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GENERAL STRAIN THEORY AND VIOLENT BEHAVIOR IN A MILITARY
SAMPLE

By

Leslie A. Greenwell
B.S., Eastern Kentucky University, 2005
M.S., University of Louisville, 2009

A Dissertation
Submitted to the Faculty of the
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Leslie A. Greenwell
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A Dissertation Approved on

July 9, 2021

By the following Dissertation Committee:

Dissertation Chair
Viviana Andreescu, Ph.D.

Dissertation Co-Chair
George Higgins, Ph.D.

Committee Member
Deborah Keeling, Ph.D.

Committee Member
David May, Ph.D.

DEDICATION

To the One who sacrificed His life and to the ones who sacrifice their lives every day . . . thank you. "Greater love has no one than this, than to lay down one's life for his friends."

-John 15:13

To my mother, you always believed in me and saw the potential in me even when I did not recognize it in myself. You blessed me by giving me a "world of knowledge in college."

To my father, you taught me to "look it up," to love science, and to always stand up for what is right.

To my uncle Fred, you told me, "You will get through this and you will get to do what you want."

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ABSTRACT

GENERAL STRAIN THEORY AND VIOLENT BEHAVIOR IN A MILITARY SAMPLE

Leslie A. Greenwell

July 9, 2021

The present study examines violent behavior in a military sample through an examination of General Strain Theory (GST). The overall sample ($n = 21,449$) is made up of active-duty, national guard, and reserve U.S. Army soldiers surveyed from 2011 to 2013 for the All Army Study (AAS) component of the Study to Assess Risk and Resilience in Servicemembers (STARRS). The present study is a secondary analysis of the STARRS' data. Overall, the results of the present study produce empirical support for GST. Binomial logistic regression analyses show that all measures of strain (e.g., deployment, health, and life spheres strain), anger, and coping skills are significant predictors of violent behaviors. Soldiers who are younger, male, and a minority are more likely to report violent behavior than soldiers who are older, female, and White. Self-control, religiosity, work support, and level of education are not significant predictors of violent behavior. The results of the analyses are interpreted and the limitations of the present study, suggestions for future research, and practical implications are then discussed.

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INTRODUCTION

Louis Zamperini was a veteran and Prisoner of War (POW). Zamperini shared his experience in the military during an interview with the Christian Broadcasting Network in 2003. In the interview, Zamperini described that after coming home from World War II, he experienced frequent nightmares about his experience as a POW and he even once strangled his wife as he dreamed of strangling his former captors. He also shared that he developed a substance abuse problem with alcohol in a futile attempt to cope with the stress of his experience while serving in the military. He explained that over time his relationship with his wife became threatened by his drinking habits and his wife eventually decided to divorce him.

However, his wife encouraged him to attend a religious revival with her during which Zamperini renewed his faith and remembered his previous commitment to God. During the interview, Zamperini shared that only after doing so was he able to forgive his captors and find spiritual peace and healing from the trauma he suffered from the experience of war. Zamperini stated, "I had nightmares every night about 'The Bird' since the war. The night I made my decision for Christ, I haven't had a nightmare since -- 1949 till now! That is some kind of a miracle" (Christian Broadcasting Network, n.d.).

While this experience may not be representative of every veteran who serves in the military, some soldiers do indeed experience stress related to their deployment, their physical health, and other aspects of their life, in addition to feelings of anger about their stress. Like Zamperini, some soldiers may find that their stress and negative emotions are

reduced by the presence of a strong faith, supportive social relationships, coping skills, and/or control over one's thoughts and behaviors. On that note, the present study examines the relationships between stressful events (e.g., deployment, health concerns, and problems in various life spheres), anger, factors that protect against violence (e.g., religiosity, work support, coping skills, self-control), and violence in a military sample.

First, the term “violence” is defined. Next, the statistics regarding the prevalence of violence and its consequences among civilian populations are presented. Then, the statistics and consequences of violence that takes place among the military population is presented. After this introduction to the topic of violence, a review of relevant research on violence and the common explanations for violence are highlighted. Several research studies of violence among military personnel have examined certain concepts that are examined specifically in one particular criminological theory, GST (Agnew, 1992).

The concepts and propositions of General Stain Theory are discussed and empirical support for the theory is presented. To the knowledge of the researcher, a quantitative study of GST and violence in a military sample is lacking from the body of research on GST. The present study seeks to fill this gap in the literature. Hypotheses based on the theory are outlined and the methods used to test those hypotheses are detailed. The results of the analyses are presented and are compared to the hypotheses of the present study, to the propositions and arguments presented in GST by Agnew (1992), and to the findings of previous, similar studies. The limitations of the present study are acknowledged and transformed into specific suggestions for future researchers. Finally, the paper concludes with an overview of policy and program implications warranted by the results of the study.

Violence

While the term *violence* is defined in a variety of ways across disciplines, behaviors with the following characteristics are the types of violence that are examined in the present study. Lee (2015) states that *violence* lacks an adaptive function, is cruel and destructive, and stands in contrast to *aggression*, which stems from other motives and characteristics. Violence may also be defined as the intentional use of force that is either threatened or real against an individual or group (Krug et al., 2002). Violence may be both physical and psychological (Mayhew & Chapell, 2007).

Although statistics are available on a variety of physically violent acts (e.g., homicide, rape, and robbery), statistics related to acts of *simple assault* and *aggravated assault* are presented here as the legal definitions of these acts are most similar to the violent behavior measured in the present study. *Simple assaults* are “an unlawful physical attack by one person upon another where neither the offender displays a weapon, nor the victim suffers obvious severe or aggravated bodily injury involving apparent broken bones, loss of teeth, possible internal injury, severe laceration, or loss of consciousness” (Federal Bureau of Investigation [FBI], 2019). *Aggravated assaults* are “an unlawful attack by one person upon another for the purpose of inflicting severe or aggravated bodily injury” (FBI, 2019).

Violence in the Civilian Population

Violence in the civilian population is a problem in the United States. The following statistics demonstrate the prevalence of one specific form of violence, *assault*, which is the type of violence of focus in the present study. In 2019, there were 836,720 arrests for *simple assault* (FBI, 2019). Seventy percent of arrestees for *simple assault*

were male, 64% were White, and 30% were between the ages of 20 and 29 (FBI, 2019). In 2019, there were 317,632 arrests for *aggravated assault* (FBI, 2019). Seventy-six percent of arrestees for *aggravated assault* were male, 61% were White, and 32% were between the ages of 20 and 29 (FBI, 2019). Twenty-nine percent of *aggravated assault* offenses were linked to offenses of destruction, damage, or vandalism (FBI, 2019). Firearms were involved in 186,543 *aggravated assaults*; knives or cutting instruments were used in 123,370 *aggravated assaults* (FBI, 2019).

Of the various circumstances in which *aggravated assaults* took place, 147,025 individuals reported experiencing a victimization during an argument and 34,845 individuals were victimized within the context of domestic violence (FBI, 2019). Fifty-three percent of *aggravated assault* victims were male, 56% were White, and 28% were between the ages of 20 and 29 (FBI, 2019). The statistics provided here show that certain types of violence, *simple and aggravated assault*, are more prevalent among younger, White males, and typically co-occur with other crimes such as property destruction. These specific acts of violence may be committed with weapons like firearms or knives and many incidents occur in a familial context such as domestic violence.

The following statistics provide an overall picture of the typical characteristics of victims of assault and suggest that offenders and victims of assault are similar in terms of sex, race, and age. Data collected on assault offenses show that over 10% of *all* assault offenses in 2019 involved alcohol and 2.5% of all offenses involved drugs/narcotics (FBI, 2019). The top five locations in which *all* assault offenses transpired were in a residential home, on a highway/road/alley/street/sidewalk, in a parking/drop lot/garage, in a hotel/motel/etc., and in a bar/nightclub (FBI, 2019). Geographically, the top three states

with the highest number of *all* assault offenses in 2019 were Texas, Michigan, and Ohio (FBI, 2019). Forty-five percent of *all* assault offenses committed in 2019 occurred between the hours of 5 p.m. and 1 a.m. (FBI, 2019). Seventy-eight percent of *all* assaults in 2019 were committed by offenders who had some type of relationship with their victims (FBI, 2019). Fifty-seven percent of *all* assault victims in 2019 were male, 63% were White, and 27% were between the ages of 21 and 30 (FBI, 2019).

Acts of violence, in general, may result in a variety of consequences. Most importantly, acts of violence may result in the death of the victim of violence. For individuals who survive violent victimizations, they may experience numerous consequences, in addition to the physical injury that may result from violence. These consequences of violence include fear (Sillito, 2012), Post-Traumatic Stress Disorder (PTSD) (Lanctot & Guay, 2014; Mayhew & Chapell, 2007; World Health Organization [WHO], 2014), depression (Sillito, 2012; Turanovic, 2019; Turanovic & Pratt, 2017; WHO, 2014), anxiety (WHO, 2014), and an array of other emotional problems (Lanctot & Guay, 2014; Mayhew & Chapell, 2007). Violence may also negatively impact victims' self-esteem (Lanctot & Guay, 2014) and their level of educational attainment (Turanovic, 2019). Violence may negatively affect victims' social support systems (Lanctot & Guay, 2014; Logan et al., 2012; Wallace, 2017). Further, some victims may abuse substances to cope with the trauma of their violent victimization (Turanovic, 2019; Turanovic & Pratt, 2017; WHO, 2014) and even engage in suicidal behavior (WHO, 2014).

Violent victimization may also decrease an individual's life expectancy (Soares, 2006). Physical injury (Marshall et al., 2005; WHO, 2014), sleep disorders (WHO, 2014), sexual and reproductive health problems (WHO, 2014), diseases (WHO, 2014), and poor

health (Sillito, 2012; Turanovic & Pratt, 2017) are several physical consequences that may be experienced by victims of violence. Both victims and offenders of violence, as well as the employers of these individuals, may incur financial costs associated with absenteeism (Krug et al., 2002; Logan et al., 2012; Reeves & O’Leary, 2007), employee earnings (Reeves & O’Leary, 2007), and employee productivity (Krug et al., 2002; Lanctot & Guay, 2014; Reeves & O’Leary, 2007).

Victims of violence may also come to embrace positive perceptions of violence (Averdijk et al., 2016) and later perpetrate violence themselves as offenders (Averdijk, 2016 et al.; Jennings et al., 2012; Turanovic, 2019; Turanovic & Pratt, 2017; Young & Lo, 2016). Both violent perpetration and violent victimization is associated with financial costs incurred by the criminal justice system and the social service agencies that respond to acts of violence (Krug et al., 2002). In sum, there are numerous consequences that victims of violence may experience. These consequences include death, physical injury, physical, mental, and emotional health problems, financial instability, and subsequent violent offending by the victim. The information presented shows that violence is a problem in the civilian population and is associated with numerous, negative consequences. However, violence and its negative consequences also occur within the military population.

Violence in the Military Population

Violence and the impact of violence occur not only among civilians, but also among the military population. According to Morgan and Truman (2020), 347,370 veterans were violently victimized in the United States 2019; this statistic does not include victimizations experienced during combat. The use of violence is also present

throughout the careers of military personnel. Military personnel may use physical force with the lawful intention of defending others and themselves while serving in the military. For example, a study of 21,449 active-duty Army soldiers between 2011 and 2013 found that almost 58% of soldiers fired rounds at the enemy or received enemy fire and over 17% were responsible for the death of an enemy combatant (Ursano et al., 2020). Military personnel may be deployed to combat zones that involve attempts to deter violence committed by enemy forces. For example, over 60% of soldiers participated in combat patrols or performed other dangerous duties like clearing buildings, disarming civilians, or working in areas with Improvised Explosive Devices (IEDs) (Ursano et al., 2020).

Military personnel may also witness the harmful consequences of violence while engaging in combat. Combat typically involves exposure to wounded and/or dying people or dead bodies (Shay, 1995; 2003). For example, over 50% of soldiers serving between 2011 and 2013 witnessed the destruction of homes and villages, about 30% of soldiers witnessed violence within a local population or mistreatment toward non-combatants, and almost half of soldiers were exposed to severely wounded, dying people or dead bodies (Ursano et al., 2020). Military personnel may also be physically victimized during combat; the United States Department of Defense (2021) reports that 6,905 deaths occurred during military operations executed since 2001. Of soldiers who survive the violence of combat, almost 44% reported having a close call wherein their equipment was shot off their body or an IED exploded near them (Ursano et al., 2020). Ten percent of all veterans were seriously injured during their military service and 75% of those injuries occurred during combat (Taylor et al., 2011).

Traumatic Brain Injury (TBI) is just one type of physical injury that military personnel may experience as a result of their exposure to violence during their military service. From 2000 to 2020, there were over 430,000 unique cases of veteran TBI (Military Health System, 2020). TBI may result in physical problems (e.g., persistent headaches, loss of coordination, fatigue or drowsiness, problems with speech, difficulty sleeping, dizziness, or loss of balance), cognitive or mental problems (e.g., memory or concentration problems), and/or sensory problems (e.g., ringing in the ears, loss of or altered sense of smell and/or taste, changes to the ability to smell, and sensitivity to light or sound). Victims of TBI may suffer cognitive problems (e.g., reasoning, judgment, and difficulty speaking or writing), executive functioning problems (e.g., coping and decision-making), social problems (e.g., problems with changes in tone, pitch, or emphasis to express emotions), behavioral changes (e.g., difficulty with self-control, risky behavior, and verbal or physical outbursts), and emotional changes (e.g., anger, irritability, and lack of empathy for others) (Mayo Foundation for Medical Education and Research, 2021).

Post-Traumatic Stress Disorder (PTSD) is another negative consequence of violence that may be experienced by veterans. Between 11% and 20% of veterans who served in Operations Iraqi Freedom (OIF) and Enduring Freedom (OEF) are diagnosed with PTSD each year (United States Department of Veteran Affairs, 2018). Veterans clinically diagnosed with PTSD may relive violent experiences, avoid situations that remind them of violent events, experience negative changes in their beliefs and feelings, and be in a continued state of hyperarousal (United States Department of Veteran Affairs, 2018).

In general, exposure to violence in combat is associated with negative consequences for the mental health of military personnel (Gade & Wenger, 2011). These veterans may experience anger, depression, and anxiety, may abuse substances to cope, and may engage in attempts to commit suicide (United States Department of Veteran Affairs, 2021). In 2017, suicide rates for veterans were 1.5 times greater than the rate of suicide for adult civilians (United States Department of Veteran Affairs, 2019b). In addition, veterans who experience violence in combat may also suffer moral injury (United States Department of Veteran Affairs, 2020). *Moral injury* relates to the emotional, social, behavioral, psychological, and spiritual impact of actions that violate a veterans' core moral values and expectations they hold of themselves and others (Litz et al., 2009). Further, the violence experienced by veterans in combat may also result in demoralization about the effectiveness of a mission and a sense of helplessness relating to others' safety and suffering (United States Department of Veteran Affairs, 2019a).

As described previously, another consequence of violence is that military personnel who are exposed to violence may become perpetrators of violence themselves. Such acts of violence create costs associated with the investigation, apprehension, judicial proceedings, sentencing, incarceration, and supervision of these offenders who are involved in the criminal justice system. A systematic review of nine studies conducted from 1983 to 2002 found that the rate of interpersonal violence among active-duty military personnel and veterans ranged from 13.3% to 58% (Marshall et al., 2005).

Another systematic review of studies published between 2001 and 2014 in the United States and United Kingdom found violent behavior to be prevalent among military personnel, with grouped estimates of 29% for physical acts of violence in the last month,

despite differences in research designs (MacManus et al., 2015). In Fiscal Year 2011, there were 5,126 offenses of misdemeanor assault and battery and 920 offenses of felonious aggravated assault by military personnel that were reported to law enforcement (United States Department of the Army, 2012). Veterans are more likely than non-veterans to be incarcerated for violent offenses. From 2011 to 2012, 64% of veterans sentenced to prison were incarcerated for violent offenses compared to 48% of nonveterans (Bronson et al., 2015).

These data are based on violence reported through self-report surveys and official criminal justice sources so the numbers may be an under- or over-estimate of the true prevalence of violent behavior among military personnel as the National Institute of Corrections (2020) encourages a “Sequential Intercept Model” for veterans who are involved in the criminal justice system. This model provides veterans with opportunities for diversion from the criminal justice system at various stages of formal processing. Diversion of veterans may occur during interactions with community services, law enforcement, and emergency services, during initial detention and court hearings, in jails and courts, and during reentry after incarceration in a correctional institution. The accuracy of official arrest statistics for violence committed by veterans may be impacted if veterans are diverted away from the Criminal Justice system before veterans are formally charged with violent offenses.

In sum, violence involves the intentional use of force, may result in the physical injury of another, and may be both physical and verbal in nature. There are specific legal definitions of physically violent acts (e.g., assault) that coincide with the definition of violence that is examined in the present study. Physically violent acts of assault typically

occur in certain situations and locations, at specific times of day, and may be committed in conjunction with weapons, drugs, and alcohol. Assaults usually occur between victims and offenders who know one another in some way. The characteristics of victims and perpetrators of assault are similar in terms of age, race, and sex.

Acts of assault are typically perpetrated by young, White males and the victims of physically violent acts like assault are also usually young, White males. Violence occurs in both the civilian and military populations. Both groups may experience numerous, adverse effects from violent victimization. Victims of various types of violence may later become perpetrators of violence themselves.

Review of Relevant Research

Explanations for Violence in the Civilian Population

Criminologists have attempted to understand and explain violence through various theoretical perspectives. For example, Social Disorganization (Shaw & McKay, 1942) theorists propose that rates of delinquency and crime, including violent crime, are the result of a disorganized society (Heidt & Wheeldon, 2015). Studies conducted from this perspective propose that neighborhood characteristics, along with individual-level characteristics, are related to higher rates of violence (Van Wyk et al., 2003). A study by Savitch and Ardashev (2001) found that rates of violence were higher in places with greater social breakdown.

In contrast, rather than focus on *rates* of violence, other criminologists have instead focused on the criminal *acts* of violence. For example, Thomas et al., (2020) argues that individuals who commit violence are rational and are more likely to commit acts of violence when those acts are more rewarding and less risky compared to other

crimes. Hughes and Short (2014) found that acts of violence were more likely to occur during unsupervised socialization among youth. For example, greater time spent in unsupervised “routine activities” like parties and hanging out in the streets was associated with a greater number of violent acts among youth (Hughes & Short, 2014).

Rather than explain rates or acts of violence, other criminologists focus more on the behavioral *process* of violence. Some researchers interpret violence as a response to an imbalance of control experienced by individuals (Tittle, 1995). For example, Higgins et al., (2005) and Castro et al. (2020) found that individuals who lack control over themselves and/or others may resort to violent predation to regain a sense of control.

Others view violence as a behavior that is *learned* or as the result of a breakdown in external and/or internal controls (Akers, 1998). For example, Social Learning theorists assume that human nature is like a “blank slate” and that individuals are a product of what they learn from others (Heidt & Wheeldon, 2015). Studies examining violence in this manner attribute such behavior as a function of differential associations with violent individuals and differential reinforcements of violent behaviors and beliefs (Cochran, Maskaly, et al., 2017; Cochran, Sellers, et al., 2011; Powers et al., 2020; Sellers et al., 2005; Wareham, 2009). In contrast, Control theories of human behavior view violence as a function of controls over an individual's behavior (Heidt & Wheeldon, 2015). For example, Gottfredson and Hirschi's (1990) theory of low self-control defines low self-control as the inability to foresee the long-term consequences of one's behavior. Lower levels of self-control were linked to the perpetration of violence in several studies (Choi, 2019; Chui & Chan, 2016; Kerley, 2008; LaGrange, 1999; Sellers, 1999; Shekarkhar & Gibson, 2011).

Explanations for Violence in the Military Population

Researchers have studied violence among members of the military and its relation to stress, emotions, and factors that decrease the effects of stress. Many studies have found violence to be related to a number of sources, such as psychological stress, stress associated with social networks, financial and occupational stress, stress from deployment and combat, and PTSD. For example, Klaw et al. (2016) conducted a study of male college student veterans from all branches of the military and all service types (e.g., active-duty, reserve, and guard). The study found psychological distress to be associated with violence.

Schmaling et al. (2011) performed a longitudinal study of married or cohabitating U.S. Army reservists who were deployed during Operation Iraqi Freedom (OIF). Reservists with decreased relationship satisfaction were more likely to perpetrate violence. Seo et al. (2014) examined the degree to which work life interfered with family life for members of the Korean Air Force. Respondents with higher levels of work-conflict strain also reported higher levels of violence.

Bradley (2007) found a relationship between financial strain and violence in a national survey of veterans and non-veterans. The study found that the odds of serious male violence increased as the total amount of debt owed by a couple increased. Results also showed that the odds of serious male violence were enhanced when the female in the relationship was employed. Stander et al. (2011) found a similar connection between occupational stress and violence. Navy personnel who experienced higher levels of occupational stress (e.g., exposure to danger, responsibility for others, long hours,

frequent deployments, and probability of witnessing injury to others) reported higher levels of violence.

Galloway et al. (2012) found that high combat intensity was a significant predictor of violent behavior in a sample of U.S. Army soldiers. Similarly, a study of deployed and nondeployed active-duty U.S. Army soldiers showed that the probability of extreme aggression was significantly higher for those who had deployed in the past year compared to those who had not deployed (McCarroll et al., 2010). Kwan et al. (2017) also found that higher deployment strain was associated with greater instances of violence in the weeks after returning from a deployment in a sample of United Kingdom reservists who served in Iraq and Afghanistan. Post-Traumatic Stress Disorder (PTSD) from combat during deployment was also linked to violence in veterans selected for study from a Veterans Affairs hospital (Morris et al., 2019).

Researchers have also examined the relationship between stress and anger. A study of previously deployed males of the U.S. Army and U.S. Air Force revealed a relationship between higher levels of PTSD and higher levels of anger (Renshaw & Kiddie, 2012). Klaw et al. (2016) also found psychological distress to be positively associated with anger. Researchers have also found that anger is correlated with violence. A study of separated U.S. military service members, national guard, and reservists from 50 states and all military branches showed that higher levels of anger predicted higher odds of family violence (Sullivan & Elgoben, 2014). A similar finding resulted from a study of active and separated veterans; increases in anger were associated with increases in violence (Elgoben et al., 2014).

Researchers have shown that certain factors may decrease the impact of stress and anger on violent behavior. For example, Heinz et al. (2015) conducted a study of male veterans in an outpatient Substance Use Disorder (SUD) treatment facility. Results showed that impulsivity fully mediated the relationship between PTSD symptom severity and frequency of aggression by veterans. In addition, factors like religiosity and coping skills are associated with violence. In a study of active-duty U.S. Air Force and civilian spouses, Smith-Slep et al. (2015) found that religious involvement and importance of spirituality decreased the odds of violence for females. The same study examined the relationship between personal and family coping and violence. Both an individual's ability to cope with stress, as well as a family's ability to cope, reduced the odds of violence for respondents.

Social support is another factor that may weaken the relationship between stress and violence. For example, social support in the work environment moderated the link between relationship stress and aggressiveness in a study of married, active-duty male soldiers (Cabrera, 2010). Seo et al. (2014) found a similar effect in a study of work-family conflict in a sample of married Korean Air Force personnel. The researchers measured whether respondents had a "counseling resource" (i.e., people they could talk to about stress). There was a stronger relationship between stress and aggression for those who lacked such social support. Similarly, Kar and O'Leary (2013) found that veterans' degree of emotional intimacy with their romantic partners mediated the association between PTSD symptoms and violence. While not examined in a mediating or moderating context, a study Stander et al. (2011) still found a negative correlation between social support and violence for females in a sample of U.S. Navy personnel.

Various explanations are provided by researchers who have studied the causes of violent behavior. While many of these studies provide a foundation for understanding violence in the military population through correlates of stress, emotions, and factors that protect against violence, what is lacking from this body of research is an in-depth explanation of how each of these concepts interact and influence one another to alter the probability of violent behavior among veterans. However, GST (Agnew, 1992) may be used to provide an alternative explanation of veteran violence; a detailed description of the theory follows.

General Strain Theory

Strain theories are rooted in the Classical School of Criminology which assumes that humans are rational human beings and will seek pleasure and avoid pain (Vold et al., 1998). Strain theories originate with the work of Emile Durkheim (1897/1951) and include the later work of Robert Merton, Albert Cohen, Richard Cloward, and Lloyd Ohlin. Durkheim identified the concept of *anomie* which refers to a low degree of moral regulation by society over an individual (Thompson, 2004). Robert Merton (1938) focused on the frustration that occurs when there is a disconnect between cultural goals (i.e., the "American Dream") and the socially-approved means to achieve those goals. Merton explained that individuals choose from five *modes of adaptation* to relieve this frustration. Merton was clear that the choice of the mode of adaptation is a rational one, in that the individual chooses a behavior that will bring them pleasure rather than further pain.

Later in 1955, Albert Cohen argued that the motivation for crime comes from the frustration experienced by lower-class individuals when they are unable to achieve

middle-class goals and values. Richard Cloward and Lloyd Ohlin (1960) theorized that subcultures only come about when differential opportunities (due to structural impediments of society) thwart someone from achieving their version of the “American Dream.” The individual rationally chooses a subculture to create or be a part of to relieve the resulting frustration to make some type of advancement.

Agnew (1992) advanced strain theory to provide a richer understanding of criminal behavior. Agnew's (1992) theory explained why some individuals resorted to crime. Agnew (1992) echoed the idea that strain and crime are indeed positively related but, most importantly, he claimed that such a relationship is mediated by the negative emotions that result from strain. Specifically, Agnew (1992) proposed that strain causes an individual to experience negative emotions; those negative emotions may lead to criminal behavior.

Strain. Although Agnew (1992) concurred that the inability to achieve a goal was certainly one source of strain, he identified two alternative sources of strain: (1) strain may occur when positively valued stimuli are removed from an individual or (2) when individuals are exposed to negatively valued stimuli. While there are many examples of strain that may fall into one of the categories identified by Agnew, he emphasized that strains must possess certain characteristics to increase the probability of crime (Agnew, 1992). For strain to be likely to lead to crime, the individual experiencing strain must perceive that strain to be unjust, great in magnitude, recently occurring, and strongly related to one’s core identity (Agnew, 2001). The strain must also be associated with low social control and generate pressure or reward to engage in crime (Agnew, 2001).

Agnew (2001) provided specific examples of strain that would be likely to result in crime. These include the failure to achieve non-conventional goals that may easily be attained through crime, parental rejection, excessive, strict, harsh, and erratic discipline, child abuse and neglect, and negative school experiences. Agnew (2001) also claimed that menial, unpleasant, and unrewarding occupations, homelessness, abusive associations, victimization, and discrimination based on characteristics present from birth (e.g., race and ethnicity) were also strains likely to result in crime. In contrast, Agnew (2001) identified several strains that should *not* increase the likelihood of crime. These strains include the failure to achieve conventional goals that cannot be easily attained through crime, stress from conventional and well-rewarded occupations, the lack of popularity with others (especially those who engage in crime), and the stress that arises from taking care of loved ones.

Negative Emotions. The relationship between crime and strains that are conducive to crime is influenced by the negative emotions generated by strain (Agnew, 1992). Depression, anxiety, and anger are just a few examples of such negative emotions. Anger plays an important role in GST (Agnew, 1992). Compared to other emotions, anger may provide an individual with the energy needed to engage in active coping through acts of crime, anger may lower one's inhibitions that may otherwise prevent illegitimate coping, and anger may instill within an individual a thirst for revenge that may be quenched through crime (Agnew, 1992).

Factors Affecting the Constraints Against and the Motivations for Crime. Agnew argued that "crime is likely when the constraints against it are low and the motivations for it are high" (Agnew, 2005, p. 37). Social support from others,

involvement in conventional activities, and personality characteristics of self-control and coping skills are all factors that affect the constraints against and the motivations for crime (Agnew, 2005). Specifically, Agnew stated that individuals who have poor relationships with others, who are involved in activities that are conducive to crime, who possess low self-control (e.g., impulsivity, high activity levels, sensation-seeking), and who have poor coping skills have a predisposition for crime because their constraints against crime are low and their motivations for crime are high (Agnew, 2005). In contrast, individuals who have positive relationships with others, who are involved in prosocial activities, who possess high self-control, and who have strong coping skills will be *less* predisposed to crime because their constraints against crime are high and their motivations for crime are low.

Social Bonding Theory. Agnew's reference to certain concepts (e.g., social support and involvement in prosocial activities) and argument that these factors act as constraints over an individual's behavior are also found in Social Bonding Theory (Hirschi, 1969). Social Bonding Theory assumes that humans will act in ways to increase their pleasure and decrease their pain. Social Bonding Theory is a control theory; control theories posit that humans are naturally deviant and there must be some control and regulation of their behavior. Social Control Theory states that control of one's behavior comes from the social bonds an individual has with others.

Hirschi (1969) identified four specific types of social bonds that constrain individuals' natural inclinations toward criminal behavior: attachment, commitment, involvement, and belief. The bond of *attachment* relates to the emotional intimacy between individuals. Engaging in criminal behavior may threaten the emotional

attachment between individuals. Attachment to others acts as a constraint over an individual's behavior because an individual wants approval from the person with whom they share an emotional bond and values their opinion. In turn, attachment influences one's level of *commitment* (i.e., desire for conventional success). This particular social bond also acts as a constraint over potential criminal behavior because individuals with higher levels of commitment possess a stake in conformity and recognize that social risks are associated with criminality.

Hirschi (1969) argued that an individual's commitment affects their *involvement* in conventional activities (e.g., church, work, school, etc.). Individuals who are more involved in conventional activities have fewer opportunities to engage in crime. *Belief* is the fourth type of social bond identified by Hirschi (1969). This particular social bond refers to the idea that individuals respect the law and accept conventional values, morals, and ethics. In turn, these beliefs constrain an individual's criminal impulses.

Self-Control Theory. Gottfredson and Hirschi's (1990) low self-control theory focuses on rational (i.e., pleasure seeking and pain avoiding) individuals' inability to foresee the long-term consequences of their behavior. This is manifested in impulsivity, insensitivity, penchant for physical as opposed to mental tasks, risk-taking behavior, short-sightedness, and non-verbal characteristics. Given that crime typically shares these characteristics, these individuals will be attracted to crime. Pratt and Cullen (2000) provided a meta-analysis that provided support for this view. Even with support for this view, Hirschi (2004) redefined self-control to account for those with higher levels of self-control. This was defined as an individual's ability to foresee any consequences of their

behavior. Additionally, individuals who can see the consequences of their behavior will have strong social bonds.

Coping Skills. Crime is one of many ways in which an individual may cope with strain and negative emotions. Agnew (2006) identified other forms of coping (e.g., behavioral, emotional, and cognitive). *Behavioral* coping strategies entail taking action to alter or remove the source of strain (Agnew, 2006). *Emotional* coping strategies involve channeling negative emotions through outlets like listening to music, exercising, or engaging in other pleasant activities (Agnew, 2006). *Cognitive* coping strategies involve altering one's perceptions of strain to reduce its subjective impact. Such efforts might entail ignoring strain, changing one's goals to cope with the inability to achieve a particular goal, or reducing the importance of a goal.

In sum, GST assumes that humans are rational and seek to increase the pleasure and decrease the pain they experience. Not all strain is likely to lead to crime; only certain types of strain are likely to do so. Strain that is likely to lead to crime is strain that is perceived as unjust, high in magnitude, recent, and tied to one's central identity. The relationship between strain and crime is mediated by negative emotions, especially the emotion of anger. Essentially, Agnew (2006) described that strain is any condition or event that is disliked by an individual.

Support for General Strain Theory

Over the last three decades, researchers have generated a wealth of empirical support for GST through studies that focus on substance use and abuse, self-harm and suicide, internet addiction and social network usage, prostitution, disordered eating,

stalking, recidivism, sexual abuse, and many other criminal behaviors.¹ Applications of GST and violence have been tested with various samples such as law enforcement officers (Bishopp et al., 2016; Bishopp et al., 2020; Bishopp et al., 2019; Kurtz et al., 2015; Moon & Jonson, 2012), inmates and probationers/parolees (Benda & Toombs, 2000; Choi, 2019; Liu et al., 2020; McGrath et al., 2012; Morris et al., 2012; Piquero & Sealock, 2004; Piquero & Sealock, 2010; Slocum et al., 2012; Zweig et al., 2015), college students (Capowich et al., 2001; Curry & Zavala, 2020; Ganem, 2010; Isom-Scott & Mikell, 2019; Mazerolle et al., 2003; Schuerman, 2013; Willits, 2019; Zavala & Guadalupe, 2018), young drivers (Ellwanger & Pratt, 2014), homeless individuals (Baron 2007; Baron 2019), individuals clinically diagnosed with mental illnesses (Link et al., 2016), various racial and ethnic groups (Broidy & Santoro, 2018; Eitle & Eitle, 2016; Liu et al., 2020; Park & Metcalfe, 2020), and soccer fans (Shadmanfaat et al., 2019).

The Relationship Between Strain and Violence. While GST has been applied to a variety of crimes, strain and negative emotions have the strongest effects on crimes of violence as compared to other crimes (Agnew, 2015). GST has been used to explain violence in over 90 empirical studies conducted throughout the past three decades. The majority of these studies testing GST provide support for a positive link between strain and violence.²

¹ Numerous studies have used GST to examine a variety of criminal and deviant behaviors (Akins et al., 2010; Baker & Pelfrey, 2016; Barrera et al., 2016; Bishopp & Boots, 2014; Bucher et al., 2015; Carson et al., 2008; Carson et al., 2009; Drapela, 2006; Eitle et al., 2013; Froggio & Agnew, 2007; Gallupe & Baron, 2009; Gibson et al., 2001; Hay & Meldrum, 2010; Higgins et al., 2011; Jang & Johnson, 2003; Jang et al., 2013; Jun & Choi, 2015; Kaufman, 2009; Keith et al., 2015; Listwan et al., 2013; Lo et al., 2008; Miller et al., 2014; Mowen & Boman, 2020; Neff & Waite, 2007; Ngo & Paternoster, 2016; Piquero et al., 2010; Posick et al., 2013; Sigfusdottir et al., 2010; Slocum et al., 2012; Steele, 2016; Stogner & Gibson, 2010; Swatt et al., 2007; Turanovic & Pratt, 2013; Vigessa, 2013; Yildiz & Solakoglu, 2019; Yilmaz et al., 2015; Yun & Kim, 2020; Yun & Lee, 2015).

² Numerous studies testing GST show support for a positive link between strain and violent behavior (Agnew, 1989; Agnew, 1992; Agnew, 2002; Agnew & Brezina, 1997; Agnew et al., 2002; Aseltine et al.,

For example, Kurtz et al. (2015) used a sample of law enforcement officers in Maryland to examine the relationship between strain and violence. The study measured officers' strain that was associated with critical incidents and psychological-physiological stress. Officers were asked if they ever shot someone, responded to a chemical spill or bloody crime scene, knew a victim personally, and were involved in a hostage situation or other critical incidents. Officers were also asked if they experienced general health problems of nausea, trouble breathing, physical pain, and faintness or dizziness to measure psychological-physiological strain. The study found that each type of strain measured increased the odds of violence among law enforcement officers.

Another study also examined the link between strain and violence in a sample of law enforcement officers in Texas (Bishopp et al., 2016). Similar to Kurtz et al. (2015), that study also found strain (e.g., fatigue, court appearances, and internal investigations) to be associated with the use of unnecessary force by law enforcement officers. Likewise, environmental strain was also found to be positively correlated to the use of unnecessary force by officers (Bishopp et al., 2020). Environmental strain included instances of a felonious death or nonfatal injury of another officer, felonious assault experienced

2000; Bao et al., 2014; Bao et al., 2007; Barbieri & Craig, 2018; Baron, 2004; Baron, 2009; Baron, 2019; Beeck et al., 2012; Bishopp et al., 2020; Bishopp et al., 2016; Botchkovar & Broidy, 2010; Brezina, 1999; Brezina, 2010; Broidy & Santoro, 2018; Capowich et al., 2001; Cho & Galehan, 2020; Choi, 2019; Craig et al., 2017; Cullen et al., 2008; Curry & Zavala, 2020; Eitle, 2002; Eitle & Eitle, 2016; Estrada-Martinez et al., 2012; Glassner, 2020; Hay & Evans, 2006; Hay & Meldrum, 2010; Hoffman & Miller, 1998; Kort-Butler, 2010; Kurtz et al., 2015; Lee & Kim, 2018; Lin, 2011; Link et al., 2016; Liu et al., 2020; Lowe et al., 2008; Manasse & Ganem, 2009; Mazerolle et al., 2000; Mazerolle & Maahs, 2000; Mazerolle et al., 2003; McGrath et al., 2012; Moon et al., 2008; Moon & Jang, 2014; Moon et al., 2011; Moon & Morash, 2012; Moon & Morash, 2017; Moon et al., 2009; Morris et al., 2012; Oh & Connelly, 2019; Ousey et al., 2015; Park & Metcalfe, 2020; Patchin & Hinduja, 2011; Pauwels & Waele, 2014; Peck et al., 2013; Piquero & Sealock, 2004; Piquero & Sealock, 2010; Rebellon et al., 2012; Robertson et al., 2010; Shadmanfaat et al., 2019; Sigfusdottir et al., 2012; Spohn & Wood, 2014; Teijon-Alcala & Birkbeck, 2019; Thaxton & Agnew, 2004; Thaxton & Agnew, 2018; Willits, 2019; Zavala & Guadalupe, 2018; Zavala & Spohn, 2013; Zweig et al., 2015).

personally by the respondent, killing someone in the line of duty, and responding to an incident that resulted in the death of a child.

The Role of Anger. Much empirical support also exists for the relationship between strain and negative emotions. Numerous studies found that as strain increases, so does an individual's level of negative emotions. In general, research shows negative emotions to be positively correlated with strain (Botchkovar & Broidy, 2013; Broidy & Santoro, 2018; Cho & Galehan, 2020; Kort-Butler, 2010; Moon & Jonson, 2012). Most of the research conducted on this relationship focuses on the negative emotion of anger. Anger was found to be positively related to strain in numerous studies (Aseltine et al., 2000; Baron, 2004; Baron, 2007; Bishopp et al., 2019; Botchkovar & Broidy, 2013; Cudmore et al., 2017; Curry & Zavala, 2020; Ganem, 2010; Jang & Song, 2015; Hay & Evans, 2006; Moon et al., 2008; Moon et al., 2009; Oh & Connolly, 2019; Patchin & Hinduja, 2010; Piquero & Sealock, 2004; Piquero & Sealock, 2010; Rebellon et al., 2012; Shadmanfaat et al., 2019; Zweig et al, 2015).

The tie between strain and anger was examined in a survey of law enforcement officers in Kentucky (Moon & Jonson, 2012). Results showed that when law enforcement officers experienced an increasing gap between what they expected their job to be compared to what their job actually was, negative emotions were more likely to occur among officers. The study also identified a positive association between irritability and strain stemming from conflict between officers' work and home lives. Another study of law enforcement officers in Texas by Bishopp et al. (2019) produced similar results. Anger was positively correlated to organization strain (e.g., overtime, work-related activities on days off, and negative comments from the public).

Factors that Affect the Constraints Against and the Motivations for Violence.

Agnew (2007) argued that individuals are more likely to cope with strain through violence if they possess certain personal characteristics like low constraint, low levels of conventional social support, and/or poor social and coping skills.

Self-Control. Studies testing GST have provided support for a negative relationship between self-control and violent behavior. For example, a national survey of children by Agnew et al. (2002) found low constraint to be positively related to acts of violent behavior. Youth who were more impulsive, restless, and overly active were more likely to report hurting someone. Similarly, Shadmanfaat et al. (2019) also examined adult male sports fans' levels of self-control; those with lower levels of self-control were more likely to engage in fan aggression. A study of male, Korean inmates showed that those with stronger preferences for physical activity and simple tasks, risk-taking, and impulsivity were more likely to commit acts of violent misconduct (Choi, 2019).

Social Support. Empirical studies that examined the impact of perceived social support on violence perpetration produced mixed results. For example, some studies provided support for a negative relationship between social support and violent behavior. Agnew (2002) reported a negative relationship between youths' attachment to family and teachers and violent delinquency. A study of law enforcement officers by Kurtz et al. (2015) found that higher levels of interpersonal support were related to lower levels of strain. Also, lower levels of strain were tied to lower levels of officer violence. Similarly, Choi (2019) found that violent misconduct by inmates increased when support from friends and family decreased. While Stander et al. (2011) found that social support was

significantly and negatively related to violence among female Navy personnel, such a relationship for male Navy personnel was lacking from the results of the study.

Religiosity. A handful of studies testing GST examined the association between religiosity and violent behavior. Evans et al. (1995) proposed that religiosity is a moderate inhibitor of adult crime and deviance. They argued that the concept of religiosity is multifaceted and variations in the operationalization of the concept may be the cause of variations in research findings on the topic. For example, Benda and Toombs' (2000) defined the concept of religiosity as being characterized by activities of prayer, Bible study, church activity, and discussions of religion with others. The study found religiosity to be significantly and negatively related to violent behavior. In contrast, Barbieri and Craig's (2018) operationalized religiosity as regularly experiencing God's love and care, having a close relationship with God, and using religion to cope with problems (Barbieri & Craig, 2018). The study found religiosity to be negatively associated with violent behavior among a sample of juveniles in the Arizona and Pennsylvania justice systems.

Coping Skills. While there are various ways of coping with strain, it is generally considered that a person has positive coping skills when he or she successfully manages their stress and possesses the capacity to effectively regulate the emotion caused by the stress (Folkman, 1991). Based on this assumption, it would be expected that individuals who are able to cope with stress in a positive manner would possess an increased ability to manage their anger, frustration, or other negative emotions that would increase the probability of violent behavior when experiencing stress.

Two studies have examined the link between coping skills and violence through the lens of GST. For example, Isom-Scott and Mikell (2019) assessed the association between coping skills and assault among a sample of female youth. The coping skills measured included positive reframing, acceptance, humor, venting, denial, substance use, and behavioral disengagement. While a measure of “positive coping” was used in the analysis, the researchers did not provide an explicit statement of which coping items were deemed “positive.” Positive coping was not significantly related with assault. Shadmanfaat et al., (2019) also analyzed the link between coping skills and violent behavior. Respondents were asked how frequently they practiced certain coping strategies such as problem-solving or talking to friends and family when experiencing strain. Those with higher levels of coping skills were less likely to engage in violent behavior.

General Strain Theory and Veteran Violence

To date, only one study has focused on violence in a sample of active-duty soldiers while explicitly declaring that study as an examination of GST (Bucher, 2011). While the study used GST as a theoretical framework, the study used a qualitative research design, and no statistical tests of significance were conducted. Bucher (2011) used GST to guide open-ended interviews with 50 active-duty soldiers.

The study found that 70% of the soldiers interviewed reported combat-related strain in the form of negative deployment experiences, physical injuries, sleep problems, and a disconnect between what they expected military service to be compared to what they actually experienced. The entire sample reported stress from following orders which with they disagreed, specifically, orders in combat situations and orders from officers as

opposed to non-commissioned officers. Soldiers also described strain related to boredom and stress from downtime while waiting for orders stateside.

Over half of those interviewed spoke of various inhibitions toward expressing negative emotions which, in turn, appeared to cause even more strain for these soldiers. Bucher argued that because the military environment typically emphasizes both the use of force and the simultaneous repression of emotion, strain inevitably occurs when these individuals cannot or do not desire to meet such expectations of concealing emotions. Bucher explained that this internal conflict was associated with the well-known identity of the traditional “military man” (i.e., one who is capable of force and lacks emotion). Bucher pointed out that failure to fit into this stereotype may cause further strain for veterans, therefore suggesting a reciprocal relationship between strain and negative emotions.

With such a high prevalence of strain experienced by soldiers, Bucher (2011) asked soldiers how they coped with their strain. Bucher found that most participants recognized the need to communicate with others about their strain and while some had social support networks, every soldier believed they should not discuss their stress, and some denied having any stress at all. These soldiers also reported a lack of *genuine* social support. Bucher (2011) observed that the strain arising from repressing negative emotions made it more difficult for soldiers to utilize social support when dealing with strain. In sum, soldiers lacked the social support that might otherwise moderate the impact of strain and negative emotions on violent behavior, as proposed by GST. Bucher’s study found that soldiers who experienced strain, in addition to a lack of social support, typically reported dealing with their anger and frustration through violent behavior.

While this study produced a number of insights into the experiences of a small samples of soldiers, these findings may not be generalizable to the larger military population. In addition, while Bucher's (2011) study is the first to examine GST in a military sample, the qualitative design of the study prevented potential empirical support for GST. To address this gap in the literature, the present study focuses on violence in a military sample through an empirical test of GST.

The Present Study

Overall, the studies identified in this literature review produced extensive support for GST, regardless of the behavior of interest or sample characteristics of each study. Overall, there is much empirical support for the relationships between violence, strain, negative emotions, and the factors that affect the constraints against and the motivations for crime. However, only one examination of GST and violence in a military sample exists; the only study to do so was Bucher's (2011) qualitative study that applied GST and violence to a relatively small sample of veterans.

While the study by Bucher (2011) provided a number of valuable insights regarding the interactions among strain, negative emotions, and coping through violence among military personnel, a quantitative study that explicitly uses GST to analyze violence among soldiers is lacking from the body of research on GST. Such a study would undoubtedly add to the body of literature on the theory as it may produce findings that are more generalizable to the larger military population.

The present study uses Agnew's (1992) GST to examine violence, strain, anger, and factors that affect the constraints against and the motivations for crime in a large sample of U.S. Army soldiers using quantitative data collection and analyses. The

hypotheses tested in the present study are guided by the propositions set forth in GST, in addition to the relationships tested in empirical tests of the theory:

Hypothesis 1: Strain (e.g., deployment, health, and life spheres) have a positive link with violence.

Hypothesis 2: Anger has a positive link with violence.

Hypothesis 3: Higher levels of religiosity have a negative link with violence.

Hypothesis 4: Higher levels of coping skills have a negative link with violence.

Hypothesis 5: Higher levels of work support have a negative link with violence.

Hypothesis 6: Higher levels of self-control have a negative link with violence.

METHOD

This dissertation is based on the restricted-access public use data from the Army Study to Assess Risk and Resilience in Servicemembers (STARRS) (Ursano et al., 2020). The data are available from the Inter-university Consortium for Political and Social Research (ICPSR) at the University of Michigan. The contents of this dissertation are solely the responsibility of the authors and do not necessarily represent the views of the STARRS investigators, funders, Department of the Army, or Department of Defense. ICPSR restricts data access to users who have completed an Agreement for the Use of Confidential Data. An agreement was approved by ICPSR and approval to conduct the analysis was granted by the University of Louisville Institutional Review Board (16.0937) and is attached in Appendix 1.

Research Design

The Study to Assess Risk and Resilience in Servicemembers (STARRS) is a study made up of five components: (1) Historical Administrative Data Study, (2) New Soldier Study (NSS), (3) All Army Study (AAS), (4) Pre-Post Deployment Study (PPDS), and (5) Special Studies. The present study is based on data collected for the All Army Study (AAS). The AAS questionnaire was administered to 32,272 active-duty, guard, and reserve U.S. Army soldiers from January 2011 to April 2013 at over 50 sites within the continental United States (CONUS) and outside the continental United States (OCONUS). The AAS included items that measured soldiers' psychological and physical health, training, combat, non-combat, life, and work experiences throughout all stages of

Army service. The purpose of the AAS was to assess soldiers' psychological resilience, mental health, and risk for self-harm.

Self-report data were collected from soldiers in group sessions using various procedures, including computer-assisted self-interviews (CASI), computer-assisted telephone interviews (CATI), paper and pencil interviews (PAPI), on-site questionnaires, and web-based surveys. The computer-based version of the questionnaire was used at most CONUS sites; the paper and pencil version of the questionnaire was used at OCONUS sites and CONUS sites in which it was less feasible to use the computer-based version.

Sample Characteristics

The present study used the final sample derived from the AAS ($n = 21,449$). This overall sample was 87.6% male, 69.5% White, and an average of 28.7 years of age (Table 1). In regard to education, almost 60% of the sample possessed a high school diploma/GED or some college. The demographic characteristics of the overall sample in the present study are similar to the characteristics of the total United States Army in 2019 and the total United States military force in 2019 (see Table 1).

Table 1

Demographic characteristics of the sample, the population of the U.S. Army, and the total U.S. military force.

	Percent male	Average age	Percent White	Percent with High School Diploma/GED or some college
Sample of current study ^a	87.6	28.7	69.5	58.8
Total United States Army ^b	82.0	-	61.5	-
Army Active Duty	-	28.5	-	69.1
Army National Guard	-	29.8	-	71.9
Army Reserve	-	32.4	-	56.7
Total United States military force ^c	81.7	28.2	70.6	65.8

^a About five percent ($n = 1,202$) of those who responded to the STARRS' All Army Study were national guard/reservists.

^{b, c} Department of Defense (2019)

Measures

Dependent Variable

Violence is a measure based on a single item. Soldiers were asked how many times in the past 30 days they had a physical confrontation during an argument.

Responses were coded as 0 = never or 1 = rarely/sometimes/often/very often. About eighty-seven percent of respondents did not report involvement in a physical confrontation during an argument.

Independent Variables

Deployment Strain. Agnew (1992) said that strain may occur when an individual is exposed to something negative. This interpretation of strain may be applied to a military context. For example, it may be said that soldiers who witness the destruction of a village or experience the death of a member of their unit are experiencing exposure to something negative. Based on this type of strain identified by Agnew (1992) and its application to military personnel, the measure of *deployment strain* is a composite measure based on seven items.

Soldiers were asked how many times they had the following experiences during any of their deployments: (1) went on combat patrols or had other dangerous duty (e.g., clearing buildings, disarming civilians, working in areas that had IEDs), (2) fired rounds at the enemy or took enemy fire, (3) had a close call (i.e., equipment shot off body, IED exploded nearby), (4) had a member of their unit who was seriously wounded or killed, (5) saw homes or villages that had been destroyed or people begging for food, (6) were exposed to the sights, sounds, or smells of severely wounded or dying people or saw dead

bodies, and (7) witnessed violence within the local population or mistreatment toward non-combatants.

Responses were coded as 0 = 0 times, 1 = 1 time, 2 = 2-4 times, 3 = 5-9 times, or 4=10 or more times. An index was created through Principal Component Analysis (PCA). The internal consistency of the index was $\alpha = .87$. Only one factor with an Eigenvalue higher than 1 emerged (Eigenvalue = 3.94). The factor explains 56.24% of variance in the component measures and factor loadings ranged from .69 to .80. Higher values indicated higher levels of deployment strain. The variable had a relatively normal distribution (skewness = .34; kurtosis = -1.00).

The items used to create the measure of *deployment strain* are similar to those items used in other studies testing GST that also measured the concept of stress associated with military or similar occupations (e.g., an occupation in law enforcement). In a study by Stander et al. (2011), Navy personnel were asked to report stress associated with exposure to danger, responsibility for others, long hours, frequent deployments, and probability of witnessing injury to others. Kurtz et al. (2015) asked a sample of law enforcement officers to report stress they experienced in relation to shooting someone, responding to a chemical spill or bloody crime scene, being involved in a hostage situation, or other similar, critical incidents. Bishopp et al., (2020) also assessed strain in a sample of law enforcement officers. These officers were asked to report their stress associated with the death or nonfatal injury of another officer, felonious assault perpetrated directly against the officer, killing someone in the line of duty, and responses to incidents that involved the death of a child.

Health Strain. Agnew (1992) said that strain may occur when something positive is taken away from an individual. This interpretation of strain is also relevant to military personnel. For example, it may be said that soldiers who suffer a Traumatic Brain Injury (TBI) and develop symptoms of ringing in the ears, headaches, and memory loss are experiencing the loss of something positive. Based on this type of strain identified by Agnew (1992) and its application to a military context, the measure of *health strain* is a summative scale composed of 17 items. Soldiers were asked how often in the past 30 days they had each of the following health problems: (1) poor appetite or overeating, (2) headaches, (3) pain in their back, neck, arms, legs, or joints, (4) muscle tension, (5) dizziness, (6) fainting spells, (7) memory problems, (8) difficulty concentrating, (9) balance problems, (10) ringing in the ears, (11) changes in their sense of taste or smell, (12) sensitivity to noise, (13) sensitivity to light, (14) sleep problems, (15) feeling tired out or low in energy, (16) easily fatigued, and (17) talking or moving more slowly than usual. Responses were coded as 1 = none of the time, 2 = a little of the time, 3 = some of the time, 4 = most of the time, or 5 = all or almost all the time. The internal consistency of the scale was $\alpha = .92$. Higher values indicated higher levels of health strain. The variable had a relatively normal distribution (skewness = .88; kurtosis = .41).

The items used to create the measure of *health strain* are similar to those items used in another study testing GST that also measured the concept of physical health stress. For example, in a study of law enforcement officers, Kurtz et al. (2015) asked officers if they experienced nausea, trouble breathing, physical pain, and faintness or dizziness. Further, the items used to measure *health strain* in the present study coincide with symptoms that an individual with Traumatic Brain Injury (TBI) may experience. As

described previously, there were over 400,00 unique cases of veteran TBI from 2000 to 2020 (Military Health System, 2020). TBI may result in several negative consequences including those of a physical, cognitive, and/or sensory nature (Mayo Foundation for Medical Education and Research, 2021).

Life Spheres Strain. Agnew (1992) also said that strain may occur when an individual is unable to achieve a goal. Like the previous strains, this type of strain may be applied to a military context as well. For example, it may be said that soldiers who are unable to achieve a promotion during their military career or who are unable to achieve the goal of an emotionally healthy romantic relationship are experiencing the inability to achieve a goal. Based on this type of strain identified by Agnew (1992) and its application to military personnel, the measure of *life spheres strain* is a composite measure based on five items. Soldiers were asked how much stress they had over the past 12 months in each of the following areas of their life: (1) financial situation, (2) love life, (3) relationship with family, (4) the health of their loved ones, and (5) other problems experienced by their loved ones.

Responses were coded as 1 = none, 2 = mild, 3 = moderate, 4 = severe, or 5 = very severe. An index was created through Principal Component Analysis (PCA). The internal consistency of the index was $\alpha = .81$. Only one factor with an Eigenvalue higher than 1 emerged (Eigenvalue = 2.86). The factor explains 57.28% of variance in the component measures and factor loadings ranged from .68 to .80. Higher values indicated higher levels of strain in the life spheres. The variable had a relatively normal distribution (skewness = 1.46; kurtosis = 2.29).

The items used to create the measure of *life spheres strain* are similar to those items used in other studies testing GST that also measured the concept of stress in major life domains (e.g., finances and love life). For example, in regard to stress associated with one's financial life sphere, Bradley (2007) measured financial strain as the total amount of debt owed by a couple in a sample of veterans and non-veterans. In regard to stress associated with an individual's loved ones, Schmaling et al. (2011) measured this type of stress as the level of relationship satisfaction among U.S. Army Reservists.

Anger. Of the variety of negative emotions an individual may experience (e.g., depression, anxiety, anger, etc.), Agnew (1992) argued that anger is the most relevant negative emotion when examining the relationship between strain and violent behavior. Accordingly, the present study includes a measure of anger. *Anger* is a composite measure based on four items. Soldiers were asked how often in the past 30 days they: (1) felt so angry that they thought they might explode, (2) felt a lot angrier than most people would be in the same situation, (3) felt that their anger was out of control, and (4) felt irritated, annoyed, or grouchy. Responses were coded as 1 = none of the time, 2 = a little of the time, 3 = some of the time, 4 = most of the time, or 5 = all or almost all the time.

An index was created through Principal Component Analysis (PCA). The internal consistency of the index was $\alpha = .90$. Only one factor with an Eigenvalue higher than 1 emerged (Eigenvalue = 2.86). The factor explains 77.36% of variance in the component measures and factor loadings ranged from .84 to .92. Higher values indicated higher levels of anger. The variable had a relatively normal distribution (skewness = 1.67; kurtosis = 2.52).

The items used to create the measure of *anger* are similar to those items used in other studies testing GST that also measured the concept of anger. For example, Bishopp et al. (2019) measured anger as acting on angry feelings, being extremely angry, and misdirecting anger toward another individual who did not deserve it in a sample of law enforcement officers. Moon and Jonson (2012) also measured anger among a sample of law enforcement officers by asking officers the degree to which their irritability interfered with their social and home life.

Religiosity. Social Bonding Theory (Hirschi, 1969) recognizes the role of one's moral beliefs, which also act as a control over an individual's deviant impulses and subsequently affect an individual's constraints against and motivations for crime. According to Hirschi (1969), individuals who are more frequently involved in conventional activities (e.g., church, work, and school) and who possess relatively stronger moral beliefs are less predisposed to crime because their constraints against crime are high and their motivations for crime are low.

The present study includes a measure that combines soldiers' frequency of religious service attendance (i.e., involvement in conventional activities) and faith/degree of religiousness or spirituality (i.e., beliefs). This measure is referred to as *religiosity* and is a summative scale based on two items. Soldiers were asked how often they usually attended religious services when they could. Responses were coded as 1 = never, 2 = less than once a month, 3 = one to three times per month, and 4 = at least once a week. Soldiers were also asked how religious (their faith in a higher power or practice or religious beliefs) or spiritual (their value of the spiritual aspect of life) they considered themselves to be. Responses were coded as 1 = not at all, 2 = slightly, 3 = moderately, or

4 = very. The internal consistency of the scale was $\alpha = .81$. Higher values indicated higher levels of religiosity. The variable had a relatively normal distribution (skewness = .23; kurtosis = -.93).

The items used to create the measure of *religiosity* are similar to those items used in other studies testing GST that also examined the concept of religiosity. For example, Benda and Toombs (2000) asked respondents how often they engaged in church activity. Barbieri and Craig (2018) also measured religiosity by asking respondents about the importance of spirituality.

Coping Skills. As previously described, Agnew (2006) stated that some individuals may cope with strain through cognitive coping strategies. He explained that cognitive coping strategies allow individuals to reinterpret strain so as to reduce its subjective impact on an individual. The present study examines soldiers' abilities to cope with strain through cognitive coping strategies.

Coping skills is a summative scale based on four items. Soldiers were asked how they rated their ability to handle stress in each of the following ways: (1) keep calm and think of the right thing to do in a crisis, (2) try new approaches if old ones did not work, (3) get along with people when they have to, and (4) keep a sense of humor in tense situations. Responses were coded as 1 = poor, (2) fair, (3) good, (4) very good, or (5) excellent. The internal consistency of the scale was $\alpha = .88$. Higher values indicated higher levels of coping skills. The variable had a relatively normal distribution (skewness = -.54; kurtosis = -.34).

The items used to create the measure of *coping skills* are similar to those items used in other studies testing GST that also examined the concept of coping skills. For

example, Isom-Scott and Mikell (2019) used items from the Brief COPE scale (Carver, 1997) to measure positive coping skills and resources. The Brief COPE scale includes items that ask respondents how often they try to come up with a strategy about what to do about stress, make jokes about stress or make fun of the situation, and learn to live with the stress. Another study testing GST by Shadmanfaat et al. (2019) also examined the concept of coping skills. Respondents were asked how often they engaged in specific coping strategies such as figuring out what was done wrong.

Work Support. Hirschi (1969) claimed that individuals with worn or broken bonds are more susceptible to criminal behavior because the withering of these bonds allows the individual to take a moral holiday. In line with Hirschi's propositions, the present study examines the level of attachment among soldiers by examining soldiers' level of support at work. *Work support* is a summative scale based on three items. Soldiers were asked how much they agreed or disagreed with each statement: (1) I can rely on other members of my unit for help if I need it, (2) my leaders take a personal interest in the well-being of all the soldiers in my unit, and (3) I can open up and talk to my first line leaders if I need help. Responses were coded as 1 = strongly disagree, (2) disagree, (3) neither agree nor disagree, (4) agree, or (5) strongly agree. The internal consistency of the scale was $\alpha = .86$. Higher values indicated higher levels of work relationships. The variable had a relatively normal distribution (skewness = $-.69$; kurtosis = $-.04$).

The items used to create the measure of *work support* are similar to those items used in other studies testing GST that also examined the concept of social support. For example, Kurtz et al. (2015) measured social support by asking respondents about their

support from their family, friends, etc. Choi (2019) also measured social support by asking respondents how often they corresponded with family and friends.

Self-Control. Individuals who are low in self-control are impulsive, sensation-seeking, and prefer instant gratification; these characteristics are reflected in the criminal acts committed by these individuals (Gottfredson & Hirschi, 1990). The present study examines soldiers' levels of *self-control* by through a summative scale based on five items. Soldiers were asked how often they had each of the following problems in the past 6 months: (1) trouble stopping themselves from overdoing things (e.g., drinking too much, spending more time than they should playing cards), (2) avoiding or delaying getting started when you had a task that required a lot of thought, (3) driving faster than other people or driving unsafely, (4) fidgeting or squirming with your hands or feet when you had to sit down for a long time, and (5) feeling overly active and compelled to do things, like you were driven by a motor. Responses were coded as 1 = very often, 2 = often, 3 = sometimes, 4 = rarely, or 5 = never. The internal consistency of the scale was $\alpha = .81$. Lower values indicated lower levels of self-control. The variable had a relatively normal distribution (skewness = -1.00; kurtosis = .55).

The items used to create the measure of *self-control* are similar to those items used in other studies testing GST that also examined the concept of self-control. For example, Choi (2019) measured self-control by asking respondents about their preference for physical activities, risk-taking, and impulsivity. Shadmanfaat et al. (2019) also measured self-control by asking respondents about their impulsivity, preference for simple tasks and physical activities, risk-seeking behavior, self-centeredness, and temper.

Control Variables. *Age, sex, race, and education* were used as control variables.

Age is a continuous variable that measures a soldier's age in years. *Sex* was a dichotomous variable coded as 1 = male and 0 = female. *Race* was coded as 1 if the soldier was White or 0 if the soldier was non-White. Soldiers were asked about the highest level of *education* they had achieved. Response for this variable were coded as 1 = GED or equivalent, 2 = high school diploma, 3 = some post high school education but no certificate or degree, 4 = post high school technical school certificate or degree (e.g., EMT), 5 = two-year college, 6 = four-year college degree (BA, BS, or equivalent), or 7 = graduate or professional study.

Analytical Strategy

The statistical analysis includes three steps. First, the mean was obtained for each measure to provide information about the distribution of the data (Salkind, 2011). Measures of dispersion (e.g., standard deviation, minimum, and maximum) were also obtained for each measure to provide information about the dispersion of the data, or how different scores are from one another (Salkind, 2011).

Second, bivariate analyses were conducted. The hypotheses previously presented were tested through a variety of statistical analyses. A matrix of Pearson correlation coefficients was examined to determine the significance, direction, and strength of the relationships between violence, strain, and anger, factors that protect against violence, and control variables. The correlation matrix was also examined to identify potential issues of multi-collinearity.

Last, multivariate analyses were conducted. Binomial logistic regression analyses were conducted to identify which of the independent variables were significant predictors

of violence since the dependent variable was a dichotomous measure. Binary logistic regression may be used when the dependent variable is dichotomous (i.e., coded 1 and 0) and the independent variables are continuous and/or categorical variables (i.e., coded 1 and 0). Logistic regression is also called a "logit model" and logistic regression coefficients (*B*'s) can be referred to as logit estimates. A logit model estimates the log odds of the outcome as a linear combination of the predictor variables (Walker & Maddan, 2020).

Assumptions for logistic regression were met prior to conducting multivariate analyses. The assumptions that must be met to conduct a logistic regression analysis are further listed. First, the dependent variable needs to be dichotomous. Second, the logistic regression model may include one or more independent variables, which can be either continuous (i.e., an interval or ratio variable) or categorical (i.e., an ordinal or nominal variable). Categorical variables should be dummy variables. Third, an independence of observations is required, and the dependent variable must have categories that are mutually exclusive and exhaustive.

The fourth assumption requires a linear relationship between any continuous independent variables and the logit transformation of the dependent variable. This assumption can be verified using the Box-Tidwell test. In order to test this assumption an interaction term between each continuous variable in the model and its logs needs to be created. If the interaction term is significant, the assumption of linearity is violated. However, if the sample size is relatively large, as is the case in the present analysis, the interaction does not need to be significant. Walker and Maddan (2020) noted that the

violation of this assumption should not be a concern when logistic regression analyses are based on large samples.

Furthermore, while logistic regression does not have many assumptions that must be met, it does generally require larger samples. In general, a minimum of 10 cases with the least frequent outcome for each independent variable in your model is needed (Agresti, 2007). As the current analysis is based on an exceptionally large sample, this assumption was met. As in any multivariate analysis, the data must not indicate multicollinearity (i.e., when two or more independent variables are highly correlated with one another). Multi-collinearity may be verified through an examination of collinearity diagnostics. An examination of the collinearity diagnostics (e.g., tolerance levels) indicated that multicollinearity was not an issue in the present analysis.

The main objective of the logistic regression analysis is to identify the predictors that significantly affect variations in the dependent variable when controlling for the other variables in the model. Significant effects are determined by examining the significance levels associated with each predictor variable. Another objective of binomial logistic regression is to determine how well the model predicts the dependent variable. The strength of the estimated model can be assessed through an examination of the Pseudo R^2 . The current analysis reports the Nagelkerke R^2 , which may reach a maximum of 1 and is a measure of model fit generally reported when logistic regression results are presented. This Pseudo R^2 can be interpreted as a percent reduction in the error of the estimates when two alternative statistical models are compared (Walker & Maddan, 2020). Different from Ordinary Least Square (OLS) regression, where a more detailed explanation of the findings focuses on the unstandardized/standardized regression

coefficients, logistic regression focuses on odds ratio (Exp *B*) values, which are interpreted (as the probability of an event occurring) and discussed if the effect of the independent variable on the dependent variable is significant.

The multivariate analysis includes two statistical models. The first model examines the effects of the three measures of strain (e.g., deployment strain, health strain, and life spheres strain) on violent behavior. The second model examines the effects of strain predictors when controlling for the additional selected predictors of violent behavior. The results of the second binomial logistic regression model serves as a sensitivity analysis and examines the stability of the effects of strain on violence, when controlling for anger, and factors that protect against violence (e.g., self-control, social support, coping skills, and religiosity), and sociodemographic measures (e.g., age, sex, race, and education).

RESULTS

Descriptive Analyses

Frequencies and percentages for each item used in the analyses are presented in Appendix 2. Other descriptive statistics (e.g., *n*, mean, standard deviation, range, and Cronbach's *a*) of the overall sample are presented in Table 2. About 87.1% of soldiers who responded reported that they had never engaged in violence in the past 30 days. As for deployment strain, over half of soldiers who responded experienced the following at least once during deployment: going on combat patrols or having other dangerous duties, firing rounds at the enemy or receiving enemy fire, seeing villages destroyed or people begging for food, exposure to severely wounded or dying people or dead bodies and having a platoon member who was seriously wounded or killed.

Concerning health strain, over half of soldiers who responded experienced the following problems at least a little of the time in the past 30 days: back pain, low energy, sleep problems, headaches, muscle tension, problems concentrating, fatigue, memory problems, and poor appetite or loss of appetite. In terms of life spheres strain, over half of soldiers who responded experienced mild, moderate, severe, or very severe levels of stress in the past year related to their finances. In response to items measuring anger, over half of soldiers who responded indicated feeling irritated, annoyed, or grouchy at least a little of the time in the past 30 days.

In response to items measuring self-control, on at least rare occasions in the past six months, over half of soldiers who responded reported avoiding or delaying a task that

required a lot of thought and over half also indicated fidgeting or squirming when they had to sit down for a long time. In regard to coping skills, over half of soldiers who responded rated their ability to handle stress as either fair, good, very good, or excellent by keeping calm and thinking of the right thing to do in a crisis, getting along with people when they had to, keeping a sense of humor in tense situations, and trying new approaches if old ones did not work.

Concerning religiosity, over half of the soldiers who responded considered themselves to be slightly/moderately/very spiritual, perceived themselves to be slightly/moderately/very religious, and attended services when they could. In terms of work relationships, over half of soldiers who responded either agreed or strongly agreed that they could rely on other members of their unit for help if they needed it, they could open up and talk to their first line leaders if they needed help, and their leaders took a personal interest in the well-being of all the soldiers in their unit.

Table 2*Descriptive statistics of sample*

Variable	<i>n</i>	<i>Mean</i>	<i>SD</i>	<i>Range</i>	<i>α</i>
Violence	21,103	0.11	0.32	0 – 1	-
Deployment	12,606	0.00	1.00	-1 – 2	.87
Health	20,758	32.83	11.91	17 – 85	.92
Life Spheres	19,923	0.00	1.00	-1 – 5	.81
Anger	21,031	0.00	1.00	-1 – 4	.90
Self-Control	20,972	20.61	4.27	5 – 25	.80
Coping Skills	19,927	15.56	3.59	4 – 20	.88
Religiosity	18,643	6.78	2.67	3 – 12	.81
Work Support	19,468	11.06	3.08	3 – 15	.86
Sex (1 = Male)	21,294	0.88	0.32	0 – 1	-
Age	21,331	28.66	7.42	18 – 61	-
Race (1 = White)	21,057	0.71	0.46	0 – 1	-
Education	21,261	3.42	1.68	1 – 7	-

Bivariate Analyses

The results of the bivariate analysis (see Table 3) produced Pearson correlation coefficients less than .55, which would suggest that multi-collinearity was most likely not a concern. Hypothesis 1 was supported as all measures of strain were found to be significantly and positively associated with violence. Of the three measures of strain, results indicated that soldiers who experienced higher levels of health strain were also more likely to commit violence ($r = .27, p < .001$), as were soldiers who experienced higher levels of life spheres strain ($r = .21, p < .001$) and those who experienced deployment strain ($r = .09, p < .001$).

Hypothesis 2 was also supported as anger was found to have a relatively strong and positive relationship with violence. Soldiers who experienced higher levels of anger were also more likely to commit violence ($r = .39, p < .001$). Results also indicated support for Hypotheses 3, 4, 5, and 6. Violence was more likely to occur among soldiers who reported lower levels of religiosity ($r = -.05, p < .001$), coping skills ($r = -.18, p < .001$), work support ($r = -.14, p < .001$), and self-control ($r = -.24, p < .001$). In regard to control variables, soldiers with higher levels of education were less likely to commit violence ($r = -.11, p < .001$), as were older ($r = -.11, p < .001$), female ($r = -.04, p < .001$), and White soldiers ($r = -.03, p < .01$).

Exploratory analyses revealed that the top three strongest correlations overall were those between health strain and anger, health strain and self-control, and self-control and anger, respectively. Soldiers who experienced higher levels of health strain were also more likely to report lower levels of self-control ($r = -.55, p < .001$). Soldiers who experienced higher levels of health strain were more likely to experience higher levels of

anger ($r = .54, p < .001$). Soldiers with lower levels of self-control were more likely to experience higher levels of anger ($r = -.53, p < .001$).

There were also significant inter-relationships among the factors that affect the constraints against and the motivations for crime. As soldiers' levels of work relationships increased, so did their coping skills ($r = .31, p < .001$). Soldiers with higher levels of self-control were also more likely to have higher levels of coping skills ($r = .30, p < .001$). In addition, self-control, coping skills, religiosity, and work relationships each exhibited a negative relationship with both strain and anger.

Additionally, there were significant relationships between some of the control variables and independent variables. Males were more likely than females to report deployment strain ($r = .21, p < .001$). Those with higher levels of education were more likely to report lower levels of health strain ($r = -.15, p < .001$) as well as lower levels of anger ($r = -.13, p < .001$).

Table 3

Correlation matrix for variables used in binomial logistic regression analyses

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Violence	-												
2. Deployment	.09***	-											
3. Health	.27***	.23***	-										
4. Life Spheres	.21***	.12***	.43***	-									
5. Anger	.39***	.16***	.54***	.44***	-								
6. Self-Control	-.24***	-.17***	-.55***	-.43***	-.53***	-							
7. Coping Skills	-.18***	.05***	-.31***	-.28***	-.37***	.30***	-						
8. Religiosity	-.05***	-.05***	-.07***	-.01	-.09***	.09***	.09***	-					
9. Work Support	-.14***	-.01	-.32***	-.23***	-.32***	.24***	.31***	.08***	-				
10. Sex (1 = Male)	.04***	.21***	-.07***	-.06***	-.03**	.02	.14***	-.07***	.10***	-			
11. Age	-.11***	.08***	-.02**	.01	-.10***	.08***	.06***	.22***	.08***	.02*	-		
12. Race (1 = White)	-.03**	.12***	-.03***	.00	.02	-.07***	.00	-.19***	.05***	.12***	-.07***	-	
13. Education	-.11***	-.01	-.15***	-.02*	-.13***	.09***	.10***	.25***	.10***	-.09***	.44***	.01	-

Note. * $p < .05$; ** $p < .01$; *** $p < .001$.

Multivariate Analyses

Table 4 presents the results for the binomial logistic regression estimates for violence. Deployment, health, and life spheres strain were entered into Model 1. All independent and control measures were entered into Model 2. Multi-collinearity was not an issue based on the collinearity diagnostics performed; the lowest Tolerance statistic was .62 (see Walker & Madsen, 2020). In Model 1, all types of strain predicted a significant increase in the odds of committing violence. The odds of violence increased by 35% ($\text{Exp}[b] = 1.35$; $p < .001$) with each unit increase in life spheres strain, by 13% ($\text{Exp}[b] = 1.13$; $p < .01$) with each unit increase in deployment strain, and by 6% ($\text{Exp}[b] = 1.06$; $p < .001$) with each unit increase in health strain.

The *Pseudo R*² (.27) for Model 2 indicates that this model produced a higher reduction (27%) in the error of the estimates than Model 1 did (15%). In Model 2, all strains and anger significantly predicted violence as hypothesized. While the odds of violence were more than twice as high for male soldiers than for female soldiers ($\text{Exp}[B] = 2.05$, $p < .001$), the odds of violence decreased by 3% with each year increase in age ($\text{Exp}[B] = .97$, $p < .001$) and also decreased by 5% with each unit increase in coping skills ($\text{Exp}[B] = .95$, $p < .001$). White soldiers had 31% lower odds of committing violence than non-White soldiers ($\text{Exp}[B] = .69$, $p < .001$). Education affected violent behavior in the anticipated direction yet lacked a significant effect ($\text{Exp}[B] = .12$, $p < .194$).

Table 4*Logistic regression estimates for violence*

Variable	Model 1				Model 2			
	B	SE	Exp(b)	Tol	B	SE	Exp(b)	Tol
Deployment	.12**	.04	1.13	.95	.14**	.04	1.15	.86
Health	.05***	.00	1.06	.79	.02***	.00	1.02	.54
Life Spheres	.30***	.03	1.35	.82	.09*	.04	1.10	.71
Anger	-	-	-	-	.67***	.04	1.95	.56
Self-Control	-	-	-	-	-.01	.01	.99	.58
Coping Skills	-	-	-	-	-.05***	.01	.95	.78
Religiosity	-	-	-	-	-.01	.02	.99	.88
Work Relationships	-	-	-	-	-.01	.01	1.00	.82
Sex (1 = Male)	-	-	-	-	.85***	.15	2.33	.90
Age	-	-	-	-	-.06***	.01	.94	.77
Race (1 = White)	-	-	-	-	-.40***	.09	.67	.92
Education	-	-	-	-	-.02	.03	.98	.75
Constant	-4.29***	.12	.01	-	-1.00*	.42	.37	-
Pseudo R^2 (Nagelkerke)			.15				.27	
$n = 9,881$								

Note. B = Logistic Regression Coefficient; SE = Standard Error; Exp(b) = Odds Ratios; Tol = Tolerance; * $p < .05$; ** $p < .01$; *** $p < .001$.

DISCUSSION

The present study conducted an empirical test of GST to examine violence in a sample of U.S. Army soldiers. The present study hypothesized that measures of GST (e.g., deployment strain, health strain, life spheres strain, and anger) would have a positive link with violence. The results of the binomial logistic regression analyses provided support for this hypothesis. This section discusses the results of the present study in terms of their relevance to the propositions of GST and arguments made by Agnew (1992). The results of the present study are also compared to the findings of other quantitative studies that examined violence in relation to strain and anger.

The results of the descriptive analyses show that only 11.3% of the sample engaged in violence in the past 30 days. This finding is similar to the results of a systematic review by MacManus et al. (2015) which reported aggregate estimates of 10% for violent behavior among seventeen studies of military personnel who were previously deployed to Iraq and/or Afghanistan. In the present study, soldiers were asked to report the frequency of certain types of experiences that occurred during any of their deployments. Two-thirds of the sample participated in combat patrols and the majority of the sample witnessed violence against civilians, had violence used against them by enemy forces, or knew other soldiers who were seriously wounded or killed during deployment. Soldiers were also asked to report how often they experienced certain health problems in the past 30 days; the majority of soldiers experienced over half of the listed health concerns at least a little of the time.

Further, the majority of soldiers experienced financial problems and almost half of the sample experienced problems in their love life in the past year. When asked about their level of anger, the majority of soldiers surveyed reported that they only felt irritated, annoyed, or grouchy in the past 30 days. In contrast, less than half the sample reported feeling so angry they thought they would explode, angrier than others in the same situation, or that their anger was out of control. While the majority of soldiers experienced strain relating to the violence of combat, their physical health, and their financial and love lives, their anger was most strongly related to health strain, followed by life spheres strain. Despite the amount of strain and anger experienced by soldiers, in addition to the strong relationship between health strain and anger among soldiers, the majority of soldiers did not cope with their strain and anger through violence.

Support for Hypotheses and Similarity of Results

The results of the binomial logistic regression analyses are consistent with the overall propositions of GST. Soldiers who never engaged in violent behavior in the last 30 days were compared to soldiers who reported that they did engage in violent behavior at least once during that time. The second regression model that included all of the independent and control variables showed that the odds of committing violence were significantly higher for soldiers with higher levels of strain and anger, lower levels of coping skills, and who were younger, male, and a minority.

Support was found for Hypothesis 1. There was a positive relationship between soldiers' levels of strain (e.g., deployment, health, and life spheres) and their likelihood of engaging in violence. The positive relationship between strain and violence in the present study is also found among several studies using military samples (Bradley, 2007;

Gallaway et al., 2012; Klaw et al., 2016; Kwan et al., 2017; McCarroll et al., 2010; Morris et al., 2019; Schmaling et al., 2011; Seo et al., 2014; Stander et al., 2011). The positive relationship between strain and violent behavior in the present study is also found in over 70 studies of GST that were previously cited, especially in studies of law enforcement officers who tend to have similar occupational duties as those individuals in military occupations (Bishopp et al., 2016; Bishopp et al., 2020; Kurtz et al., 2015).

While Agnew (1992) proposed that strain and crime are related, he also argued that certain types of strain are more likely to lead to crime than others (Agnew, 2001). Agnew identified victimization, abusive associations with others, and unpleasant occupations as examples of such strain. These types of strains are especially evident in the items used to measure deployment strain in the present study (e.g., engaging in combat, receiving enemy fire, having a close call, witnessing violence toward civilians, and knowing other soldiers who were wounded or killed in combat). Even so, deployment strain had the weakest relationship with both anger and violence as compared to health strain and life spheres strain. While some individuals may interpret the experiences inherent to deployment as stressful, the majority of soldiers may instead perceive these experiences as a normal aspect of their military service and are therefore less inclined to interpret such strain as the result of an unpleasant occupation, which is a type of strain likely to lead to crime (Agnew, 2001).

There was a positive relationship between soldiers' levels of anger and likelihood of violence (Hypothesis 2). This finding aligns with the special attention Agnew (1992) gave to anger. Agnew (1992) argued that anger increases the likelihood of crime, reduces the potential for legitimate coping, and translates to vengeful, criminal behaviors such as

violence (Agnew, 2007; Agnew 2015). This positive association between anger and violent behavior is evident in other studies of military samples (Elgoben et al., 2014; Sullivan & Elgoben, 2014) as well as studies of civilian samples (Capowich, 2001; Zweig et al., 2015).

To reiterate, Agnew (2007, 2015) argued that GST is compatible with other theories, such as self-control and social bond theories, and that concepts from these theories help explain “why certain individuals are more likely to engage in violent coping” when under strain (Agnew, 2007, p. 528), while others who also experience strain do not. The present study examined the effect of GST measures on violent behavior while controlling for soldiers' level of self-control, social ties to institutions of informal social control (i.e., work support and religiosity), and problem-solving skills.

The current analysis indicates that one's level of religiosity (i.e., church attendance and self-assessed religiosity and spirituality) does not have a significant negative effect on the dependent variable, as hypothesized (Hypothesis 3). Although the number of studies that examined the effect of religiosity on violent behavior is limited, prior research generally found that violent behavior is less likely to be reported by religious/spiritual individuals. For instance, Barbieri and Craig's (2018) study found that religiosity was significantly and negatively related to criminal activities that included violent behavior. On the other hand, Benda and Toombs (2000) found that while religiosity (i.e., religious beliefs) was significantly and negatively related to violent behavior, church attendance was not. It is possible that that the operationalization of religiosity might have impacted the results in the present analysis. Due to limitations of the data, the construct was based on only two questionnaire items, church attendance and

degree of religiosity and spirituality. However, Benda and Toombs (2000) argue that church attendance is a superficial measure of religiosity because it may not reflect the intensity of one's religious beliefs or one's true attachment to the church institution just as classroom attendance may not reflect students' true attachment to school. In sum, future research should examine the impact of religiosity on violent behavior using a validated multi-item instrument to measure religiosity.

As previously mentioned, when discussing the impact of strain on violent behavior, Agnew (2007) noted that, among other characteristics (e.g., low constraint and negative emotionality), individuals who respond to strain with violence also have "poor social and problem-solving skills" (p. 523). Conversely, persons with positive problem-solving skills are less likely to be violent. The current analysis found strong support for this hypothesis (Hypothesis 4), as did another study (Shadmanfaat et al., 2019). This finding is also consistent with the results of evaluation studies of violence prevention programs built on insights from social learning theory (Bandura, 1965) and developmental psychology. These programs, especially interventions based on a cognitive-behavioral approach, demonstrate that teaching children and adolescents as well as adults to respond in nonviolent ways when facing strain can be an effective strategy to deter violence (Beelmann & Lösel, 2021; Nessel et al., 2019; Sukhodolsky et al., 2004).

Additionally, it has been hypothesized that strong social bonds to co-workers would act as a factor that protects against violence. Consistent with Choi's (2019) findings, which indicate that having supportive friends or family members does not significantly decrease the respondents' violent behavior, the current analysis also found

that soldiers who acknowledged support at work are not significantly less likely to report violent behavior when compared to soldiers working in a less supportive environment (Hypothesis 5). Similar findings were reported by Stander et al. (2011) for a study of Navy personnel. Although further research is warranted, it was observed that soldiers with higher levels of work support also report significantly lower levels of anger ($r = -.32; p < .001$). This suggests that social support at work might indirectly decrease violent behavior by lowering one's level of anger.

Although prior research that examined the link between self-control and violence found that a low level of self-control is a significant predictor of violent behavior (Choi, 1999; Kerley et al., 2008; Payne et al., 2010; Sellers, 1999; Shadmanfaat et al., 2019), results of the multivariate analysis do not show a significant relationship between self-control and violent behavior, even though a significant bivariate correlation was present ($r = -.24; p < .001$) (Hypothesis 6). It should be noted, however, that the current analysis also examined the effect of anger on violent behavior, a relationship that was not explored in any of the previously mentioned studies that documented the significant effect of self-control on violent behavior. Considering the relatively strong relationship between self-control and anger ($r = -.53, p < .001$), it seems plausible to assume that even if self-control does not directly impact violent behavior in this sample of soldiers, it may do so indirectly via anger. Future research that plans to explore the compatibility of GST with other theoretical perspectives should verify this possibility.

The results of the present study also support Agnew's arguments relating to group (e.g., sex, age, and race) differences in crime. For example, Agnew argued that age is the strongest sociodemographic correlate of violence (Agnew, 2007). Accordingly, the

results of the present study showed that age was indeed significantly and negatively linked with violence. These results are similar to the findings of numerous other studies that also examined the link between age and violence (Bishopp et al., 2016; Bradley, 2007; Cabrera, 2010; Choi, 2019; McGrath et al., 2012; Patchin & Hinduja, 2010; Peck, 2013; Renshaw & Kiddie, 2012; Schmaling et al., 2011; Sigfusdottir et al., 2012; Smith-Slep et al., 2015; Sullivan & Elgoben, 2014; Taft et al., 2009).

In regard to sex, Agnew (2005) stated that males are more likely to experience strains that are more conducive to crime, are more likely to cope with strains through violence (Agnew, 2005), and are more likely than females to cope with strain through violence (Agnew, 2007). The results of the present study showed that being male is indeed a significant predictor of violence. While some studies have not found this type of significant relationship between sex and violence (Baron, 2009; Kwan et al., 2017; Teten et al., 2009), several other studies have found such a relationship (Barbieri & Craig, 2018; Bishopp et al., 2016; Kurtz et al., 2015; Peck, 2013; Sigfusdottir et al., 2012; Willits, 2019).

In regard to race, Agnew (2007) stated that certain race groups have higher rates of violence than other groups. The results of the present study showed that being a minority was a significant predictor of violent behavior. These results are similar to the findings of numerous other studies that also examined the link between race and violence (Barbieri & Craig, 2018; McGrath, 2012; Patchin & Hinduja, 2011; Peck, 2013; Taft et al., 2009). Agnew (2005) also argued that the likelihood of violence increases as an individual's level of education decreases. While some studies have found such a significant, negative relationship between education and violence (Bradley, 2007;

Gallaway, 2012), the relationship between education and violence in the present study was indeed negative yet lacked a significant effect. The results of the present study are similar to those found in other studies that similarly found a negative but non-significant association between education and violence (Choi, 2019; Kwan et al., 2017; Taft et al., 2009; Wilk et al., 2015).

Limitations

The results of the analyses and subsequent interpretation thereof may be affected by certain aspects relating to the generalizability of the study, the research design, potential threats to validity, and the precision of measurement protocols.

Research Design

In terms of research design, it is unknown if the sample was randomly selected from the U.S. Army population when originally collected for the STARRS' All Army Study. In regard to the generalizability of results, while the demographic characteristics of the sample in the present study are similar to those of the total U.S. Army and the total U.S. military, the results may be inapplicable to the larger civilian population or other groups that differ greatly in their demographic characteristics. Further, some items that were used to measure certain concepts in the present study were not included in every version of the STARRS' All Army Study questionnaire that was originally administered to soldiers. Also, the cross-sectional nature of the original study prevented inferences associated with causality.

Measurement

In regard to the precision of measures, strengths of the present study include the fact that each independent measure was made up of at least two or more survey items. All

scales had reliability coefficients of .80 or higher. However, the validity of some of the independent measures may have been strengthened if more items or items with more depth were available in the original survey. As the present study was a secondary analysis of previously collected data, the ability to operationalize theoretical concepts in a certain way was limited. For example, the dependent variable that measured violence was made up of only one survey item that may or may not have been the most ideal measure of violent behavior. Furthermore, the measure of violence lacks specificity regarding whether the violence was provoked by the respondent themselves or whether their behavior was a defensive response to violence initiated by another individual.

Similarly, the concept of religiosity was made up of only two items. These items were superficial measures of religiosity as they asked soldiers how religious/spiritual they were, without further defining the meaning of religiousness and spirituality, and how often soldiers attended religious services when they could. Additionally, while the original survey instrument included multiple items that measured the concept of coping skills, a type of cognitive coping, items that measured other forms of coping (e.g., emotional and behavioral coping) were missing from the original survey instrument.

Further, the items used to measure soldiers' levels of strain in their life spheres lacked specificity as soldiers were simply asked to report the amount of stress they had in the past year in each life sphere. Finally, the time constraints identified in each item used in the present study were inconsistent. Some items referred to experiences in the past month (e.g., health strain and anger) while other measures referred to experiences in the past year (e.g., life spheres strain) and still other measures referred to experiences that occurred at any point in time (e.g., deployment strain).

Validity

Threats to validity that are inherent to all surveys/interviews include those relating to reactivity and interviewer effects, respondent bias, telescoping, and errors in coding and data entry (Hagan, 2006). Concerning reactivity and interviewer effects, soldiers' awareness of being studied may have resulted in inaccurate self-reports of behaviors, feelings, and experiences. Some soldiers may have reported behavior that they thought researchers and/or military administrators wanted them to report. Such data may have been under- or over-reported. In relation to respondent bias, some soldiers may have tended to rate some items in a specific manner, perhaps based on the desire to be over-agreeable in an attempt to please researchers and/or military administrators. This type of respondent bias may have been more prevalent among survey responses pertaining to sensitive information, such as the item that asked soldiers if they engaged in violence.

The tendency of soldiers to shift events forward or backward in time (i.e., telescoping) is another threat to validity that is inherent to research designs that use surveys and interviews to collect data (Hagan, 2006). Instances of telescoping may have occurred among items that measured soldiers' health problems or stress in certain life spheres. A final area of concern for interview and survey research is that of potential mistakes when coding and/or entering data. While some soldiers completed web-based versions of the survey instrument, other soldiers completed the paper and pencil versions of the survey instrument or were interviewed. Such variations in data collection methods increase the likelihood of coding and data entry errors.

A final area of potential limitations in the present study relates to the variations of the survey instrument used in the original study. Specifically, the question format of the

items used to measure deployment experiences, along with the level of measurement for those items, differed according to which version of the survey a soldier completed. The present study used those items that were part of the survey versions given to the majority of the sample in order to minimize the number of missing responses to each deployment question. Responses to deployment questions for the entire sample could not be merged into a single, new variable due to processing limitations of the statistical program (SPSS) used in the present analyses, in conjunction with the relatively large size of the sample.

Suggestions for Future Research

Research Design

Despite the potential limitations to the present study, the results and interpretation of the analyses may be generalized to other populations that are similar in terms of sex, age, race, and level of education, especially other military populations. As shown by the statistics in Table 1, the demographic characteristics of the sample in the present study are similar to those of the total U.S. Army and total U.S. military force as of 2019. Replications of the present study with other military branches are especially recommended and feasible provided that those studies account for the limitations of the present study. In regard to research design, future research should utilize samples that are drawn at random. All administrations of the surveys should include all of the items used to measure each concept under examination. In addition, a longitudinal research design would permit a more complete test of the propositions identified in GST and allow for causal inferences.

Measurement

Concerning the precision of measurements, future research should use at least three or more items to measure each concept, in addition to using items that are more detailed in nature. Specifically, future research that measures the concept of violence should use multiple items to do so that are worded differently and/or capture alternative examples of violent behavior (e.g., throwing things at another person, stabbing another person, and/or using a physical object to impose physical injury upon another person). Future research should also include items that measure cognitive, behavioral, and emotional coping as well as the addition of items worded in various ways to measure respondents' amount of stress in each of the life spheres. Researchers performing similar studies in the future should use consistent time constraints for each of the items used to measure theoretical concepts.

Validity

Future research may be able to overcome instances of reactivity, interviewer effects, and respondent bias with the inclusion of official data and/or by rechecking survey responses through interviews with respondents (Hagan, 2006). Additionally, reverse record checks or interviews with others who can provide a cross-check on certain behaviors (e.g., violent behavior) are ideal (Hagan, 2006). Possible telescoping of events may be resolved through the administration of multiple surveys in which each survey interaction records the timeframe for which previous behaviors were reported (Hagan, 2006).

Policy and Program Implications

The results of the analyses conducted in the present study justify numerous practical implications. Strain, anger, and coping skills were significant predictors of violent behavior. These are all elements that can be manipulated to decrease the likelihood that individuals will respond to strain through crime. Agnew (2010) asserted that the primary implication of GST is to reduce strains by modifying the environment. Additional implications of the theory involve changing the characteristics of individuals. Efforts that decrease the probability that individuals will cope with strains through crime are other implications of the theory.

Modify the Environment

The environment may be altered so that strains are eliminated, avoided, removed from individuals, or altered to make them less conducive to crime. The strains examined in the present study are those associated with deployment strain, health problems, and strain in various life spheres.

It may not be feasible or realistic for soldiers to eliminate or avoid the stressful experiences associated with deployment due to the role of the U.S. Army within the military force and/or due to the specific duties a soldier is assigned as part of their occupation in the military. However, while the violence soldiers may be subjected to and may witness during deployments may not be completely avoided or eliminated, the frequency, clustering, duration, and timing of deployments may be altered. Since younger age is associated with higher levels of violence, it may be beneficial to defer the timing in which younger soldiers are deployed. However, this may be impractical if soldiers tend to be recruited at younger ages and soldiers tend not to stay in the Army past their initial

obligation. Even so, deployment strain may be altered by deploying soldiers less frequently, for shorter durations, and by spacing out deployments over time.

Similar to deployment strain, health and life spheres strain may never be completely eliminated for some soldiers. However, both of these types of strain may be altered. The strain associated with health problems may be improved by ensuring soldiers have access to and take advantage of high-quality, experienced, and motivated healthcare providers. Even if the medical services and benefits provided to soldiers meet these standards, there may still exist a lingering subcultural norm among soldiers that recognizing and caring for health problems are indicative of weakness. Leaders in the Army should promote and reinforce the mental and physical well-being of all soldiers. Doing so may increase the overall efficiency and effectiveness of the Army as a whole, by enhancing soldiers' performance and potential and improving their interpersonal relationships in and outside of the military. Klaw et al. (2016) also recommends that the psychological and social health needs of veterans on college campuses be met through peer-support groups for veterans or special courses for veterans that will help them transition to college life and prepare them for challenges related to higher education.

The strains that soldiers experience in the various life spheres may also be altered. Financial strains may be altered by providing soldiers with free, ongoing, and intensive educational programs that model and reinforce financial responsibility and planning. Currently, many financial institutions offer products and services at a discount to veterans which may make it easier for soldiers to manage their finances. In regard to health strains experienced by the loved ones of soldiers, this particular strain can be altered by ensuring soldiers' dependents also have access to high-quality, experienced, and motivated

healthcare providers. The strain in soldiers' love lives may be altered by providing soldiers with free, ongoing, intensive, and effective educational programs that model and reinforce conflict resolution and communication skills in a personal context, as the behaviors and skills used to solve problems in the military workplace may not translate well to use in interpersonal relationships.

Because strain related to deployment, health, and the life spheres may never be completely eliminated, it is important that military recruits and their families be informed of potential strains of military life and coping resources provided to all whom these strains may impact (Moon & Jonson, 2012). On that note, Schmaling (2011) recommends that pre-deployment stress prevention programs be implemented for military personnel. For example, the "Prevention and Relationship Enhancement Program" (PREP) prepares couples for the strain of deployment and teaches coping and conflict resolution skills to couples.

Change the Characteristics of Individuals

In addition to altering or eliminating strains, Agnew (2010) also stated that the characteristics of individuals may be modified by providing individuals with the traits and skills needed to avoid strains conducive to crime and by teaching individuals how to minimize their subjective strain. Such efforts would involve teaching soldiers social skills, coping skills, how to control their anger, how to exercise more self-control, how to think before acting, and develop academic and vocational skills (Agnew, 2010).

For example, the Domestic Conflict Containment Program was developed for military personnel involved in interpersonal violence (Marshall, 2005). This program teaches individuals cognitive restructuring principles, relationship skills, anger

management, responsibility, and self-control. Also, the “Strategic Memory Advanced Reasoning Training” (SMART) is already provided for some military personnel; such training teaches individuals to down-regulate their emotional responses to stress and improve decision-making skills (Bishopp et al., 2019).

Other practical implications include providing soldiers with counseling services that make use of Cognitive Behavioral Therapy (CBT) techniques to modify hostility and anger (Seo et al., 2014). Programs utilizing CBT typically focus on the alteration of one's thinking processes, positive cognitive skills, anger management, social skills, moral development, and relapse prevention (Lipsey et al., 2007). Efforts to encourage soldiers to take advantage of such counseling resources should coincide with efforts to reduce stigma and other barriers from obtaining mental health treatment (Marshall et al., 2005). Wilk et al. (2015) recommends that the screening regimens that are already in place for returning combat veterans include formal assessments of anger. These post-deployment screening efforts should also be regularly evaluated for effectiveness (MacManus et al., 2015).

Agnew (2010) also stated that individuals can be taught to interpret or perceive the environment in ways that minimize strains. Practically speaking, this may entail teaching soldiers desensitize themselves to minor slights and provocations that may lead to a violent response (Agnew, 2010). Soldiers may also be taught to recognize that anger may be a response to the desire to escape pain. Recognizing this, along with an acknowledgement of one's triggers for angry responses (Agnew, 2005), may disrupt the chain of events that are likely to lead to criminal coping.

Negative emotions may never be completely eliminated, but soldiers may learn to express negative emotions in safe, controlled environments through healthy, prosocial expressions of emotions outside of their military service. For example, the Veterans Writing Project is a non-profit organization that created a curriculum for the Department of Defense's research and treatment facility for PTSD and TBI. This organization provides free creative writing seminars and workshops to military personnel for therapeutic purposes as an avenue to share and express their military experience. The overall goal of the organization is captured in the phrase, "Either you control the memory, or the memory controls you." (Veterans Writing Project, n.d.).

Decrease the Probability of Criminal Coping

In addition to the alteration of strain and anger, Agnew (2010) stated that certain factors may be manipulated to decrease the probability that individuals will engage in criminal coping. Practical efforts that seek to strengthen soldiers' coping skills may disrupt the chain of events that begin with strain, are fueled by anger, and end in violence. Agnew (2005) said that efforts to change individuals in this way will only be effective if implemented through intensive programs that last for months or years and that use a variety of strategies. Further, such programs should be designed based on research and measured for effectiveness (Bishopp et al., 2020).

Each military branch already implements similar measures for developing soldiers' physical strength and other capabilities required during military service. Similar to the constant practice and drills soldiers undergo in relation to their military duties and preparation for combat, similar types of activities may be practiced that develop soldiers' long-term thinking, coping, and critical thinking skills.

Conclusion

While extensive research has been done on GST and violence, to date only one study that was qualitative in design examined GST and violent behavior in a military sample (to the knowledge of the researcher). The present study contributed to the body of knowledge on violence among military personnel through an empirical test of GST. Hypotheses were articulated based on the concepts and propositions presented in GST and were tested through a variety of statistical analyses. Overall, the results of the analyses generated empirical support for GST. Specifically, the present study found that higher levels of deployment strain, health strain, life spheres strain, and anger, lower levels of coping skills, and being young, male, and a minority were significantly associated with violent behavior among soldiers.

The potential limitations of the present study were identified and translated into suggestions for future researchers. Arguments presented in GST (Agnew, 1992), along with the findings of the present study and other similar studies, were discussed and used to generate numerous program and policy implications. Practical efforts that modify the environment, strengthen certain characteristics of soldiers, and decrease the probability of criminal coping may ultimately decrease the prevalence of violence among soldiers.

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Appendix 1

Approval from Institutional Review Board

**UNIVERSITY OF
LOUISVILLE**

Human Subjects Protection Program Office
MedCenter One – Suite 200
501 E. Broadway
Louisville, KY 40202-1798

DATE: September 21, 2020
TO: Viviana Andreescu, Ph.D.
IRB NUMBER: 16.0937
STUDY TITLE: Coping Among Veterans with Service-Related Trauma
REFERENCE #: 715060
REVIEW DATE: 09/21/2020
IRB STAFF CONTACT: Jackie Powell, CIP
852-4101
Jspowe01@Louisville.edu

The continuation request for this study was reviewed by a member of the Institutional Review Board (IRB) through the expedited review procedure, according to 45 CFR 46.110 and 21 CFR 56.110 since this study falls under Category 5: Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis).

The study now has continued committee approval from 10/19/2020 through 10/18/2021.

The following items were reviewed and approved:

Submission Components			
Form Name	Version	Outcome	
Submit Continuing Review	Version 4.0	Approved as Submitted	
Study Document			
Title	Version #	Version Date	Outcome
Protocol	Version 1.0	10/11/2016	Approved

Continuation Review Requirements

You are responsible for submitting a continuation review approximately 30 days prior to the expiration date of your research study. Investigators who allow their study approval to expire have committed non-compliance. Such lapses may require an audit by HSPPO compliance auditors and/or reporting to federal agencies. For additional information see:

<http://louisville.edu/research/humansubjects/lifecycle/continuous-reviews>

This action will be reported promptly to the IRB at a scheduled full Board meeting.

If you have any questions, please contact: Jackie Powell, CIP 852-4101 jspowe01@Louisville.edu



Appendix 2

Frequencies and percentages of items used in analyses

Violence

How often did you do each of the following things in the past 30 days?

	Never		Rarely, sometimes, often, or very often	
	<i>n</i>	%	<i>n</i>	%
Have a physical confrontation during an argument.	18678	88.51	2425	11.49

Sex

Are you male or female?

	<i>n</i>	%
Female	2504	11.76
Male	18790	88.24

Race

What is your race?

	<i>n</i>	%
Non-White	6148	29.20
White	14909	70.80

Education

What is the highest level of education you completed?

	<i>n</i>	%
GED or equivalent	1315	6.19
High school diploma	6716	31.59
Some post high school education but no certificate or degree	5904	27.77
Post high school technical school certificate or degree (e.g., EMT)	1336	6.28
Two-year college	2174	10.23
Four-year college degree (BA, BS, or equivalent)	2766	13.01
Graduate or professional study	1050	4.94

Deployment Strain

How many times did you ever have each of these experiences during any of your deployments?

	0 times		1 time		2-4 times		5-9 times		10 or more times	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Go on combat patrols or have other dangerous duty (e.g., clearing buildings, disarming civilians, working in areas that had IEDs)	4312	33.25	403	3.10	862	6.65	614	4.74	474	52.25
Fire rounds at the enemy or take enemy fire (either direct or indirect fire)	4816	37.22	844	6.52	1789	13.82	1115	8.61	4375	33.81
Have a close call (that is, equipment shot off body, IED exploded near you)	6516	50.50	2039	15.80	2639	20.45	915	7.09	794	6.15
Have member(s) of your unit who were seriously wounded or killed	5904	45.71	2188	16.94	2963	22.94	1061	8.21	799	6.19
See homes or villages that had been destroyed or people begging for food	5108	39.75	521	4.05	1506	11.71	930	7.24	4785	37.24
Get exposed to the sights, sounds, or smells of severely wounded or dying people or see dead bodies	5746	44.74	1266	9.86	2340	18.22	1072	8.34	2418	18.82
Witness violence within the local population or mistreatment toward non-combatants	8319	64.93	742	5.78	1695	13.22	696	5.43	1360	10.61

Health Strain

How often in the past 30 days did you have each of the following health problems?

	None of the time		A little of the time		Some of the time		Most of the time		All or almost all of the time	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Poor appetite or overeating	10538	49.33	4409	20.64	3462	16.21	1955	9.15	994	4.65
Headaches	8004	37.50	6282	29.43	4717	22.10	1681	7.86	661	3.10
Pain in your back, neck, arms, legs, or joints (knees, hips, etc.)	3743	17.51	3835	17.94	5167	24.17	4495	21.03	4136	19.35
Muscle tension	8723	40.05	5405	24.81	4645	21.32	2180	10.00	826	3.79
Dizziness	15435	72.35	3789	17.76	1603	7.51	371	17.39	135	.63
Fainting spells	20238	94.92	743	3.48	258	1.21	56	.26	26	.12
Memory problems	9936	46.54	5061	23.71	3745	17.54	1770	8.29	836	3.91
Difficulty concentrating or your mind going blank	8918	41.8	5480	25.70	4281	20.08	1868	8.76	773	3.63
Balance problems	14652	68.66	3531	16.55	2075	9.72	739	3.46	344	1.61
Ringing in the ears	11778	55.14	4106	19.22	3241	15.17	1216	5.69	1019	4.77
Changes in your sense of taste or smell	17286	81.2	2145	10.07	1325	6.22	375	1.76	157	.74
Sensitivity to noise	13891	65.14	3185	14.94	2563	12.01	1233	5.78	453	2.12
Sensitivity to light	13603	63.79	3484	16.33	2623	12.30	1099	5.15	515	2.41
Sleep problems (getting to sleep, staying asleep, waking too early, sleeping too much)	5667	26.53	3761	17.61	4590	21.49	4172	19.53	3168	14.83
Feeling tired out or low in energy	4253	19.90	5993	28.03	6003	28.08	3434	16.06	1694	7.92
Being easily fatigued	9146	42.82	5555	26.01	3661	17.14	1982	9.27	1015	4.75
Talking or moving more slowly than usual	13225	62.04	4631	21.73	2244	10.53	826	3.87	390	1.82

Life Spheres Strain

How much stress did you have over the past 12 months in each of the following areas of your life?

	None		Mild		Moderate		Severe		Very Severe	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Your financial situation	8973	44.62	6235	31.00	3421	17.01	1019	5.07	461	2.29
Your love life	10967	54.6	4631	23.05	2749	13.69	1116	5.56	623	3.10
Your relationship with your family	12785	63.65	4328	21.55	2023	10.07	628	3.13	321	1.60
The health of your loved ones	12164	60.63	4432	22.09	2340	11.666	757	3.77	369	1.84
Other problems experienced by your loved ones	13952	69.56	3644	18.17	1724	8.60	497	2.48	240	1.20

Anger*How often in the past 30 days did you...*

	None of the time		A little of the time		Some of the time		Most of the time		All or almost all of the time	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Feel so angry that you thought you might explode?	12237	57.96	4632	21.93	2621	12.41	971	4.60	652	3.10
Feel a lot more angry than most people would be in the same situation?	13268	62.90	3915	18.56	2116	10.03	1142	5.41	654	3.10
Feel that your anger was out of control?	16827	79.68	2325	11.01	1114	5.27	467	2.21	386	1.82
Feel irritated, annoyed, or grouchy?	4573	21.63	8338	39.44	4866	23.02	2223	10.52	1139	5.39

Religiosity

	Never		Less than once a month		One to three times per month		At least once a week	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
About how often do you usually attend religious services when you can?	8811	46.8	4714	25.04	2182	11.59	3118	16.56
	Not at all		Slightly		Moderately		Very	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
(A) How religious (your faith in a higher power or practice of religious beliefs) or spiritual (your value of the spiritual aspect of life) do you consider yourself to be? How religious do you consider yourself to be?	4957	26.39	5730	30.51	5674	30.21	2420	12.89
(B) How religious (your faith in a higher power or practice of religious beliefs) or spiritual (your value of the spiritual aspect of life) do you consider yourself to be? How religious do you consider yourself to be?	3839	20.52	5208	27.84	6008	32.12	3650	19.51

Coping Skills

*How would you rate
your ability to
handle stress in
each of the
following ways?*

	Poor		Fair		Good		Very Good		Excellent	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Keep calm and think of the right thing to do in a crisis	298	1.49	1663	8.30	4438	22.16	6439	32.15	7188	35.89
Try new approaches if old ones don't work	605	3.03	2090	10.45	5349	26.75	6125	30.63	5826	29.14
Get along with people when you have to	325	1.63	1646	8.23	4667	23.34	6232	31.17	7122	35.62
Keep your sense of humor in tense situations	453	2.27	1547	7.74	4067	20.34	5602	28.02	8324	41.63

Work Support*How much do you agree or disagree with each of these statements?*

	Strongly Disagree		Disagree		Neither Agree nor Disagree		Agree		Strongly Agree	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
I can rely on other members of my unit for help if I need it.	910	4.64	1392	7.11	3612	18.46	7946	40.60	5710	29.18
My leaders take a personal interest in the well-being of all the soldiers in my unit.	1964	10.07	2016	10.34	4798	24.61	6248	32.05	4471	22.93
I can open up and talk to my first line leaders if I need help.	1409	7.21	1595	8.17	3331	17.06	7088	36.29	6107	31.27

Self-Control

How often did you have each of the following problems in the past 6 months?

	Very Often		Often		Sometimes		Rarely		Never	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Trouble stopping yourself from overdoing things (e.g., drinking too much, spending more time than you should playing cards)	623	2.94	896	4.24	1948	9.22	3782	17.89	13886	65.70
Avoiding or delaying getting started when you had a task that required a lot of thought	903	4.26	1555	7.33	3883	18.31	5626	26.54	9234	43.55
Driving faster than other people or driving unsafely	756	3.57	984	4.65	2177	1.29	4604	21.76	12641	59.73
Fidgeting or squirming with your hands or feet when you had to sit down for a long time	2100	9.91	2416	11.40	3268	15.42	3898	18.39	9513	44.88
Feeling overly active and compelled to do things, like you were driven by a motor	698	3.30	1330	6.28	3173	14.99	4631	21.88	11335	53.55

CURRICULUM VITAE

NAME: Leslie A. Greenwell

EDUCATION: B.S., Criminal Justice
Eastern Kentucky University
2005

M.S., Justice Administration
University of Louisville
2009

Ph.D., Criminal Justice
University of Louisville
2021