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MODERATING EFFECTS OF POSTTRAUMATIC GROWTH ON SUICIDAL IDEATION  
AFTER COMBAT EXPOSURE

by

MATTHEW A. STRADER

(Under the Direction of Jeff Klibert)

ABSTRACT

The suicide rate in the United States has risen since 1999 (Curtin, Warner, & Hedegaard, 2016). This increase may be a distinct problem for military service members who may have an additional risk through combat exposure (Bryan et al., 2015). There is a need to identify protective factors for suicide broadly and specifically for military service members and veterans. There is emerging evidence that posttraumatic growth may be a protective factor for suicide ideation possibly buffering the effects of combat exposure on suicide ideation (Bush, Skopp, McCann, & Luxton, 2011). The current study was designed to further examine the relationship between combat exposure and suicide by examining the moderating effects of posttraumatic growth. A sample of 423 veterans participated in this correlational study by completing a series of online measures. Results indicated that posttraumatic growth had a significant inverse relationship with suicide ideation. In addition, combat exposure had a significant positive relationship with posttraumatic growth. Finally, age significantly accounted for variation in posttraumatic growth. However, the interaction effect between combat exposure and posttraumatic growth did not significantly account for variation in suicide ideation scores, suggesting that posttraumatic growth does not moderate the associated effects of combat exposure on suicide ideation. Clinically this suggests posttraumatic growth may be a target to reduce suicide ideation directly. However, posttraumatic growth does not seem to alter the effects of combat exposure on suicide ideation.

INDEX WORDS: Combat Exposure, Posttraumatic Growth, Suicide Ideation, Veterans

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by

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B.S., Georgia Southern University, 2013

M.S., Georgia Southern University, 2017

A Dissertation Submitted to the Graduate Faculty of Georgia Southern University in Partial  
Fulfillment of the Requirements for the Degree

DOCTOR OF PSYCHOLOGY

STATESBORO, GEORGIA

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Electronic Version Approved:  
July 2018

## ACKNOWLEDGMENTS

I would like to thank and acknowledge all who supported and encourage me, without you all I could not have accomplished this. I would like to specifically thank each member of my dissertation committee. I would first like to thank my Dissertation Chair Dr. Kilbert. Dr. Klibert always made himself available whenever I had an issue or a question about my research or writing, his flexibility and dependability ensured my success in this endeavor. I would also like to thank my committee members Dr. Smalley, and Dr. Warren, I am indebted to each of you for your guidance and patience in overcoming numerous obstacles along the way. Their passion for research was always inspiring and their work with the Rural Health Research Institute at Georgia Southern University played an indispensable role in this research. I would like to express gratitude to my mother, father, and brother, for their unwavering encouragement and positive attitudes. Finally, to all my friends who provide balance to my life, thank you.

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## CHAPTER 1: INTRODUCTION

Suicide has been the subject of debate and research for many years, but recently there has been a steady increase in the rates of suicide in the United States. Between 1999 and 2014 the suicide rate for both males and females increased. Males increased from 17.8 per 100,000 to 20.7 per 100,000, while females increased from 4.0 per 100,000 to 5.9 per 100,000 (Curtin, Warner, & Hedegaard, 2016). Prior to this increase, suicide rates had been in steady decline since 1986, leading to an 18% drop of total suicides from 1986 to 1999 (Hu & Wilcox, 2008). Members of the U.S. military have historically had lower suicide rates than the average population, but recently service members' rates of suicide have exceeded the average population's rate, all while the average rate is climbing higher (Bryan et al., 2015). This suggests a major increase in suicidality among veterans. A report from the Department of Veterans Affairs that examined 55 million records from 1979 to 2014 found that 20 veterans die by suicide each day. These data showed that in 2014, veterans accounted for 18% of the suicides in the United States, despite the fact that veterans accounted for less than 9% of the population (VA, 2016).

Due to the unique experiences service members encounter, they face distinct risk and protective factors related to suicide. The study of suicide has mostly focused on risk factors, or predictors, and significantly less attention has been given to protective factors (Nock et al., 2013). The study of risk is important because it allows clinicians and health care professionals to consider different psychosocial elements as a means to lower suicide risk (Nock et al., 2013). In a review of literature by Nock et al. (2013), risk factors for suicide in service members include psychological elements (mental health diagnoses, impulsiveness, aggressive traits, and neurocognitive deficits), family history elements (family history of mental health diagnoses, aggression, criminality, suicide/suicide attempts), early life stressors (childhood abuse,

household dysfunction, and parental divorce), negative life events (traumatic experiences, chronic illness/pain, recent stressors, and situational factors), and past or current suicidal behavior (suicidal ideation, suicide plan, suicide attempt, and suicide). While this focus may seem intuitive, it leaves clinicians in the position of developing strategies to avoid risk factors or mitigate their negative effects, rather than specifically working to bolster resilience in a more proactive form of prevention. In this vein, protective factors merit specific scientific inquiry because they reduce the likelihood of occurrence for individuals who are at risk. In the same vein, protective factors for suicide in veterans include social support, psychological protective factors (resilience, character strength, life satisfaction, positive moods, self-esteem, hope, gratitude, and life meaning), mental health treatment, physical health, and fitness (Nock et al., 2013). Because of the complex intersection of risk and protective factors, further research is needed in order to identify those factors that more accurately predict outcomes and support theories, in order to create and implement effective interventions.

One specific protective factor of emerging importance to veteran suicidality is Posttraumatic Growth (PTG), or the positive reported outcomes of trauma experiences. PTG has consistently been found in military service members and veterans (e.g., Benetato, 2011; Hijazi, Keith, & O'Brien, 2015; Maguen, Vogt, King, King, & Litz, 2006; Moran, Schmidt, & Burker, 2013; Pietrzak et al., 2010; Staugaard, Johannessen, Thomson, Berteleson, & Bernsten 2015; McLean et al., 2013). Hijazi et al. (2015) found that, in a sample of veterans from multiple conflicts, at least one area of PTG was reported to a moderate degree by 69% of the sample. In contrast, Fulton et al. (2015) estimated that the rate of PTSD in veterans of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) was 33% based on their meta-analysis of 33 studies and 4,945,897 veterans of OEF and OIF. This may mean that veterans are more likely to

experience PTG than PTSD, suggesting that growth may be a more common outcome of trauma than distress.

PTG has been associated with many other positive constructs such as optimism, social support, and coping (Prati & Pietrantonio, 2009); hope (Helgeson et al., 2006); wisdom and intrapersonal strength (Webster & Deng, 2015); strengths of character (Peterson, Park, Pole, D'Andrea, & Seligman, 2008); sense of belonging (Dekel, & Nuttman-Shwartz, 2009); religious coping (Chan, Young, & Sharif, 2016; Prati & Pietrantonio, 2009); extraversion and openness to experience (Feder et al., 2008; Tedeschi & Calhoun, 1996); and better adjustment and life satisfaction (Triplett et al., 2012). PTG may be a specific protective factor against negative outcomes of trauma (e.g., Bush, N., Skopp, N., McCann, R., & Luxton, D. 2011; Gallaway, Millikan, & Bell, 2011; Yu, et al., 2010). While PTG may act as an independent protective factor of trauma, it may also be one part of intersecting constructs that influence negative outcomes associated with trauma. By facilitating PTG through interventions before and after trauma, it may be possible to increase its strength as a protective factor and increase development of positive psychological resources.

The majority of research involving combat exposure has focused on negative outcomes, most notably involving broad mental health outcomes (Creech, Swift, Zlotnick, Taft, & Street, 2016; Prigerson, Maciejewski, & Rosenheck, 2002; Xue et al., 2015), especially suicide (Bryan et al., 2015). Recently, several studies have observed positive outcomes of combat exposure through the construct of PTG, where combat exposure has consistently been shown to have a positive relationship with PTG (e.g., Dekel, 2011; Gallaway, Millikan, & Bell, 2011; McLean, et al., 2013; Mitchell, Gallaway, Millikan, & Bell, 2013; Pietrzak, et al., 2010; Staugaard et al., 2015). Interestingly, combat exposure also has been found to have a positive relationship with

suicide ideation (SI; e.g., Bryan et al., 2015; Bryan, Bryan, Ray-Sannerud, Morrow, & Etienne, 2013; Fontana, Rosenheck, Brett, 1992; Logan, Skopp, Karch, Reger, & Gahm 2012; Monteith, Menefee, Forster, Wanner & Bahraini, 2015; Mitchel et al., 2013). Similarly, there is also initial research suggesting that PTG has an inverse relationship with suicidality (e.g., Bush, et al., 2011; Gallaway, et al., 2011; Yu, et al., 2010). One explanation for this unique set of associations could be the proposed distinction of perpetrating violent acts or killing, versus being the victim of violent acts or trauma not associated with an interpersonal component (Jensen, & Simpson, 2014; MacNair, 2001, 2002, 2015; Maguen et al., 2010, Maguen et al., 2011; Pitts et al., 2013; Pollock, 1999; Smith, Duax, & Rauch, 2013; Van Winkle, & Safer, 2011). There have been a number of recent studies that support killing in combat as a separate predictor of suicide ideation compared to other combat experiences (e.g., Bryan et al., 2015; Kline, Weiner, Interian, Shcherbakov, & St Hill, 2016; Maguen et al., 2011; Maguen et al., 2012; McLay et al., 2014; Tripp, McDevitt-Murphy, & Henschel 2016). Specific combat experiences may account for variation in how PTG is associated with different suicide outcomes. It is also possible that the presence of PTG may moderate the effects of combat exposure on suicide.

## **Purpose**

Further research is needed to identify specific protective factors for suicide in military populations (Nock et al., 2013). This study's purpose was to broaden the literature regarding protective factors by exploring the relationships between PTG and a range of self-harm behaviors (Bush, et al., 2011). This study also aimed to examine the conditional relationship between combat exposure and self-harm behaviors through PTG. The goal of this study is to advance the current literature by addressing the following questions: (a) does PTG in veterans act as a protective factor for different suicide outcomes?; (b) do distinct combat experiences relate to

separate outcomes of PTG and suicide outcomes; and (c) does PTG moderate the relationships between combat exposure and suicide outcomes.

### **Significance**

Clarifying the relationship between combat exposure, PTG, and self-harm behaviors may provide more evidence for PTG as a protective factor for suicide. If a clinically significant relationship is found, it may provide evidence for future pathways to reduce suicide in military service members and veterans through the facilitation of PTG techniques. Tedeschi and McNally (2011) have already conceptualized a pathway for PTG specifically in veterans and advocated for the testing of their model. The outcomes of this study may support testing of their model as well as the use and further development of strategies to promote PTG in this population.

Through separating combat experiences, the evidence may show more informative relationships between negative and positive outcomes based on specific trauma type. Distinctions in experience may provide further support for theories describing what makes some individuals report positive outcomes from trauma more than others. The evidence of this study may support or contradict the idea that separate trauma types produce different outcomes, both positive and negative. Specifically, the evidence may support the theory that perpetrating violent acts may be conceptually different from other forms of trauma, potentially explaining variation in different mental health outcomes. If significant, the data may support revisions to screening measures used by the military, VA, and other institutions or individuals serving this population in order to more accurately assess for risk and choose appropriate interventions.

### **Definition of Terms**

*Posttraumatic Growth.* Posttraumatic Growth (PTG) is the collective set of positive outcomes that occur as the result of a traumatic event or major life stressor (Tedeschi & Calhoun,

2004). PTG can be broken down into five categories, New Possibilities, Relating to Others, Personal Strength, Spiritual Change, and Appreciation of Life (Tedeschi & Calhoun, 1996). New Possibilities represents changes in interests, activities, priorities, and sometimes even life or career paths. Relating to Others represents changes in how one views others, potentially leading to increased closeness, compassion for others, and intimacy. Personal Strength represents changes in one's self-image regarding power or strength. Calhoun and Tedeschi (2006) describe a common idea that "one has been tested, weighed in the balance, and found to be a person who has survived the worst, suggesting that one is indeed quite strong" (pg. 5). Spiritual Change represents change in existential, religious, or spiritual matters, often involving an increase in sense of purpose and greater meaning. Appreciation of Life represents a greater appreciation for what one has and for life in general. Calhoun and Tedeschi (2006) describe people who grow in this area as commonly reporting joy found in everyday occurrences and having greater sense of meaning. In this study PTG served as the Moderating Variable and was measured by the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996).

*Combat Exposure.* Combat Exposure is a broad term that encompasses many experiences that can occur in a warzone. In this study, Combat Exposure is measured by Combat Exposure Scale (CES), and characterized by performing combat operations, receiving fire or firing at others, the perceived danger of being injured or killed, being surrounded by an enemy force, and witnessing someone hit by incoming or outgoing rounds (Keane, et al., 1989). In addition to the CES, a question was added to address the participant's perception of having personally killed someone in combat. Combat Exposure acted as a predictor variable in the present research.

*Self-Harm Behaviors.* Self-Harm (SH) is intentional behavior that is harmful to oneself. SH can vary from milder behaviors sometimes described as self-sabotaging, to more serious

behaviors sometimes described as self-destructive (Sansone, Wiederman, and Sansone 1998). These behaviors include driving recklessly on purpose, burning, cutting, or hitting oneself, overdosing, and attempting suicide. In this study SH was measured by the Self-Harm Inventory (SHI). In addition to the SHI, additional questions were asked in regard to suicide ideation. SH acted as the dependent variable within the current research.



## CHAPTER 2: LITERATURE REVIEW

### Trauma and Suicide Theory

Trauma has a well-established correlational relationship with suicide and the Interpersonal Theory of Suicide (IPT; Joiner, 2007; Van Orden, et al., 2010) provides important perspectives into this relationship. The IPT model conceptualizes suicide using three inter-related constructs: thwarted belongingness, perceived burdensomeness, and acquired capability for suicide. Thwarted belongingness and perceived burdensomeness are related to the desire to die by suicide, while acquired capability outlines psychophysiological components underlying the capability to kill oneself.

Thwarted belongingness is described as occurring when the need to belong goes unmet. This idea is well established within the literature, as social isolation is a consistent predictor of suicide ideation and suicidal behavior across the lifespan. In this theory, when one's desire to belong is not met, an individual may develop a desire for death often described as passive suicide ideation (Van Orden, Witte, Gordon, Bender, & Joiner, 2008).

Perceived burdensomeness is theorized to be the underlying factor for multiple risk factors such as family conflict, unemployment, and physical illness. A common example of this would be when an individual thinks his or her family would be better off if he or she was dead. This construct is made up of two aspects of interpersonal functioning, a belief that one is flawed and thus a burden to others and thoughts of self-hatred that produce intense emotions (Ma, Batterham, Calear, & Han, 2016). Van order et al. (2010) describe unemployment, incarceration, homelessness, serious physical illness, perceptions of being expendable, unwanted, or burdens on others, and affect-laden self-hate, as being risk factors involved in making lasting perceptions

of burdensomeness. Thwarted belongingness and perceived burdensomeness are thought to be related but separate constructs impacting a desire for death distinctly.

In the IPT model, a desire to die by suicide alone does not explain suicide behavior. Acquired capability is the capability to die by suicide and helps to explain who is at risk for a fatal attempt. The theory assumes that people generally have a fear of death and in order to die by suicide, an individual must overcome or reduce this fear of death. The authors suggested that based on various evolutionary models of fear, suicidal behavior requires the exposure to fear inducing stimuli. It is suggested that individuals are able to overcome these natural barriers through a lowered fear of death, elevated physical pain tolerance, habituation, and painful and provocative experiences (Van Order, et al., 2010). Habituation is a description of how individuals acquire capability through various mechanisms and is drawn from Opponent Process Theory (Solomon & Corbit, 1974). They suggest that individuals who are repeatedly exposed to events espousing fear can be habituated to feel positively toward those events. One example could be parachuting. Participation in this sport may produce fear initially, but through habituation the initial emotion of fear may be reduced and positive emotions such as exhilaration may be emphasized by the individual. The authors list several specific experiences as painful and frightening enough to "engage habituation and opponent processes with regards to the pain and fear involved in self-harm," (Van Order, et al., 2010, pg. 17) including childhood maltreatment, previous suicide attempts, and combat exposure.

Based on this theory, veterans may be distinctly at risk compared to the general population. Many experiences violent and fear-inducing experiences are required of military personnel including shooting a gun (most members of the military will fire a weapon during their career), physical fights (for training and sport), intentionally hurting animals (survival training),

jumping from high places (parachutists), and combat experiences (Van Order, et al., 2010). Since veterans are at an increased risk for suicide and have a higher likelihood of using a firearm (Kaplan, Huguet, McFarland, & Newsom, 2007), it is important to explore how habituation (i.e., using firearms) may explain elevations among this population.

### **Combat Experiences as Trauma**

Combat experiences can vary and are defined broadly by past research. Different combat experiences may have differing relationships with suicide, just as different trauma experiences can contribute to a variety of outcomes (e.g., Ehring and Quack 2010; Forbes et al., 2012). Combat experiences may be related to the acquired capability for suicide and thwarted belongingness (Bryan, Cukrowicz, West, & Morrow, 2010). No direct relationship between combat exposure and perceived burdensomeness exists, but it is possible that subsamples such as wounded veterans and amputees may be more likely to experience this. Van Order, et al. (2010, p. 18) say that “combat exposure, which involves exposure to the fear of one’s own possible death, as well as killing others, represents a relatively direct pathway,” to suicidal behavior. The authors are actually describing a specific combat experience that involves possible death and killing, where either of those two qualifiers can be experienced independently by a service member. For example, during the wars in Iraq and Afghanistan, any personnel could be exposed to an Improvised Explosive Device (IED) attack without ever having the opportunity to fight or kill enemy combatants. Conversely members of aircrews may be able to kill others with little to no fear of dying (this is exemplified in the case of drone pilots). Even so, the traditional definition of combat exposure, as defined by attempting to kill people while people are attempting to kill you, appears to present a reasonably direct pathway to suicidal thoughts and behaviors based on this theory.

There is some evidence that differing types of trauma may have different effects on individuals. For example, Ehring and Quack (2010) found higher PTSD symptomology in individuals who had chronic, interpersonal, early life trauma, when compared to individuals who report late life, single event, and non-interpersonal trauma. In one Australian national survey, Creamer, Burgess, and McFarlane (2001) found that rape and sexual molestation were more likely to be associated with PTSD compared to other trauma types. Breslau et al. (1998) found similar results, suggesting assaultive violence (military combat, rape, kidnapping, physical and sexual assaults) was a more predictive risk factor for PTSD compared to a sudden unexpected death of a loved one, non-interpersonal injury, and learning about traumas happening to others. Forbes et al. (2012) found that interpersonal trauma was associated with greater PTSD symptoms in the early aftermath of trauma. Finally, Forbes et al. (2014) found evidence suggesting that intimate interpersonal trauma was associated with a greater endorsement of PTSD symptoms when compared to non-intimate interpersonal traumas or non-interpersonal traumas. They also suggested non-intimate interpersonal traumas were associated with a greater endorsement of PTSD symptoms than non-interpersonal traumas. The data on the prevalence rates of Acute Stress Disorder based on the type of trauma results in the following: typhoon 7% (Stabb, Grieger, Fullerton, & Ursano, 1996), industrial accident 6% (Creamer & Manning, 1998), motor vehicle accident 13% (Harvey & Bryant, 1998a; Harvey & Bryant, 1998b), violent assault 19% (Brewin, Andrews, Rose, & Kirk, 1999), and mass shooting 33% (Classen, Koopman, Hales, & Spiegel, 1998). These data support the idea that interpersonal traumas tend to be more severe, as human-caused traumas are associated with the highest prevalence rates of ASD.

It has been theorized that participation in violent acts can be as traumatic, if not more traumatic, than being the victim of the same acts. MacNair (2001, 2015) has described such

instances as perpetration-induced traumatic stress (PITS) and considers it a form of PTSD. Maguen et al. (2009) found that in a sample of Iraq war veterans, even after controlling for guilt, the act of killing was related with PTSD symptoms. Maguen et al. (2011) found that killing in combat among Gulf War veterans predicted PTSD symptoms and frequency and quantity of alcohol use, even after controlling for perceived danger, exposure to death and dying, and witnessing the death of fellow soldiers. In a similar study for soldiers returning from Operation Iraqi Freedom, Maguen et al., 2010 found that killing was associated with greater PTSD symptoms, alcohol abuse, anger, and relationship problems, even after controlling for combat exposure. MacNair (2002) using the National Vietnam Veterans Readjustment Study, found that those who were involved in atrocities and reported they killed in combat had higher rates of PTSD. In another sample of Vietnam veterans, Van Winkle and Safer (2011) found that those who likely killed enemy combatants reported elevated levels of PTSD compared to those who did not kill in combat. Pitts et al. (2013) found similar results in combat medics, where those who had killed in combat had higher PTSD symptoms compared to those who had not killed. Looking at the evidence presented in these studies, it appears that killing in combat is a significant risk factor for PTSD across multiple wars and conflicts.

There is support for the hypothesis that killing is a uniquely traumatic experience and this experience may relate independently with suicide behaviors. Bryan and Cukrowicz (2011) compared types of combat experiences and found that the experiences involving violence and high levels of injury and death were associated with greater capability for suicide. This fits neatly into the IPT model (Van Order, et al., 2010). Maguen et al. (2012) conducted a study based on the National Vietnam Veterans Readjustment Study and grouped veterans into three groups, those who had higher killing experiences, low killing experiences, or none at all. The authors

found that those who were in the high killing experiences group had double the rates of suicide ideation when compared to the low or no killing groups. A meta-analysis conducted by Bryan et al. (2015) looking at suicide outcomes (ideation, attempts, and death) in veterans found strong relationships among deployment, deployment to a combat zone, combat experience, exposure to specific events, and a wide range of suicide outcomes. The strongest relationships to suicide outcomes were found in the exposure to specific events of killing and atrocities. Tripp, McDevitt-Murphy, and Henschel (2016) found that killing was related to suicidal ideation. These studies provide evidence that more severe and brutal combat experiences may relate uniquely with suicide outcomes.

## **PTG**

Growth from adversity, suffering, or stress has been written about for more than a millennium (Calhoun and Tedeschi, 2006; Frankl, 1963; Maslow, 1954). Even so, large scale studies were less prevalent before the creation of the Posttraumatic Growth Inventory (PTGI) by Tedeschi and Calhoun (1996). Since then, the study of growth after trauma has flourished and found a home in the field of positive psychology.

PTG has a defensible position within the literature. The PTGI was not created using preconceived ideas about PTG, but was developed from quotations by trauma survivors during clinical interviews (Calhoun & Tedeschi, 1989, 1990). The resulting domains were derived from factor analysis and have been supported by multiple studies (e.g., Taku, Cann, Calhoun, & Tedeschi, 2008; Lee, Luxton, Reger, & Gahm, 2010; Shakespeare-Finch, Martinek, Tedeschi, & Calhoun, 2013). Individuals report PTG without prompting, suggesting the impact of growth is substantial for some individuals (Duran, 2013). When individuals are prompted, they frequently underreport the growth that they have experienced (Smith & Cook, 2004). PTG appears to

remain stable after developing over a few months (Danhauer et al., 2013). The growth process appears complex with many variables potentially impacting the presence and level of growth. Despite the complexity, PTG occurs across a variety of experiences including, but limited to natural disasters (Cryder, Kilmer, Tedeschi, & Calhoun, 2006); accidents (Snape, 1997); HIV infection (Milam, 2006); myocardial infarction (Senol-Durak & Ayvasik, 2010); youth exposed to terror incidents (Laufer & Solomon, 2006); bereavement (Michael & Cooper, 2013); sexual assault (Ullman, 2014); and vicarious traumatic exposure (Manning-Jones, Terte, & Stephens, 2015).

*The PTG Process.* For PTG to occur, individuals must experience challenges to assumptions about their world, the future, or themselves as a result of a traumatic experience. These challenges may relate to core beliefs and often result in significant distress. It has been hypothesized that the severity of the trauma relates directly to the amount an individual's world view is challenged (Cann, et al., 2011). Although a greater challenge often relates to greater distress, it may also relate to greater opportunities for growth. PTG occurs as the individual processes these challenges both cognitively and affectively. Calhoun and Tedeschi (2004) describe this process as the rebuilding of one's worldview. They suggest that some assumptions will be strengthened by incorporating the traumatic experience into one's worldview, while other assumptions may be discarded altogether. This cognitive rebuilding process results in growth when the individual includes the changed assumptions of reality post-trauma. These changed assumptions result in schemas that include the trauma and possible adverse future events. Because these new schemas incorporate the traumatic event, they are more resistant to being challenged by future traumas or trials (Tedeschi & Calhoun, 2004).

Rumination has been suggested as a key to successful cognitive rebuilding. Tedeschi and Blevins (2015) separate ruminations into positive rumination (deliberate or reflective rumination) and negative rumination (intrusive rumination or brooding). Deliberate rumination about the trauma that is enacted by the individual in attempts to understand the trauma is believed to allow for the positive reframing of the trauma. Garland et al. (2015) support the emphasis on reflection as they found that deliberate rumination is integral to meaning making and well-being. This follows other studies that show deliberate rumination has an association with PTG and meaning making (e.g., Lindstrom, Cann, Calhoun, & Tedeschi, 2013; Triplett, Tedeschi, Cann, Calhoun, & Reeve, 2012). Intrusions are expected after a trauma and may represent the first attempts to engage with trauma. Although distressing, they often precede deliberate rumination and this transition appears vital to the facilitation of growth (Tedeschi & Blevins, 2015). Helping to facilitate the transition from intrusive to deliberate rumination may be an area of clinical importance for those who want to promote PTG.

*PTG in Veterans.* Six variables influence the presence and degree of PTG found among Veterans. These variables are: 1) the cognitive processing, often through rumination; 2) the disclosure of cognitions involving the trauma; 3) the reactions others have to this self-disclosure; 4) the socio-cultural context surrounding the trauma, cognitive processing, disclosures, and attempts to resolve the trauma; 5) the disposition and resiliency of the individual; and 6) the amount that these processes are restricted or facilitated (Tedeschi, & McNally, 2011).

Studies of combat veterans have found that veterans often report positive outcomes despite combat. Among male Vietnam veterans, 70.1% described their tour in Vietnam as mainly positive (Kulka et al., 1990; Dohrenwend et al., 2004). In addition to Vietnam, many veteran groups have found evidence of PTG in veterans of the Persian Gulf War (Maguen, Vogt, King,



King, & Litz 2006), Iraq, and Afghanistan (Pietrzak et al., 2010). One multi-war sample of veterans found that 69% of the sample reported a moderate or greater degree of PTG on one or more of the five dimensions of the PTGI (Hijazi, Keith, & O'Brien, 2015). When sampling veterans' specific military occupations and experiences, PTG has been found in samples of military medical personnel (McLean et al., 2013), POW's (Erbes et al., 2005), amputees (Stutts, & Stanaland 2016), Reservists and National Guardsmen (Pietrzak et al., 2010), and individuals with an acquired brain injury (Rogan, Forture, & Prentice, 2013).

**PTG as a Protective Factor for Suicide.** There is limited amount of mixed evidence for PTG as a protective factor to suicide. PTG has been found to be inversely related to suicide (Bush et al., 2011; Gallaway et al., 2011) with some evidence of temporal precedence (Yu, et al., 2010). However, research indicates PTG does not clearly moderate the effects of certain stressors on different suicide outcomes (Bush et al., 2011).

The first study published involving this relationship looked at PTG and suicidal ideation in 623 adolescents one month after the Sichuan Earthquake in China. The authors of this study found that of those who reported suicide ideation before the earthquake, 57.4% indicated suicide ideation was reduced one month after the earthquake. PTG was significantly related to the reduction in suicide ideation (Yu et al., 2010). When considering veterans, Gallaway et al. (2011) found that in a sample of 1,834 U.S. Army soldiers with previous combat deployment experience, those with the greatest number of combat experiences reported higher overall PTG. The authors also found a significant inverse relationship between PTG and recent suicide ideation. Interestingly, there was not a significant difference between PTG for those who had deployed multiple times and those who deployed once. Instead, variation in PTG was associated with combat-specific deployment. The authors hypothesize the relationship between suicide

ideation and PTG may be caused by differences in how soldiers ascribe meaningfulness or a lack of meaning toward their combat experiences. Finally, Bush et al. (2011) found a similar pattern of findings, where higher levels of PTG was related to less suicide ideation. In this sample, the authors did not find a significant relationship between the level of combat exposure and PTG. Although the literature on this relationship is limited to three studies, it is important that all reviewed studies suggest PTG and suicide are inversely related.

Using the IPT model, there are several ways that PTG may reduce suicide outcomes. Specifically, PTG may protect against perceptions of burdensomeness, a key component of the IPT. The PTG factors of Personal Strength, Relating to Others, and New Possibilities may be especially related to lower perceptions of burdensomeness. Personal Strength may involve increased feelings of self-reliance, confidence in one's ability to handle difficult things, and a belief that one is stronger than he or she previously thought. Any or all of these may reduce perceptions of burdensomeness. For example, if one increasingly feels self-reliant, he or she may be less likely to think that he or she is a burden on others. Relating to others may involve putting more effort into one's relationships, believing one can count on others in times of trouble, acceptance of needing others, and a greater sense of closeness with others. This factor may reduce perceptions of burdensomeness as one who has positive feelings associated with depending on others, has put effort into relationships, and experiences feelings of closeness in these relationships may perceive their relationships as appropriate and ascribe contributing value to their role in relationships. New Possibilities may involve believing one can do better things with one's life, believing one is more likely enact change, and developing new a life path or interest. If one believes he or she has the power to change and has started a new, meaningful life path, then he or she may be less likely to have perceptions of burdensomeness. In addition, PTG

is related to several constructs that could reduce the level of perceived burdensomeness including hope (Helgeson et al., 2006), wisdom and intrapersonal strength (Webster & Deng, 2015), better adjustment, and life satisfaction (Triplett et al., 2012).

PTG may also protect against thwarted belongingness, especially through the factors of Relating to Others and Spiritual Change. PTG often involves positive changes in how one views their relationships, changes in time spent on relationships, and a greater sense of closeness with others. These changes may reduce thoughts and feelings of thwarted belongingness. Religious affiliation can also be related to a greater sense of belonging (Lim, & Putnam, 2010). In this way, the factor of Spiritual Change may protect against thwarted belongingness. The growth process often involves disclosing thoughts and emotions related to traumatic event to others (Tedeschi & McNally, 2011). Prior to disclosure, an individual may feel no one can understand their traumatic experience, and negative reactions to disclosures can further this sentiment. If disclosures are well received, which is suggested to be a contributing factor to PTG (Lindstrom, et al., 2013), an individual could experience growth and reduce thoughts and feelings of thwarted belongingness. In addition, PTG has been associated with several constructs that could reduce the presence of thwarted belongingness, including optimism, social support, and coping (Prati & Pietrantonio, 2009), sense of belonging (Dekel, & Nuttman-Shwartz, 2009), and religious coping (Chan, Young, & Sharif, 2016).

Based on the IPT model, it does not appear that PTG could protect against the acquired capability for suicide. The level of habituation, reductions in fear of death, or change in pain tolerance that may influence the capability for suicide are unlikely to change as a result of growth of trauma. Also, while not directly related to perceived burdensomeness, thwarted belongingness, or acquired capability for suicide, growth in the factor Appreciation of Life may

also protect against suicidal ideation and behaviors. One who has better appreciation of each day and ascribes greater value and appreciation to his or her life may experience lower levels of suicidality.

### **Current Study and Hypotheses**

The current study examines if the inter-relationship among combat exposure, type of combat exposure, PTG, and different suicide outcomes. As exploratory feature, this study examines whether reports of PTG and suicide outcomes vary by combat exposure type. Finally, this study aims to determine if PTG moderates the associated effects of combat exposure on different suicide outcomes.

The study's hypotheses are as follows: Hypothesis #1: It is expected that combat exposure will have a positive relationship with suicide ideation. Hypothesis #2: It is expected that PTG will have a positive relationship with combat exposure. Hypothesis #3: It is expected that PTG will have inverse relationship with suicide ideation. Hypothesis #4: It is expected that combat exposure type will explain variation in PTG and suicide ideation scores. Hypothesis #5: It is expected that PTG will moderate the relationship between combat exposure and suicidal ideation; greater levels of PTG will decrease the strength of the relationship between combat exposure and suicide ideation.

## CHAPTER 3: METHODOLOGY

### Participants

Participants for this study were recruited online using MTurk. This data set was pulled from a larger scale study examining the health and wellbeing of veterans. A total of 423 participants completed the larger study with an age range of 19 to 75 years ( $M=37$ ,  $SD=11.78$ ). 124 participants identified as women (29.3%) and 298 as men (70.4%). 319 participants reported identifying as White (79%), 48 as Black/African American (11.9%), and 37 as Hispanic/Latino (9.2%). 91 participants identified as lower class (21.8%), 316 participants identified as middle class (75.6%), and 11 participants identified as upper class (2.6%).

Within the sample, 235 individuals reported serving in active duty with the Army, 53 with the Navy, 74 with the Air Force, 31 with the Marine Corps, 9 with the Coast Guard. 67 reported serving in a reserve status with the Army Reserve, 12 Navy Reserve, 18 Air Force Reserve, 3 Marine Corps Reserve, 2 Coast Guard Reserve, 30 Army National Guard, and 6 with the Air National Guard. 4 reported serving in the Korean War, 19 in the Vietnam War, 4 in Grenada, 6 in Panama, 45 in the Gulf War, 12 in Bosnia, 14 in Kosovo, 118 in Afghanistan, 144 in Iraq. Within this sample, 125 participants (29.6%) reported combat exposure.

### Procedure

Participants were notified of the ability to participate in the study via MTurk. The MTurk system displayed a brief statement regarding the study and interested participants clicked on the study to learn more. When participants expressed interest in participating in the study, they were directed to an informed consent page detailing the purpose and procedures of the study, the right of the participant to withdraw from the study at any time, risks, potential discomfort/adverse effects, possible benefits of research, limitations of confidentiality, incentives for participation,

administrators' contact information, and ethical constraints of partaking in the study. Because the study was completed through the internet, obtaining a signature for informed consent was not possible. Instead of a signature, participants responded to a yes or no question indicating their agreement to participate in the study. After completing this consent process, participants were sent to the survey. Only a subset of the complete survey was used for this study. Participants taking the parent survey completed a series of demographic questions and questionnaires related to health, wellbeing, and experience within the military. These questionnaires were designed to assess a variety of outcomes in veterans. After completing the survey, participants were sent to a debriefing page. Participants who complete the survey were compensated \$0.50 via their MTurk account.

## **Measures**

The data collected for this study used demographic questions and three questionnaires: (a) The Post Traumatic Growth Inventory (PTGI); (b) The Self-Harm Inventory (SHI); and (c) The Combat Exposure Scale (CES). Participants provided demographic data to include: age, gender, sexual orientation, Enlisted/Officer, conflicts served in, race/ethnicity, years of service, and number of deployments, marital status, whether they were active duty, reservists, or national guardsmen, and whether they lived in a rural or urban area.

*The Post Traumatic Growth Inventory (PTGI).* We used the Post Traumatic Growth Inventory (PTGI) as the tool to determine the PTG levels of the participants (Tedeschi & Calhoun 1996). The PTGI is a 21-item questionnaire that results in a total score (Cronbach  $\alpha = .90$ ) and includes 5 factors, those being: New Possibilities (5 questions,  $\alpha = .84$ ), Relating to Others (7 questions,  $\alpha = .85$ ), Personal Strength (4 questions,  $\alpha = .72$ ), Spiritual Change (2 questions,  $\alpha = .85$ ), and Appreciation of Life (3 questions,  $\alpha = .67$ ). The PTGI has modest

relations to both extraversion and optimism. Possible response scores range from 0 to 105 with higher scores indicating greater posttraumatic growth. Response options range from 0 to 5 for each item (0 = I did not experience this change as a result of my crisis, 5 = I experienced this change to a very great degree as a result of my crisis). Sample items include, “I changed my priorities about what is important in life” and “I have a greater feeling of self-reliance” (Tedeschi & Calhoun 1996). In the current study, the PTGI demonstrated good internal consistency ( $\alpha = .95$ ).

*The Self-Harm Inventory (SHI)*. To measure suicidality and self-harm we used the Self-Harm Inventory (SHI; Sansone, Wiederman, and Sansone 1998). The SHI is a 22 item, yes or no, self-report measure. This questionnaire begins each item with the phrase “Have you ever intentionally, or on purpose...” Examples of the second portion of questions include, “cut yourself,” “burned yourself,” “hit yourself,” and “scratched yourself.” The questionnaire contains three questions to assess eating disorders (i.e., “exercised an injury on purpose, starved yourself to hurt yourself, abused laxatives to hurt yourself”), and two questions involving lethality (i.e., “overdosed, attempted suicide”). Three questions assess medical related self-harm (i.e., “prevented wounds from healing, made medical situations worse, abused prescription medication”). The sum of “yes” responses is the total score for the SHI. Scores range from 0-22, with any score over 5 being significant (Sansone and Sansone, 2010). In addition to the SHI, suicidal ideation was assessed by adding “seriously thought about committing suicide” as an additional assessed behavior

*The Combat Exposure Scale (CES)*. We used the Combat Exposure Scale (CES) as the measure of combat exposure in participants (Keane, et al., 1989). The CES is a 7-item self-report measure that assesses wartime stressors experienced by combatants. Response options range

from 0 to 5. Response items are rated on frequency (with 1 being no/never, to 5 being more than 50 times) and duration (with 1 being never, to 5 being more than 6 months, or degree of loss with 1 being no one to 5 being 76% or more). The sum of the response scores is adjusted to achieve the total CES score, which ranges from 0 to 41. Participants rate their combat exposure and experiences. Examples of this would include, “were you ever under enemy fire,” and “how often did you see someone hit by incoming or outgoing rounds.” The total CES score is broken down into five categories, including light (score of 0-8), light-moderate (score of 9-16), moderate (score of 17-24), moderate-heavy (score of 25-32), and heavy (score of 33-41). The CES has been found to have high internal consistency (Cronbach  $\alpha = .85$ ; Keane, et al., 1989). In addition to the CES, an additional question was added to assess for the specific experience of having killed in combat. In the current study, the CES demonstrated good internal consistency ( $\alpha = .86$ ).

### **Analytical Plan**

Throughout the proposed analyses, demographic variables with univariate relationships of interest were included as control variables, as appropriate. Hypothesis #1: It was expected that combat exposure would have a positive relationship with suicide ideation. A logistic regression was used to determine if there was an association between combat exposure and suicidal ideation, either reported or denied. Hypothesis #2: It was expected that PTG would have a positive relationship with combat exposure. A bivariate correlation was used to determine if there is a correlation between PTG, as measured by the PTGI, and combat exposure, as measured by the CES. Because controlled analyses were indicated, multivariate linear regression was utilized. Hypothesis #3: It was expected that PTG will have significant inverse relationship with suicidal ideation. A logistic regression was used to determine if there is a correlation between PTG, as measured by the PTGI, and reported suicidal ideation. Hypothesis #4: It was expected



that PTG, as measured by the PTGI, moderated the relationship between combat exposure and suicidal ideation. A logistic regression was used to determine if there is a correlation between combat exposure, as measured by the (CES), and reported suicidal ideation, including an interaction term of PTGI by CES. A series of logistic regressions was used to determine if there is a weaker correlation between reported killing and PTGI compared to other specific combat experiences, as measured by individual items on the CES.

## CHAPTER 4: RESULTS

### Hypothesis 1

I used a logistic regression to determine whether combat exposure was positively related to suicide ideation. In the logistic regression, suicide ideation was regressed onto combat exposure, age, RACE(1), and RACE(2). Overall, the model accounted for a non-significant amount of variance in suicide ideation scores, Nagelkerke's  $R^2_N = .01$ . When analyzing the main effects, none of the predictors accounted for significance variance in suicide ideation scores. Importantly, the relationship between combat exposure and suicide ideation was non-significant,  $B = .02$ ,  $Wald(1) = 1.193$ ,  $Exp(B) = 1.021$ ,  $p > .05$ . This finding does not support the proposed hypothesis of a positive relationship between combat exposure and suicide ideation.

### Hypothesis 2

I used a multiple regression to determine whether posttraumatic growth had a positive relationship with combat exposure. In the multiple regression analysis, posttraumatic growth was regressed onto combat exposure, age, White identity status, Black identity status, and Hispanic identity status. Overall, the model accounted for a significant amount of variance in posttraumatic growth,  $R^2 = .04$ ,  $F(5, 379) = 3.06$ ,  $p < .01$ . At a main effects level, both combat exposure ( $B = .05$ ,  $t = 2.44$ ,  $p < .05$ ) and age ( $B = -.27$ ,  $t = -2.51$ ,  $p < .05$ ) accounted for unique variance in posttraumatic growth scores. This indicates that elevated levels of combat exposure are related to greater levels of posttraumatic growth. This finding is consistent with my hypothesis. In addition, age was negatively associated with posttraumatic growth. This indicates that individuals who are younger are less likely to exhibit higher levels of posttraumatic growth.

### Hypothesis 3

I used a logistic regression to determine whether posttraumatic growth was inversely related to suicide ideation. In the logistic regression suicide ideation was regressed onto posttraumatic growth, age, RACE(1), and RACE(2). Overall, the model accounted for a significant amount of variance in suicide ideation scores, Nagelkerke's  $R^2_N = .05$ . When analyzing the main effects, only posttraumatic growth accounted for variance in suicide ideation scores. Importantly, the relationship between posttraumatic growth and suicide ideation was significant,  $B = -.02$ ,  $Wald(1) = 8.99$ ,  $Exp(B) = .98$ ,  $p < .01$ . For every one unit of change in posttraumatic growth, there is a slight reduction in suicide ideation scores. This finding does support the proposed hypothesis of an inverse relationship between posttraumatic growth and suicide ideation.

#### **Hypothesis 4**

I used a logistic regression to determine whether the relationship between combat exposure and suicide ideation was moderated by posttraumatic growth. In this logistic regression suicide ideation was regressed onto posttraumatic growth, combat exposure, age, RACE(1), RACE(2), and the interaction between combat exposure and posttraumatic growth. Overall, the model accounted for a significant amount of variance in suicide ideation scores, Nagelkerke's  $R^2_N = .05$ . When analyzing the main effects, only posttraumatic growth accounted for variance in suicide ideation scores. Importantly, the relationship between posttraumatic growth and suicide ideation was significant,  $B = -.02$ ,  $Wald(1) = 6.65$ ,  $Exp(B) = .98$ ,  $p < .01$ . For every one unit of change in posttraumatic growth, there is a slight reduction in suicide ideation scores. At an interactive level, the interaction between posttraumatic growth and combat exposure did not account for any unique variance over and above the identified main effects in the model in suicide ideation scores,  $B = .00$ ,  $Wald(1) = 0.09$ ,  $Exp(B) = 1.00$ ,  $p > .05$ . Because the interaction

effect did not account for unique variance in the model, it appears that posttraumatic growth does not moderate the relationship between the two variables.

## CHAPTER 5: DISCUSSION

### Review of Purpose

The main purpose of the current study was to obtain a better understanding of protective factors (i.e., posttraumatic growth) for suicide in military populations by examining the conditional relationship between combat exposure and suicide ideation through posttraumatic growth. Given the goal of this study, the following inquiries were examined: (a) does posttraumatic growth in veterans act as a protective factor for different suicide outcomes; (b) do distinct combat experiences relate to separate outcomes of posttraumatic growth and suicide outcomes; and (c) does posttraumatic growth moderate the relationships between combat exposure and suicide outcomes?

### Combat Exposure and Suicide Ideation

I analyzed a logistic regression to determine if combat exposure was related to suicide ideation. Results did not reveal a significant relationship. This finding is a little surprising as it conflicts with a large compendium of studies which confirm a significant relationship between these two variables (Bryan et al., 2015). There may be two specific reasons why my findings are discordant from previous work. First, the range of combat exposure was somewhat limited in the current sample. Specifically, few participants endorsed combat exposure associated with killing another person or witnessing death of another during combat. These types of combat experiences appear particularly important in terms of suicide outcomes. For instance, individuals with killing experiences in combat appear considerably more vulnerable to suicide compared to individual with no or non-killing experience in combat (Maguen et al., 2012). As a result, it may be important to re-analyze my findings using a sample of veterans with a diverse range of combat experiences.

In addition, the relationship between combat exposure and suicide ideation may be more complex than originally stated. For instance, there may be significant conditions by which combat exposure may effect suicide outcomes, like ideation. Institutional support, resilience, personal relationship functioning, and psychophysiological vulnerability to anxiety are factors that may clarify the associated effect of combat exposure on suicide ideation. It is important for future research to consider these variables in outlining the relational effects of combat exposure on suicide ideation.

### **Combat Exposure and Posttraumatic Growth**

I analyzed a multiple regression to determine if combat exposure was related to posttraumatic growth. Results revealed a significant relationship, where combat exposure positively accounted for elevated rates in posttraumatic growth. This finding is consistent with previous studies highlighting a significant relationship between these two variables (Gallaway et al., 2011). Given these findings, it is important to develop a more deconstructed look at this relationship. Posttraumatic growth is a complex variable with multiple dimensions (i.e., New Possibilities, Personal Strength, Appreciation of Life). Currently, few studies examine the possibility that combat exposure can differentially affect growth in the posttraumatic growth dimensions. For instance, surviving combat exposure might highlight new forms of personal strength, yet may do little in the way of extending one's new possibilities. It is important to obtain a more deconstructed look at the relationships between combat exposure and different posttraumatic growth dimensions. To this end, researchers may use this information to develop better causal models by which combat exposure increases dimensions to posttraumatic growth.

### **Age and Posttraumatic Growth**

Also, within the multiple regression analysis, age significantly accounted for variation in posttraumatic growth. Specifically, results revealed a significant relationship, where a greater age related to a lower level of posttraumatic growth. Previous studies highlight mixed findings when deconstructing the relationships between posttraumatic growth and age. In many studies there are no reported effects of age on posttraumatic growth (Maercker, Herrle, & Grimm, 1999; Tedeschi & Calhoun, 1996). However, one study shows older participants reporting lower levels of growth (Powell, Rosner, Butollo, Tedeschi, & Calhoun, 2003). My study seems to be consistent with this study. In conjunction with Powell and colleagues (2003) findings, age may possess a small to moderate effect on the ability to elevate posttraumatic growth. There may be cohort effects within veteran samples that impact the growth of older veterans. Cohorts of veterans may be structured around the conflicts in which they were involved with many distinctions between conflicts including drafting versus the all-volunteer force, public perception of the conflict, availability and perception of mental health services, etc. For example, younger veterans may have perceived and taken advantage of programs designed to increase posttraumatic growth in their branch of the military. Given these possibilities, it is not surprising that posttraumatic growth may relate to age. If these findings hold up to replication, it is important to identify unique pathways to posttraumatic growth for older veterans. These pathways may help distinguish effective clinical treatment for older veterans.

### **Posttraumatic Growth and Suicide Ideation**

I analyzed a logistic regression to determine if posttraumatic growth was related to suicide ideation. Results revealed a significant relationship, where an increase in posttraumatic growth related to a significant decrease in suicide ideation scores. This finding is consistent with previous studies (Gallaway et al., 2011). However, the relationship found in the current study is

only correlational, it cannot be said that increasing posttraumatic growth causes a reduction in suicide ideation. Therefore, it is important for researchers to determine if posttraumatic growth contributes to reductions in suicidal ideation among sample of veterans. Specifically, a randomized controlled trial investigating the clinical effects of different posttraumatic growth interventions on suicidal ideation is an important next step. If posttraumatic growth interventions are found to reduce suicidal ideation, then researchers need to compare these effects against other established interventions to determine if posttraumatic growth is an avenue worth pursuing in larger prevention programs.

### **Moderated Effects on Suicide Ideation**

I analyzed a logistic regression to determine whether the interaction effect between combat exposure and suicide ideation was moderated by posttraumatic growth. Results revealed a nonsignificant interaction effect between combat exposure and posttraumatic growth on suicide ideation. This lack of a significant effect does not confirm posttraumatic growth as a protective factor to suicide ideation. This finding is inconsistent with the prevailing literature on posttraumatic growth, which emphasizes the protective qualities of this construct (Gallaway et al., 2011). However, it is consistent with the findings offered by Bush and colleagues (2011). As previously noted, this finding limits the claim that posttraumatic growth is a protective factors for suicide. However, further research needs to be investigated to clarify the role of posttraumatic growth on suicide ideation among samples of veterans. Importantly, research can support the position of posttraumatic growth as a protective factor by providing evidence for temporal precedence. This may be established using longitudinal studies to examine the effects posttraumatic growth in predicting suicide ideation over the course of 6-12 months. In addition, the relationship between posttraumatic growth and suicide ideation should be evaluated through



experimental designs by manipulating a posttraumatic growth intervention to determine whether it leads to reductions in suicide behavior/ideation scores. Overall, it is important for research to determine if posttraumatic growth, and specifically interventions producing growth after trauma, can protect against the development of different suicide outcomes (e.g., ideation).

### **Clinical Implications**

Clinically, this study suggests age is an important factor to consider when working with veterans who experienced trauma. Specifically, when working with individuals after a traumatic experience, the individual's age may determine the degree of opportunity by which an individual likely developed a foundation for posttraumatic growth. Younger individuals may need less support in facilitating growth, while older adults may need more support or require a longer period of time to achieve similar levels of growth. This is likely a result of cohort differences in available mental health resources within different branches of the military. It is also possible that the facilitation of growth will look different depending upon the age of the individual, both when the trauma occurred and when the individual seeks treatment. Clinicians are encouraged to consider age and cohort effects in determining how much posttraumatic growth emphasis should be included in treatment.

This study offers a potential target (i.e., posttraumatic growth) to build upon in attempts to reduce suicide ideation. Specifically, the facilitation of posttraumatic growth may be a pathway to reduce suicide ideation. My findings indicate that higher levels of posttraumatic growth are associated with lower levels of suicide ideations among veterans. Although the literature is limited on the subject, both broad parameters for facilitating growth (Tedeschi & McNally, 2011), and explicit interventions (Borowa, Robitschek, Harmon, & Shigemoto, 2016), have been studied specifically for veterans and service members who have experienced trauma.

By facilitating posttraumatic growth, one or all of the factors involved (i.e., new possibilities, relating to others, personal strength, spiritual change, and appreciation of life) may reduce suicide ideation. When using the interpersonal theory of suicide as a model of comparison, one may see a relationship between the increase of the five factors of posttraumatic growth and a reduction of a desire to die, perceived burdensomeness, and thwarted belongingness. Further research may look at specific interventions used to promote growth as a means to reduce suicide ideation.

### **Limitations**

The current study had several limitations. First the generalizability of the present findings is limited because of the sample involved. All participants in this study identified as veterans so the findings may not be generalizable to other populations. In addition, the majority of individuals identified as white, male, and heterosexual, which may limit the generalizability of the results to those with differing cultural backgrounds and identities. Future studies should evaluate the legitimacy of these findings across different samples of culturally diverse subpopulations, noncombatant populations exposed to combat (i.e., journalists, aid workers, local populations) and veterans seeking outpatient or inpatient services. Another limitation of the current study was the research design. The measures of the current study were self-report, which suggests that the participants may have been influenced by social desirability concerns (i.e., a desire to appear in a positive light). This may have affected the direction and strength of the examined relationships. It is important that future studies to include behavioral or observational measures, such as clinical interviews, to examine the inter-relationships among combat exposure, posttraumatic growth, and suicide ideation. A final limitation is the use of one-item suicide ideation measure, where suicide ideation is either present or not. This single item does not fully capture the variance associated with the construct of suicide ideation. A more complete measure of suicide ideation should be included in further studies to better examine the effects of combat exposure and posttraumatic growth. In addition, other suicide-related

outcomes (e.g., self-harm behaviors) may need to be examined to determine if combat exposure and posttraumatic growth have differential effects on different suicide outcomes.

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**TABLE 1**

*Table 1. Logistic Regression Statistics: Combat Exposure, Age, and Ethnicity Account for Variation in Suicide Ideation Status*

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>	95% <i>C.I.</i> <i>Lower</i>	95% <i>C.I.</i> <i>Upper</i>
CES	.021	.019	1.193	1	.275	1.021	.983	1.061
Age	.004	.010	.190	1	.663	1.004	.985	1.024
Caucasian/White			.365	2	.833			
African American/Black	-.225	.396	.321	1	.571	.799	.367	1.737
MexicanAmerican/Hispanic	.059	.408	.021	1	.884	1.061	.477	2.363

**TABLE 2**

Table 2. Multiple Regression Statistics: *Combat Exposure, Age, and Ethnicity Account for Variation in Posttraumatic Growth*

	<i>B</i>	<i>S.E.</i>	<i>Beta</i>	<i>t</i>	<i>Sig.</i>	<i>95% C.I.</i> <i>Lower</i>	<i>95% C.I.</i> <i>Upper</i>
Combat Exposure	.504	.206	.123	2.441	.015	.098	.910
Age	-.268	.107	-.128	-2.511	.012	-.478	-.058
Caucasian/White	-2.605	5.894	-.045	-.442	.659	-14.193	8.984
African American/Black	2.270	6.891	.028	.329	.742	-11.281	15.820
MexicanAmerican/Hispanic	-.514	7.079	-.006	-.073	.942	-14.433	13.406

**TABLE 3**

*Table 3. Logistic Regression Statistics: Posttraumatic Growth, Age, and Ethnicity Account for Variation in Suicide Ideation Status*

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>	95% <i>C.I.</i> <i>Lower</i>	95% <i>C.I.</i> <i>Upper</i>
PTG	-.016	.005	8.985	1	.003	.985	.975	.955
Age	.001	.011	.006	1	.940	1.001	.980	1.022
Caucasian/White			1.239	2	.538			
African American/Black	-.517	.470	1.210	1	.271	.597	.238	1.498
MexicanAmerican/Hispanic	.029	.435	.004	1	.947	1.029	.439	2.415

**TABLE 4**

*Table 4. Logistic Regression Statistics: Posttraumatic Growth, Combat Exposure, an Interaction Effect, Age, and Ethnicity Account for Variation in Suicide Ideation Status*

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>	95% <i>C.I.</i> <i>Lower</i>	95% <i>C.I.</i> <i>Upper</i>
PTG	-.015	.006	6.653	1	.010	.985	.973	.996
CES	.053	.064	.064	1	.404	1.054	.931	1.194
PTG by CES	.000	.001	.001	1	.755	1.000	.998	1.001
Age	.002	.011	.011	1	.847	1.002	.981	1.023
Caucasian/White				2	.587			
African American/Black	-.483	.471	.471	1	.306	.617	.245	1.554
MexicanAmerican/Hispanic	.012	.437	.437	1	.979	1.012	.430	2.382