
| | Homicide | Nonviolent | 1.76 | | 1.10 | 2.82 | **.018** |
| | Violent-NL | Nonviolent | 1.10 | | 0.75 | 1.59 | .630 |

Note. *p*-values less than .05 in bold; parameter estimates are referenced to the nonviolent offender group; *SE* = standard error; *Violent-NL* = violent/non-lethal; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit