

**Social Problem-Solving and Posttraumatic Growth among United States Military
Veterans**

A Thesis

Submitted to the Faculty

Of

Drexel University

By

Derek Anthony Giannone

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requirements for the degree

of

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Dedications

I dedicate this thesis first and foremost to all members of the United States Armed Forces, past and present, who have made sacrifices for the welfare of our nation. I also wish to dedicate this thesis to my parents, Mary Ann Giannone and Paul J. Giannone, for their eternal support and love, and to my brother, Captain Michael J. Giannone, for his service to our country in the United States Air Force.

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Table of Contents

List of Tables	v
Abstract.....	vi
CHAPTER 1. Introduction.....	1
Posttraumatic Growth	2
Social Problem-Solving	9
Social Problem-Solving and Posttraumatic Growth	12
Present Study	14
CHAPTER 2. Methods	17
Participants.....	17
Measures	18
Procedures.....	20
Ethical Considerations	23
Plans for Statistical Analysis	23
CHAPTER 3. Results.....	25
Preliminary Analysis.....	25
Descriptive Statistics for Study Variables	26
Relationships Among Sample Characteristics and Outcome Variables	27
Assumptions of Hierarchical Linear Regression	28
Hierarchical Linear Regression Models.....	30
CHAPTER 4. Discussion.....	33

Main Findings and Implications	33
Secondary Findings and Implications	37
Limitations	39
List of References	43
APPENDIX A. Tables	52
APPENDIX B. Measures.....	66
B1. Demographic Information	66
B2. Social Problem-Solving Inventory – Revised: Short Form (SPSI-R:S).....	73
B3. Posttraumatic Stress Disorder Checklist (PCL-5).....	76
B4. Posttraumatic Growth Inventory (PTGI).....	80

List of Tables

Table 1. Demographic Characteristics of Study Participants	52
Table 2. Military-Related Characteristics of Study Participants	56
Table 3. Descriptive Statistics for Study Variables	58
Table 4. Descriptive Statistics of Study Variables Among Recruitment Types and Analysis of Variance Results Testing for Group Differences	59
Table 5. Bivariate Relationships Among Study Variables	60
Table 6. Bivariate Relationships Among Demographic and Military-Related Variables, Posttraumatic Growth, and Posttraumatic Stress Symptomatology	61
Table 7. Summary of Hierarchical Regression Analysis for Predicting Posttraumatic Growth from Positive Social Problem-Solving Factors.....	62
Table 8. Summary of Hierarchical Regression Analysis for Predicting Posttraumatic Growth from Negative Social Problem-Solving Factors	63
Table 9. Summary of Hierarchical Regression Analysis for Predicting Posttraumatic Stress Symptomatology from Positive Social Problem-Solving Factors.....	64
Table 10. Summary of Hierarchical Regression Analysis for Predicting Posttraumatic Stress Symptomatology from Negative Social Problem-Solving Factors	65

Abstract

Social Problem-Solving and Posttraumatic Growth Among United States Military Veterans

Derek Anthony Giannone

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The present study hypothesized that social problem-solving (SPS), or the process by which a person understands, devises, and implements strategies to resolve problems they encounter in life, is a factor that contributes to the experience of PTG in United States Military Veterans. This research study was developed to examine the relative contributions of components in the SPS model to levels of PTG in Veterans, and explore additional relationships that may provide insight to the nature of SPS and PTG in relation to stressful or traumatic events.

Participants were 154 individuals who indicated that they were Veterans of the United States Military and completed a demographics questionnaire and three standardized self-report instruments. Recruitment was conducted through a mixed-methods approach, consisting of individuals recruited in-person through a local Veterans organization in Philadelphia, PA, and online through the use of snowball sampling and Amazon's Mechanical Turk. The three study instruments completed by participants were the Social Problem-Solving Inventory – Revised: Short Form (SPSI-R:SF) to measure social problem-solving orientations and styles, the Posttraumatic Checklist for the DSM-V (PCL-5) to measure posttraumatic stress symptoms, and the Posttraumatic Growth Inventory – Revised (PTGI) to measure perceived growth after a stressful or traumatic event.

The main research questions of this study consisted of hierarchical multiple linear regression models that investigated the relative contributions of SPS model components to PTG and symptoms of PTSD. Reported tobacco use was found to be a significant predictor of PTG in the sample, while combat experience, deployment experience, and alcohol use were significant predictors. These variables were included as covariates in the main regression analyses to control for their impact on the outcomes of interest. The effective SPS factors of positive problem orientation (PPO) and rational/planful problem-solving style (RPS) were significant predictors of PTG, while the ineffective SPS factor of negative problem orientation (NPO) was a significant predictor of PTSD symptoms. The secondary aim of this study was to explore the form of the relationship between PTG and PTSD, and explore the contributions of trauma-related characteristics to variability in PTG. PTG was found to have a curvilinear association with PTSD symptoms, and was unrelated to both the perceived stressfulness and perceived impact of the event at the time it occurred.

The findings of this study establish an important association between SPS and PTG, which reveals that increases in effective SPS factors corresponds to increases in PTG. Further, this study replicates previous research findings that NPO to be an important predictor of PTSD symptoms, and PTG to be highest in individuals with moderate levels of PTSD symptoms. Our results suggest that SPS plays a role in both symptoms of PTSD and levels of PTG, indicating that Problem-Solving Therapy (PST), an evidence-based psychosocial intervention that aims to facilitate adaptive problem-solving attitudes and strategies to reduce the negative impact of stressors, can be effective in reducing symptoms of PTSD and facilitating PTG in the wake of trauma. Future

studies should replicate these initial findings and explore factors underlying the connection between SPS and PTG. Future PST interventions and programs aimed toward those who have experienced psychological trauma should include measures of perceived growth, and examine the longitudinal associations between SPS and PTG.

CHAPTER 1. Introduction

In the wake of recent military operations in the Middle East – Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), and Operation New Dawn (OND) – an estimated 2.7 million Veterans have returned home from deployment overseas (Department of Veterans Affairs, 2016). Partly due to the increased probability of experiencing intense life threatening events and military-related stressors, Veterans are at an increased risk for experiencing behavioral health issues such as depression, anxiety, substance abuse, and posttraumatic stress disorder (PTSD; Shen, Arkes, & Williams, 2012). The Department of Veterans Affairs (2015) reports that among the 1,189,709 OEF/OIF Veterans utilizing VA healthcare, roughly 60% exhibited signs and symptoms of a behavioral health disorder. While much psychological research on the Veteran population has focused on these behavioral health outcomes, a growing base of research has explored the possibility of positive changes, or posttraumatic growth (PTG), following experiences of psychological trauma. (Tsai, El-Gabalawy, Sledge, Southwick, & Pietrzak, 2015). While studies have revealed that about 70% of Veterans exposed to trauma experience a significant level of PTG (Tsai et al., 2015), the extant literature on PTG is characterized by disagreements and ongoing uncertainties about the nature of this construct. The present study aims to investigate how social problem-solving (SPS), or how people come to understand, devise, and implement solutions to real-life problematic situations, relates to PTG in Veterans of the United States Armed Forces (hereafter Veterans). In light of the wealth of research on SPS and an SPS-based psychosocial intervention (i.e. Problem-Solving Therapy; PST) as well as the need to further identify factors that contribute PTG after stressful or traumatic events, this investigation can make

important contributions to our understanding of the etiology, development, and facilitation of PTG.

Posttraumatic Growth

Despite the hypothesis of growth through suffering having a rich history in philosophy, religion, and psychology, empirical research on this phenomenon has only proliferated place in the past two decades (Calhoun & Tedeschi, 2014). A review of the critical literature shows that the foundational research studies and articles on event-related perceived growth emerged around the turn of the Millennium; while Park and colleagues (1996) introduced the concept of *stress-related growth* and Tomich and Helgeson (2004) explored the idea of *benefit finding* in cancer patients, Tedeschi and Calhoun (1995) coined the term *posttraumatic growth* in their seminal work, *Trauma and Transformation*. Attempting to further clarify this construct, Tedeschi and Calhoun (1995) employed a qualitative analysis of trauma narratives to isolate the different categories in which individuals perceive growth after trauma. Through this analysis, it was revealed that people typically experience these positive changes in their self-concept, views of the world, and their experiences of relationships (i.e., perceptions of self, philosophy of life, relationships with others). Providing a means by which they could quantitatively measure PTG, Tedeschi and Calhoun (1996) developed the Posttraumatic Growth Inventory (PTGI), measuring the five specific domains of ‘personal strength’, ‘new possibilities’, ‘relating to others’, ‘appreciation of life’, and ‘spiritual change’ were revealed.

The five domains of PTG correspond to unique areas in which those who have experienced extremely stressful or traumatic events often perceive positive changes

(Calhoun & Tedeschi, 2014). Traumatic events are noted for their potential to disrupt and challenge basic assumptions about the beneficence, quality, or possibilities of the self and the world (Janoff-Bulman, 1993), and commonly produce acute or prolonged stress reactions that leave a lasting negative impact. In this process, however, individuals may come to perceive themselves as having new strengths or abilities (i.e., personal strength), develop a renewed sense of what is most important in life and increasingly value their experiences (i.e., appreciation of life), or experience a change of a career and newfound, or renewed, interest in activities and hobbies (i.e., new possibilities). Additionally, those who have suffered from trauma can report greater compassion and experience a new level of intimacy through disclosure (i.e., relating to others), or can find a renewed sense of spirituality (i.e., spiritual change).

Providing support for the concept of PTG, research has revealed its broad occurrence among diverse individuals who have experienced many different types of stressful or traumatic events. Much of this research has explored perceived growth in the context of serious medical conditions or illnesses such as cancer, spinal cord injury, HIV/AIDS, and acquired brain injury (e.g., Grace, Kinsella, Muldoon, & Fortune, 2015; Kalpakjian et al., 2014; Parikh et al., 2015; Pollard & Kennedy, 2007; Shand, Cowlshaw, Brooker, Burney, & Ricciardelli, 2014; Sherr, Nagra, Kulubya, Clucas, & Harding, 2011), and some have even investigated PTG within the caregivers and service providers of those afflicted by these conditions (e.g., Cadell et al., 2014; Cormio et al., 2014; Teixeira & Pereira, 2013). Others have revealed the presence of PTG in individuals experiencing other types of traumatic events such as natural disasters, bereavement, violent conflict, and sexual abuse (e.g., Akbar, 2014; Easton, Coohy, Rhodes, &

Moorthy, 2013; Fergusson, Boden, Horwood, & Mulder, 2014; Michael & Cooper, 2013; Shamia, Thabet, & Vostanis, 2015; Siqveland, Nygaard, Hussain, Tedeschi, & Heir, 2015; Taku, Tedeschi, & Cann, 2013; Ullman, 2014). Together, this varied literature indicates that, despite the fact that each situation has its own unique factors, PTG occurs regularly across these types of stressful and traumatic events.

Posttraumatic growth processes. Along with the development of the PTG construct, Calhoun and Tedeschi (2014) proposed a cognitive processing model inspired by the *shattered assumptions theory of trauma*, which posits that traumatic events, in their nature, disrupt the basic assumptions of the self, others, and the world as generally benevolent and secure (Janoff-Bulman, 1993). The cognitive processing model of PTG begins with a person's experience of a so-called 'seismic' event, which disrupts the way individuals have come to think about themselves and the world (i.e., cognitive schemas) as well as their own story within that world (i.e., personal narrative). These disruptions subsequently produce emotional distress, the disintegration of beliefs and goals, and difficulties reconciling these changes within the personal narrative. For some, the events and core belief challenges will produce automatic rumination or intrusions, which initiates coping efforts aimed at managing emotional and psychological distress, deliberate and thoughtful approach to intrusions with the goal of comprehension and problem-solving (i.e., deliberate rumination), and intimate engagement with others through self-disclosure. Successful and effective approach attempts within the proper sociocultural context are expected to engender positive schema change and the reformation of a positive personal narrative incorporating the trauma in a positive way, which leads to development of PTG in the defined domains.

Past research exploring these hypothesized processes have provided tentative support for their association with PTG. To explicitly test the Calhoun and Tedeschi (2014) model of PTG, Cann and colleagues (2010) developed the *Core Beliefs Inventory* to measure the extent to which stressful or traumatic events disrupt the ‘assumptive’ world. Recent studies utilizing this inventory have shown that individuals reporting greater challenges to their core beliefs from a traumatic event tend to report higher levels of PTG (Cann et al., 2010; Lindstrom, Cann, Calhoun, & Tedeschi, 2013). In terms of the deliberate rumination process, Taku, Calhoun, Cann, and Tedeschi (2009) found intrusive rumination directly after the event, and deliberate rumination at a later point to be positively associated with PTG at long-term follow-up. Exploring the socio-cultural component, Schroevers, Helgeson, Sanderman, and Ranchor (2010) found tangible social support after a traumatic event was associated with greater PTG at an 8-year follow-up, even after controlling for perceived social support. Ullman (2014) similarly found that individuals who report positive social reactions from others after a trauma disclosure report greater PTG. More generally, PTG has been associated with scores on ‘effective’ or ‘adaptive’ coping measures such as problem-focused coping and positive religious coping (Garcia, Páez-Rovira, Zurtia, Martel, Reyes, 2014; Tuncay & Musabak, 2015).

Although the cognitive processing model proposed by Calhoun and Tedeschi (2014) has been the most cited and supported conceptualization in the literature, there has not yet been an overwhelming consensus among researchers concerning the nature of PTG. Although trauma-exposed individuals may report positive psychological changes, the extent to which these perceptions correlate to actual growth is unclear (Frazier et al., 2009; Zoellner & Maercker, 2006). Some have suggested that, rather than being an

outcome of coping, PTG may itself be a coping process aimed at preserving the integrity of the self by claiming positive changes as compensation for negative changes (Zoellner & Maercker, 2006). This alternative approach may explain a variety of findings that are inconsistent with the cognitive processing model of PTG. While one recent study found PTG was related to actual growth (Gunty et al., 2011), another study found PTG was unrelated to a more tangible operationalization of growth (Frazier et al., 2009).

Presenting further complications, some researchers have found associations between PTG and effective coping (e.g., Butler et al., 2005; Tuncay & Musabak, 2015; Ullman, 2014), others have observed associations of PTG with avoidant and maladaptive coping (Gerber, Boals, & Schuettler, 2011; Hall, Hobfoll, Canetti, Johnson, & Galea, 2009). Attempting to reconcile discrepancies in the literature, Zoellner & Maercker (2006) proposed a two-process model in which PTG is comprised of both constructive and illusory aspects.

Posttraumatic growth and Veterans. Military members and Veterans have received much focus in the literature on PTG, perhaps unsurprisingly so. Partly attributable to the unique experiences and status corresponding to military service, active and former members of the military puts are at increased risk for experiencing stressful or traumatic events (Norris & Slone, 2013). Although the lifetime trauma exposure rate in the general population is estimated to be 60% to 70% (Norris & Slone, 2013), this rate increases to 87% among the Veteran population and about 35% of trauma-exposed Veterans report having direct combat experience (Wisco et al., 2014). Exposure to combat itself increases the risk for post-trauma difficulties, and researchers suggest this vulnerability is a function of being vulnerable to the more intense experiences of being attacked or seriously injured, attacking or killing others, or losing a close friend (Hoge et

al., 2004). Other researchers believe that combat-related experiences can often be classified as ‘moral injury’, defined as events that involve the perpetuation, failure to prevent, witnessing of, or knowledge of acts that defy previously held morals (Litz et al., 2009). Recent studies have also revealed that female Veterans are at an increased risk of experiencing military sexual assault during their time in the service (Klingensmith, Tsai, Mota, Southwick, & Pietrzak, 2014).

In addition to the increased risk of trauma exposure, Veterans also experience a diverse set of both typical and unique stressors that contribute to the development of behavioral health concerns. Along with the general population, Veterans also commonly report experiencing stressors in domains such as interpersonal relationships, family life, physical health, spirituality, and financial status (Sherman, Larsen, & Borden, 2015). In addition to possible difficulties related to deploying overseas, there are currently high rates of military-related disabilities and injuries (Clarke, Gregory, & Salomon, 2015). After exiting the military Veterans are vulnerable to the unique stressors related to reintegration into civilian life (Sayer et al., 2010; Sayer et al., 2015). Moreover, specific sub-populations such as student Veterans may face even more unique stressors when tasked with integrating into unfamiliar environments that demand the utilization of vastly different social, academic, and occupational skill sets (Rumann & Hamrick, 2010). Beyond behavioral health, the impact of these unique stressors and experiences can be observed in the increased rates in which Veterans experience sexual health and physical health compared to their non-Veteran counterparts (Beaulieu et al., 2015; Proctor et al., 1998).

Although these increased stressors and rates of trauma exposure have the potential to be deleterious to behavioral health, recent researchers have also acknowledged that it is possible for Veterans to report positive psychological changes in the wake of stressful or traumatic events (Pietrzak et al., 2010; Tsai et al., 2015). For instance, Pietrzak and colleagues (2010) found that around 70% of the Veterans reported a significant level of growth in at least one PTG domain, and the recent National Health and Resilience in Veterans Study indicated that 75% of Veterans with PTSD display moderate levels of PTG (Tsai et al., 2015). Providing additional support for the presence of PTG in Veterans, others have replicated these findings in various samples over the past decade (Benetato, 2011; Gallaway et al., 2011; Hijazi, O'Brien, & Keith, 2015; Maguen, Vogt, King, King, & Litz, 2006; Tsai, Mota, Southwick, & Pietrzak, 2016; Zerach, Solomon, Cohen, & Ein-Dor, 2013). These investigations have led some to believe there may be a clinical utility of PTG in the psychosocial treatment of Veterans with behavioral health disorders, as perceived growth has been associated with lower levels of depression, stress, and suicidal ideation as well as more optimal physical health and psychological functioning (Gallaway et al., 2011; Moore, Varra, Michael, & Simpson, 2010; Tsai et al., 2015; Tsai et al., 2016). Further, Tsai and colleagues (2016) recently found that PTG served as a protective factor for diagnosis and severity of PTSD related to newly experienced traumatic events at a two-year follow-up. Roepke (2015) argues that, due to the uncertainty concerning the specific mechanisms of these relationships, additional research in the Veteran population is needed to expand upon these promising findings and provide guidance for the facilitation of PTG.

Social Problem-Solving

One factor that may be important in the development and maintenance of PTG is social problem-solving (SPS), which refers to the process by which a person seeks to understand, devise, and implement strategies to resolve stress producing cognitive affective states and situations they encounter in life (Nezu et al., 2013). SPS is labelled as ‘social’, or formerly ‘real life’ problem-solving, to differentiate from problem-solving in non-social realms such as mathematics or logic. Specifically, it is the process in which people cope with situations by altering the situation itself to become less problematic, or by better managing maladaptive reactions to those situations. A ‘problem’ can be understood as any life situation requiring a response, or an adaptive behavior, and lacks an apparent effective response. Research on SPS has identified two main dimensions, problem orientation and problem-solving style, which emerge across populations and cultures. Factors such as cognitive overload, emotional overwhelm, and negative thinking can negatively impact these characteristics and inhibit successful coping with a situation. Through decades of research, the SPS model has been associated with a range of psychopathology and behavioral health disorders, and problem-solving treatments have been found effective in treating a range of populations and disorders (see Nezu et al., 2013 for a detailed summary of these studies).

The first dimension of SPS, *problem orientation*, is defined as the set of beliefs, attitudes, and emotional reactions regarding problems and a person’s ability to cope with these problems (Nezu et al., 2013). Problem orientation is typically expressed in two general types of orientations; positive problem orientation (PPO) and negative problem orientation (NPO). Individuals high in PPO tend to view problems as challenges, feel

positive about their ability to solve those problems, and have realistic expectations for their resolution. Inversely, individuals high in NPO tend to be threatened by problematic situations, increasingly doubt their ability to address those situations, and have a low threshold for frustration and negative emotions in the problem-solving process. Problem orientation has been shown to have a large impact on a person's problem-solving style (Nezu et al., 2013), and is associated with poor behavioral health outcomes such as depression, anxiety, suicidality, and substance abuse (Fergus, Valentiner, Wu, McGrath, 2015; Godshall & Elliot, 1997; McMurrin & Christopher, 2009; Speckens & Hawton, 2005; Spence, Sheffield, & Donovan, 2002). While positive and negative problem orientation are understood as distinct factors, it is increasingly acknowledged that an individual's placement on these factors varies across problem types and environments (Nezu et al., 2013).

The second dimension of SPS, *problem-solving style*, is defined as the collection of an individual's cognitive-behavioral activities utilized to cope with or solve stressful problems and situations they encounter (Nezu et al., 2013). Researchers have identified three distinct problem solving styles that individuals typically engage in; planful problem-solving (RPS), avoidant problem-solving style (AS), and impulsive-careless problem-solving (ICS). Individuals with a RPS are characterized by a systematic and thoughtful approach to problem solving that consists of defining the problem, generating alternatives, making decisions, and implementing the solution. Alternatively, the problem-solving styles of AS and ICS are ineffective or problematic in comparison to RPS. Individuals high in ICS tend to engage in problem-solving attempts that are not carefully thought out and often exhibit deficiencies in generating alternatives and

decision-making. Individuals high in AS are characterized by general avoidance of the problem through a lack of action, passive action, or a reliance on others to solve their problems. Problem-solving style is an important component of the problem-solving process, and deficiencies in this realm (i.e., AS, ICS) are associated with negative psychological outcomes such as depression, PTSD, obsessive-compulsive disorder. Inversely, RPS is associated with positive outcomes such as optimism, interpersonal competence, effective coping, and perceptions of psychological and physical well-being (see Nezu et al., 2013 for a full review).

The effectiveness of a person's problem-solving abilities is thought to be diminished or amplified by a variety of factors such as cognitive overload, emotional dysregulation, negative thinking, and maladaptive problem-solving (Nezu et al., 2013). Problem-Solving Therapy (PST), an evidence-based psychosocial intervention developed the social problem-solving framework, focuses on diminishing these problem-solving barriers and improving coping responses to life stressors. This intervention seeks to improve coping responses and well-being through implementing toolkits designed to assist clients with overcoming obstacles to effective problem-solving. While PST has a systematic and structured approach, execution of the treatment varies as a function of the individual's specific needs, problem orientation, and problem-solving abilities. Despite these unique client needs and abilities, outcome studies have established PST as an effective treatment for a range of behavioral health concerns and adjustment problems. A meta-analysis of randomized clinical trials (RCTs) conducted by Malouff, Thorsteinsson, and Schutte (2007) found PST to be a comparable evidenced-based clinical intervention, and other studies have shown that PST can be effective as a group therapy format, as an

adjunctive treatment, as part of a collaborative care package, as a medical treatment adherence protocol, as an internet-based therapy, as a telephone based intervention and as a prevention strategy (see Nezu et al., 2013 for a full review).

Social Problem-Solving and Posttraumatic Growth

A theoretical connection between SPS and PTG can be found in the hypothesized ruminative and socio-cultural processes associated with PTG development in the cognitive processing model put forth by Tedeschi and Calhoun (1996). Although rumination is commonly conceptualized as negative, uncontrolled, and deleterious to psychological well-being, the theory behind these processes in PTG outlines a more multi-dimensional view. Martin and Tesser (1996) first suggested that rumination, in addition to being potentially negative, intrusive, and automatic in nature, can also be defined as continued reflective attempts to understand events and problem-solve a situation in a deliberate and constructive manner. More recently, Watkins and Teasdale (2004) suggested that certain types of self-focused attention such as deliberate rumination may serve the additional functions of facilitating self-knowledge and the development of alternative interpretations of negative thoughts, emotions, and memories. Calhoun and Tedeschi (2014) suggest that individuals need to make the transition from the more automatic rumination and intrusions to the more deliberate ruminative or reflective style for PTG to develop.

Effective problem-solvers may be more likely to successfully engage in activities that facilitate these hypothesized processes of posttraumatic growth development. When experiencing distress and automatic rumination, persons with higher PPO will perceive less threat and maintain more adaptive views toward distress, increasing the likelihood of

engagement and decreasing the likelihood of avoidance. Segal, Nezu, and Nezu (2013) recently found that more effective problem-solvers held more open and positive attitudes toward seeking help, indicating that effective problem-solving can increase the recognition of behavioral health issues and a willingness to engage them among Veterans. As such, increased PPO can be a facilitative factor in the shift from automatic rumination to the deliberate engagement hypothesized by Calhoun and Tedeschi (2014). Furthermore, higher levels of PPO and RPS will correspond with more adaptive management of emotional distress, increased perceptions of one's own ability to cope, and increased use of active or approach coping strategies such as instrumental social support, which are suggested to engender positive schema change in the proper socio-cultural context.

From a more parsimonious viewpoint, difficulties associated with trauma or posttraumatic stress can be understood as a problematic situation in which a person will engage in problem-solving and more broadly utilize coping responses. Diagnostic criteria found in the *DSM-V* (American Psychiatric Association, 2013), and common negative cognitions related to PTSD (Foa, Ehlers, Clark, Tolin, & Orsillo, 1999), seem to apply distinctly to the domains of PTG. For example, common cognitions such as “Nothing good can happen to me anymore” and “I am a weak person” respectively constitute a person's perceptions of their possibilities in life and personal strength (Foa et al., 1999, p. 307). Further, individuals experiencing posttraumatic stress may be at risk for experiencing additional life stressors, which might augment, or be augmented by, difficulties related to posttraumatic stress. Effective problem-solvers, having more positive and adaptive attitudes towards these difficulties associated with trauma and more

adaptive problem-solving strategies, are more likely to cope successfully with trauma-related psychosocial stressors and the daily life stressors that interact with them. Inversely, ineffective problem-solvers, having a negative problem orientation and either an impulsive/careless style or an avoidant style, might not be as likely to successfully cope with posttraumatic stress symptoms and their daily life stress. These suggestions are supported broadly by research showing an association between SPS and symptoms of PTSD, such that individuals who report more symptoms of PTSD also report more ineffective problem-solving (Reich, 2015). Further, the suggestion that SPS relates to daily life stressors is supported by past research finding SPS buffers the negative impact of life stressors on behavioral health (Nezu, Nezu, & Jain, 2008). In adaptively coping with posttraumatic stress and daily life stressors, effective problem-solvers will be more likely to show reductions in symptoms of PTSD and exhibit corresponding gains in the PTG domains closely related to those domains.

Present Study

This present study aims to investigate the relationship between SPS and PTG in a sample of United States Military Veterans. Since the advent of the Global War on Terror (Operation Enduring Freedom [OEF]) and other recent conflicts in the Middle East (e.g., Operation Iraqi Freedom [OIF]; Operation New Dawn [OND]), an estimated 2.5 million Veterans have returned from deployment overseas (National Center for Veterans Analysis and Statistics, 2013). Research has shown Veterans to be high risk for experiencing both traumatic events and behavioral health concerns (Beaulieu et al., 2015; Hoge et al., 2004; Klingensmith et al., 2014; Proctor et al., 1998; Wisco et al., 2014) compared with the general population. Nearly 60% of OEF/OIF/OND Veterans

accessing Veterans Administration health care display signs and symptoms of some behavioral health disorder (Department of Veterans Affairs, 2015). Furthermore, the National Center for PTSD (2015) estimates a PTSD prevalence rate of 10-18% in this population, while a recent meta-analysis suggests this metric may be as high as 23% (Fulton et al., 2015). In light of these statistics, behavioral health among the Veteran population, specifically PTSD and trauma-related psychological issues, presents a significant public health concern that warrants the allocation of both research and resources. While much of the research to date has emphasized negative legacy of psychological trauma, a growing base of research explores the possibility of positive psychological changes because of stressful or traumatic events (Calhoun & Tedeschi, 2014). PTG, defined and explored by Tedeschi and Calhoun (1996), is a construct resulting from these investigations that provides a quantitative method for capturing the positive changes across multiple interpersonal and intrapersonal domains.

Past research has shown that PTG is a common occurrence, and appears to apply broadly across a range of different types of stressful or traumatic events (Calhoun & Tedeschi, 2014). Veterans are certainly no exception to this phenomenon, as recent studies have consistently found the presence of PTG in trauma-exposed Veterans, and have revealed connections between PTG and more optimal psychological health (Tsai et al., 2015). Past research also reveals that these positive psychological changes are associated with decreases in suicidal ideation, depression, and stress levels, and can serve as a protective factor for future PTSD diagnosis and severity (Galloway, Millikan, & Bell, 2011; Moore et al., 2010; Tsai et al., 2016). As such, understanding how the stress and coping process relates to PTG can provide us with important empirical guidance for

future attempts to facilitate growth after trauma among Veterans. Investigating SPS, a empirically-validated cross-cultural model of coping with a corresponding evidence-based treatment, has important implications for these attempts and the PTG research literature more broadly. If there is a relationship between SPS and PTG, PST and PST-based programs can be utilized as an evidence-based intervention to facilitate the development of PTG in Veterans.

Research Question and Hypotheses. The present study aims to address the research questions of whether SPS impact PTG and symptoms of PTSD in a sample of Veterans. This research question will be addressed by the following hypotheses:

H₁: Positive social problem-solving factors (i.e. PPO, RPS) will account for a significant amount of variance in PTG above and beyond covariates.

H₂: Negative social problem-solving factors (i.e. NPO, ICS, AS) will account for a significant amount of variance in PTG above and beyond covariates.

H₃: Positive social problem-solving factors (i.e., PPO, RPS) will account for a significant amount of variance in PTSD symptom levels above and beyond covariates.

H₄: Negative social problem-solving factors (i.e., NPO, ICS, AS) will account for a significant amount of variance in PTSD symptom levels above and beyond covariates.

Among these regression models, we will aim to explore the relative contributions of SPS factors to levels of PTG and PTSD symptoms. We expect that the effective SPS factors of PPO and RPS will be positively associated with PTG and negatively associated with

PTSD symptom levels, while the ineffective SPS factors of NPO, AS, and ICS will be negatively associated with PTG and positively associated with PTSD.

Exploratory Objectives. In addition to the main hypotheses, this study will attempt to provide further understanding of the sample and, more generally, to the PTG phenomenon through specific aims:

1. Describe the sample and compare to different Veteran populations (i.e. general, Pre-9/11, Post-9/11).
2. Describe the level of main study variables (i.e. SPS, PTSS, PTG) in the sample, and examine any differences in these variables among study subgroups.
3. Examine the relationships between PTG and PTSS, perceived event intensity, and perceived event impact.

CHAPTER 2. Methods

Participants

Participants were Veterans of the United States Military who were at least 18 years of age and able to speak English fluently as their first or second language. Due to some individuals participating through online mediums, study procedures required that participants be considered competent to waive consent. Individuals were considered ineligible to participate in the study if they reported actively serving in the United States Armed Forces. We intended to recruit at least 175 participants for this study, which was determined through an a-priori power analysis and a consideration of additional recruitment required to account for methodological flaws (see section below entitled “Plan for Statistical Analysis”).

Measures

Demographic and military-related characteristics. Demographic (e.g., age, sex, sexual orientation, education) and military-related information (e.g., deployments, rank, combat experience) will be collected through a form developed specifically for the purposes of this study. Provided choices for sex, sexual orientation, and self-defined race/ethnicity conformed to the most current categories defined by governmental and non-governmental organizations. Appendix A1 presents a copy of the questions and answer choices provided in this demographics form.

Social Problem-Solving. Social problem-solving (SPS) was assessed with the Social Problem-Solving Inventory-Revised: Short Form (SPSI-R:S; D’Zurilla, Nezu, & Maydeu-Olivares, 2002; Appendix A2), a 25-item measure assessing how a person seeks to understand, devise, and implement strategies to manage or solve problematic and stressful situations. The SPSI-R:S contains five separate sub-scales representing each factor of the two SPS dimensions of problem orientation (i.e. positive, negative) and problem-solving style (i.e. planful, impulsive, avoidant). Respondents rate themselves on each item with 5-point Likert scales, ranging from “0: *Not true at all of me*” to “4: *Extremely true of me*”. Total scores are derived through summing averaged scores on the PPO and RPS subscales with averaged reverse scores of the NPO, ICS, and AS subscales. Amongst both total and scale scores, higher scores indicate higher levels of SPS or of that particular SPS factor. Previous validation has revealed high internal consistency ($\alpha = .85$ to $\alpha = .96$) and high test-retest reliability ($r = .87$) in addition to strong structural, concurrent, predictive, convergent, and discriminative validity.

Posttraumatic Stress. Posttraumatic stress symptomatology was assessed with the Posttraumatic Stress Disorder – Checklist Version 5 (PCL-5; Weathers, Litz, Keane, Palmieri, Marx, & Schnurr, 2013; Appendix A3), a 20-item self-report inventory assessing posttraumatic stress disorder criteria from the *DSM-V* (American Psychiatric Association, 2013). Respondents are asked to identify their worst or most stressful experience and rate themselves on the presence of PTSD symptoms in the past month on a 5-point Likert scale ranging from “0: *Not at all*” to “4: *Extremely*”. Item scores are summed for a total score ranging from 0-80, with higher scores indicating higher levels of PTSD. Two recent psychometric analyses of the PCL-5 with samples of Veterans revealed excellent internal consistency ($\alpha = .95$) and test-retest reliability ($r = .82$) as well as convergent and discriminant validity (Blevins, Weathers, Davis, Witte, & Domino, 2015). Furthermore, the PCL-5 has also been shown to have good sensitivity to clinical change and diagnostic utility. Developed by the National Center for PTSD, the PCL-5 and the measure from which it has been developed are among the most widely used self-report instruments utilized to assess PTSD (Blevins et al., 2015). The PCL-5 is freely available for use in the context of non-profit research. Additionally, two Likert scales will be added to this instrument to further assess the impact and perceived intensity of the stressful or traumatic event. Respondents will rate their perception of the impact of the event on their life from “-5: *Impacted me very negatively*” to “5: *Impacted me very positively*”. Furthermore, respondents will rate their perception of the severity or intensity of the event from “0: *Not intense or severe*” to “5: *Very intense or severe*”.

Posttraumatic Growth. Posttraumatic growth (PTG) will be assessed utilizing the Posttraumatic Growth Inventory-Revised (PTGI; Tedeschi & Calhoun, 1996;

Appendix A4), a 21-item measure assessing positive psychological changes after traumatic events. The scale contains subscales assessing the five PTG domains; personal strength, new possibilities, relating to others, appreciation of life, and spiritual change. Respondents rate themselves on each item with 6-point Likert scales, ranging from “0: I didn’t experience this change” to “5: I experienced this change to a very great degree”. To calculate a total PTG score, all items are summed for a total score ranging from 0-105, with higher scores indicating more perceptions of positive psychological changes related to a stressful or traumatic event. Previous validation of the PTGI-SF revealed good internal consistency ($\alpha = .90$), acceptable test re-test reliability ($r = .71$), concurrent validity, and discriminant validity. Appendix A5 presents a written approval of use from the copyright holders of this instrument.

Procedures

The present study employed a mixed sampling strategy consisting of both online and in-person recruitment methods, which commenced in August 2016 and completed in November 2016. The Veterans Multi-Service Center (VMC) of Philadelphia served as a partnering organization, assisting with recruitment through the distribution of study flyers and business cards, and by providing access to their Veteran population in their secure facilities. Confirmation and permission for this partnership was provided by the VMC prior to the initiation of this study through a signed letter, which was provided and authorized by the Drexel University Institutional Review Board (IRB). Additional recruitment was conducted through snowball sampling and Amazon’s Mechanical Turk, an online crowd-sourcing platform. Participants registered to complete the study online

with a hyperlink to Qualtrics, a secure online survey-research platform. These recruitment methods and corresponding study procedures are detailed below.

Interested individuals from the Veterans Multi-Service Center were provided the option of completing the study online through a survey link, scheduling an appointment to complete the survey measures at authorized Drexel University facilities, or completing the self-report measures on-site at the VMC. Given the online platform used by some participants to complete this study, it was not possible to have an official consenting process.

Additional online recruitment was conducted through the distribution of study information through authorized postings on Veterans forums and relevant professional organization listservs, and through the distribution of flyers to colleagues and professional networks. Individuals who came to learn about the study by word of mouth were also allowed to participate in the research study.

Lastly, a portion of the study participants were recruited through Amazon's Mechanical Turk (AMT), an online crowd-sourcing platform regularly used for research in the social sciences (Mason & Suri, 2012). AMT 'workers' were provided a Qualtrics link through a *human intelligence task* (HIT) posting on the AMT website. Participants were then provided all of the information commonly found in a consent form, and asked if they would like to proceed with the study. Upon completion of the study, these participants were provided a randomly generated unique study ID, which they would enter into the AMT website to confirm completion. In keeping with best practices recommended for behavioral sciences survey research, attention checks were placed within the to ensure participants were attentive and providing valid responses. For

individuals who did not adequately answer these attention checks, their participation was immediately terminated and they were brought to an end-of-survey message informing them of this termination.

For participants recruited through AMT, a process was pre-determined to verify Veterans status and eligibility for the study. This was completed by asking participants for military occupational codes and designations considered to be commonly held knowledge among military Veterans. Additionally, information concerning the branch of service, campaigns served, deployments, and discharge were used to determine Veteran status.

In consideration of the time and effort taken to participate in this study, all participants, including those from AMT, were provided the option to enter into a raffle for one of three \$25 gift cards upon verification of completion. Individuals who participated in-person were offered entry into the raffle verbally after completion of the study measures. Any identifying information that would be used to contact the participant was recorded by study assessors on a document or a password-protected digital document that was separated from their study measures to ensure no identifying information would be connected to their responses. Individuals who participated in the study through Qualtrics were directed to an additional survey that asked for contact information used to inform them if they were selected. Any identifying meta-data such as IP addresses or location coordinates provided by Qualtrics were not included in the extracted databases.

Ethical Considerations

Although the present study contained only self-report inventories and was not anticipated to put participants at higher than minimal risk, participants could potentially experience emotional distress or discomfort when responding to certain items. As a portion of the total participants completed the study anonymously through online surveys, it was impossible to identify, assist, or intervene with individuals that might have experienced distress. Despite this possibility, this risk was determined to be necessary to expand the scope of the sample outside of the approved recruitment sites. Additionally, this study did not have any direct benefits for participants. While participants invested time in responding to multiple questionnaires, the participants were not offered any direct monetary compensation or any psychological services in return. However, to provide some possible benefits, all participants who waived consent and completed the study were provided the chance to enter into a raffle for one of three prizes to be delivered as a \$25 Amazon gift card. To ensure anonymity, the names and contact information (i.e. telephone number, e-mail address) was not connected with their survey responses.

Plans for Statistical Analysis

Preliminary Analysis. First, the data will be profiled to examine the presence of any missing data, outliers, departures from normality, or other problematic aspects of the data set. Second, major characteristics of the sample will be provided and compared to characteristics of both general and Post-9/11 Veteran populations. Additionally, levels of the main study variables among the participants and recruitment type groups will be examined. Further, basic associations between study variables will be examined and presented in bivariate correlation tables, which will be additionally utilized to diagnose

important covariates. Lastly, relationships of PTG to PTSS, perceived event intensity, and perceived event impact will be assessed.

Regression Analysis. Four hierarchical multiple regression models will be employed to test our hypotheses, with a pre-determined α of .05 and a two-tailed hypothesis test. Assumptions of multiple linear regression will be checked (i.e. homoscedasticity, linearity, independence, multi-collinearity), and if necessary, measures will be taken to adjust for these violations (i.e. predictor removal, transformation). The following equation represents the hierarchical multiple regression models that will be employed to test the main hypotheses:

$$\textit{Block 1: PTG or PTSS} = (\text{covariates}) + \text{error}$$

$$\textit{Block 2: PTG or PTSS} = (\text{covariates}) + (\text{positive or negative SPS factors}) + \text{error}$$

CHAPTER 3. Results

Preliminary Analysis

Participants included 175 individuals who waived consent for their participation in the study. Out of the total 175 participants, 21 were removed from the analysis because they did not complete the study or had missing data for one or more of the questions in the survey measures. These 21 participants consisted of seven individuals recruited and assessed at the Veterans Multi-Service Center (VMC) in Philadelphia and 14 individuals that were recruited through online methods. Thus, the final analyses presented in this paper include observations from 154 Veterans, of which 29 participated in-person at the VMC and 125 participated online. Of the online participants, 50 were recruited through snowball sampling and 75 were recruited using Amazon's Mechanical Turk.

Demographic characteristics of the sample are presented in Table 1. Participants in our sample were primarily middle-aged ($M = 48.37$, $SD = 13.94$), male (78.6%, $n = 121$), White/Caucasian (74%, $n = 114$), Christian (60.3%, $n = 93$), heterosexual (95.5%), and married (52.6%, $n = 81$). Additionally, participants in our sample were primarily low- to middle-income (e.g., \$0-100,000; 86.4%, $n = 133$), non-students (78.6%, $n = 121$) with at least some college experience (84.5%, $n = 130$), whom have never been diagnosed with a psychiatric disorder (51.3%, $n = 79$) and are not currently not received psychological or psychiatric treatment (73.4%, $n = 113$).

Military-related characteristics of the sample are presented in Table 2. Participants in our sample primarily served in the Army (53.9%, $n = 83$), participated in one of the recent operations in the Middle-East (i.e., Operation Iraqi Freedom, Operation Enduring Freedom, Operation New Dawn, Operation Inherent Resolve; 55.2%, $n = 85$),

deployed at least once (68.8%, $n = 106$), have not experienced combat (62.3%, $n = 96$), and never suffered from a military-related injury or disability (54.5%, $n = 84$).

Demographic differences were observed between participants from the Veterans Multi-Service Center ($n = 29$) and online participants ($n = 125$). In terms of demographic characteristics, these participants were primarily older ($M = 60.45$, $SD = 5.55$), Black/African-American (75.8%, $n = 22$). In terms of military-characteristics, they were more likely to have served during the Vietnam War or Persian Gulf War (65.0%, $n = 19$), had a deployment deployed (58.6%, $n = 17$), and never have experienced combat ($n = 79.3$, $n = 23$).

Descriptive Statistics for Study Variables

Observations on the study variables were gathered utilizing the Social Problem-Solving Inventory – Revised: Short Form (SPSI-R:S) to determine social problem-solving orientations and styles, the Posttraumatic Checklist for the DSM-V (PCL-5) to assess symptoms of PTSD, and the Posttraumatic Growth Inventory (PTGI) to assess perceived positive psychological changes as a result of traumatic events. SPS was determined to be below average in the sample as determined by norm-referencing information provided in the SPSI-R manual (D’Zurilla et al., 2002). To determine standardized scores of SPS, each subscale is summed, reverse coded in the case of ineffective SPS factors, and divided by the total number of items. Mean scores for each subscale are then summed to compute a total raw score, which in our sample was 12.21 ($SD = 2.78$). Norm-referencing for this mean score indicated that our sample with a mean age of 58 was .66 standard deviations below average in SPS when referenced with middle-aged adults (aged 40-55 years). Using a previously suggested PCL-5 cut-point of

55 for a likely diagnosis of PTSD (Wisco et al., 2016), slightly over a quarter of our sample was determined to exceed the PCL-5 score for PTSD diagnosis ($n = 43, 27.9\%$). Compared to a sample of 327 Veterans from a recent study examining PTG using the PTGI short form (Kaler, Erbes, Tedeschi, Arbisi, & Polusny, 2011), average item scores appeared to be higher in our sample ($M = 3.49, SD = 1.26$) compared with this previous samples in Kaler and colleagues (2011; $M = 2.04, SD = 1.19$) and Tsai and colleagues (2016; $M =$

Differences among recruitment type. A secondary aim of this study was to examine differences in the main study variables among the three recruitment groups. Table 4 presents means, standard deviations, and analysis of variance tests on the main study variables for the three distinct recruitment types. There were significant differences between group means on the variables of PPO [$F(2,153) = 12.455, p < .01$], NPO [$F(2,153) = 11.184, p < .01$], RPS [$F(2,153) = 17.750, p < .01$], AS [$F(2,153) = 10.927, p < .01$], and PTG [$F(2,153) = 5.227, p < .01$]. There were no differences between groups on either the ICS subscale or the PCL-5. Overall, Veterans recruited from the Veterans Multi-Service Center appeared to have consistently lower endorsements of both effective and ineffective problem-solving factors as well as PTG. Group differences between the general internet sample and the Amazon Mechanical Turk did not appear to diverge greatly.

Relationships Among Sample Characteristics and Outcome Variables

Prior to examining the assumptions of the hierarchical linear regression models, the associations of demographic and military-related characteristics of the study participants to the outcomes of PTG and PTSD symptom levels were assessed using

Pearson correlation coefficients and point bi-serial correlation coefficients. Table 4 presents the bivariate relationships between important sample characteristics, PTSD, and PTG. Demographic and military-related variables that were significant predictors of the outcome variables were included in the appropriate hierarchical linear regression models. PTG was negatively associated with tobacco use ($r = -.22, p = .007$). PTSD symptom levels were positively associated with weekly average alcohol use ($r = .17, p = .018$), deployment history ($r_{pb} = .17, p = .032$), and prior combat experience ($r_{pb} = .352, p < .001$). As such, reported tobacco use was included as a covariate in the models predicting PTG, while alcohol use, deployment history, and combat experience were included as covariates in the models predicting PTSS.

Assumptions of Hierarchical Linear Regression

Prior to conducting the hierarchical linear regression models, the data and models were inspected to ensure that there were no violations of test assumptions. There are five main assumptions of multiple linear regression models employed here: 1) independence of observations, 2) normality of residuals, 3) linearity, 4) homoscedasticity of residuals, and 5) non-multicollinearity.

First, the Durbin-Watson test was utilized to assess independence of observations, as determined by a value between 1.5 and 2.5. As the Durbin-Watson values for all of the regression models fell between 1.6 and 2.1, the assumption of independence of observations was determined to be satisfied in our models.

Second, the normality of residuals was assessed by producing the residuals from each model, and testing their normality with the Kolmogorov-Smirnov (K-S) tests. K-S tests on two models were found to be significant, PTG prediction from effective SPS

factors and PTSS prediction from ineffective SPS factors. To adjust for these deviations from normality, standardized residuals were inspected and individual cases were considered for omission if they exceeded 2 standard deviations from the mean.

Alternatively, standard transformations were applied to the outcome variables in an attempt to reduce these violations. However, after the omission of anomalous cases and the application of multiple types of algebraic transformations, non-normality was not corrected. An inspection of Normal P-P plots of the residuals, the distribution of residuals did not appear to be extremely problematic, and concerns of model validation will be noted as a limitation.

Third, the linearity of the independent variables with the dependent variables in the regression models was tested by inspecting X_j - Y_j scatterplots. Although certain relationships between the predictor variables and the outcome variables appeared to have weak associations, they all appeared to at least have some linear form and no quadratic or cubic functions were observed among any of the variables. As such, no violations to the assumption of linearity were determined.

Fourth, the homoscedasticity of residuals was assessed by inspecting plots of model residuals versus predicted values. Among the plots inspected for each model, the residuals appeared to distribute evenly around the prediction line and there were no funnel shaped distributions or any limiting factors observed.

Lastly, tolerance values and Variable Inflation Factor (VIF) values were inspected to examine the assumption of non-multicollinearity. As all tolerance values were above .1 and all VIF values were below 2.5, the assumption of non-multicollinearity was determined to be met.

Hierarchical Linear Regression Models

Hierarchical linear regression models were employed to assess the association of both effective and ineffective SPS factors with PTG and PTSD symptomatology.

Tobacco use ($Y = 1, N = 0$) was included as a control variable in the first step of the hierarchical linear regression models predicting PTG. Alcohol use (number of drinks per week), deployment history ($Y = 1, N = 0$), and combat experience ($Y = 1, N = 0$) were included as control variables in the first step of the hierarchical linear regression models predicting PTSD symptom levels.

PPO and RPS were significant predictors of PTG after controlling for current tobacco use. Model fit statistics and coefficients are displayed in Table 7. Current tobacco use was entered into Step 1 of the model, and explained 4.7% of the variance in PTG, $R^2 = .047, F(1,152) = 7.418, p = .007$. Effective problem-solving factors PPO and RPS were included in Step 2, explaining an additional 12.9% of the variance in PTG, $R^2_{\text{change}} = .129, F_{\text{change}}(2,150) = 11.773, p < .001$. After including PPO and RPS, current tobacco use remained a significant predictor of PTG, $\beta = -.17, p = .024$. After controlling for tobacco use, PTG was significantly associated with both PPO ($\beta = .17, p = .047$) and RPS ($\beta = .25, p = .004$), indicating that participants with higher levels of PPO and RPS tend to report higher levels of PTG.

NPO, ICS, and AS were not significant predictors of PTG after controlling for tobacco use. Model fit statistics and coefficients are displayed in Table 8. Current tobacco use was entered into Step 1 of the model, and explained 4.7% of the variance in PTG, $R^2 = .047, F(1,152) = 7.418, p = .007$. Ineffective problem-solving factors NPO, ICS, and AS were included in Step 2, and did not explain any additional variance in PTG

above and beyond current tobacco use, $R^2_{\text{change}} = .129$, $F_{\text{change}}(3,149) = .726$, $p = .538$. After including the ineffective SPS factors, current tobacco use remained a significant predictor of PTG, $\beta = -.23$, $p = .005$. Controlling for tobacco use, PTG was not associated with either NPO ($\beta = -.01$, $p = .963$), ICS ($\beta = -.095$, $p > .05$), or AS ($\beta = -.032$, $p > .05$).

PPO and RPS were not significant predictors of PTSD symptom levels after controlling for alcohol use, deployment history, and combat experience. Model fit statistics and coefficients are displayed in Table 9. Alcohol use, deployment history, and combat experience were entered into Step 1 of the model, and explained 15.7% of the variance in PTSS, $R^2 = .157$, $F(2,151) = 14.114$, $p < .001$. Effective problem-solving factors PPO and RPS were included in Step 2, but did not explain a significant amount of variance in PTSD symptoms above and beyond the covariates in Step 1, $R^2_{\text{change}} = .010$, $F_{\text{change}}(2,149) = .880$, $p = .417$. After including PPO and RPS, weekly alcohol use and combat experience remained significant predictors of PTSD symptoms. Controlling for weekly alcohol use, deployment history, and combat experience, posttraumatic stress symptoms were not associated with either PPO or RPS.

When controlling for weekly alcohol use, deployment history, and combat experience, NPO was a significant predictor of PTSD symptoms. Model fit statistics and coefficients are displayed in Table 10. Alcohol use, deployment history, and combat experience were entered into Step 1 of the model, and explained 15.7% of the variance in PTSS, $R^2 = .157$, $F(2,151) = 14.114$, $p < .001$. Ineffective problem-solving factors NPO, ICS and AS were entered into the model in Step 2, and explained an additional 9.9% of the variance in PTSD symptoms above and beyond weekly alcohol use, deployment

history, and combat experience. After including NPO, ICS, and AS, weekly alcohol use ($\beta = .17, p = .022$) and combat experience ($\beta = .28, p < .001$) remained significant predictors of PTSD symptom levels. When controlling for weekly alcohol use, deployment history, and prior combat experience, only NPO was a significant predictor of PTSD symptoms ($\beta = .28, p < .001$).

Secondary Aims

An exploratory aim of this study was to examine the characteristics of our sample and compare the sample to the general population of Veterans, which has recently been described by the National Center for Veterans Analysis and Statistics (NCVAS). In 2016, the NCVAS published a Profile of Veterans that was created with data from the American Community Survey (ACS). Results from the ACS indicate that Veterans are older (Median Age = 60), primarily male (92.1%), White/Caucasian (83.5%) served prior to 9/11 (85.9%), and have at least some college experience (53.8%). Comparing these statistics to our sample, we can see that our sample has a similar proportion of males, but is much younger, more racially and ethnically diverse, and more educated than the typical Veteran population.

An additional study aim was to examine the relationship of PTG to variables related to stressful or traumatic events such as symptomatology of PTSD, perceived event intensity, and perceived impact of the event. Pearson correlation coefficients reveal that posttraumatic growth was not associated with symptom levels of posttraumatic stress ($r = -.07, p = .375$), perceived event stressfulness ($r = .12, p = .154$), or perceived impact of the event on one's life ($r = .14, p = .077$). Provided the non-significant association between PTG and PTSD symptoms, we tested a quadratic transformation to explore

whether there was a curvilinear association between these variables. A hierarchical linear regression model reveals that applying a quadratic transformation to PCL-5 scores among participants produces a strong curvilinear association between PTSD and PTG. In the first step, PCL-5 scores did not serve as a significant predictor of PTG, $b = -.095$, $SE = .106$, $p = .375$. In the second step, the quadratic PCL-5 term emerged as a significant predictor of PTG above and beyond the linear PCL-5 term, $b = -.017$, $SE = .005$, $p = .001$. This finding indicates that there is a significant curvilinear association between symptoms of PTSD and PTG.

CHAPTER 4. Discussion

Main Findings and Implications

The primary purpose of this study was to examine whether SPS factors predict PTG among a sample United States Military Veterans. As expected, the adaptive SPS factors of PPO) and RPS were significant predictors of PTG when controlling for covariates (i.e., tobacco use). Together, PPO and RPS explained roughly 13% of the variability in PTG above and beyond reported tobacco use, with RPS being a slightly stronger predictor than PPO (see Table 7). Contrary to our expectations, the ineffective problem-solving factors of NPO, AS, and ICS were not significant predictors of PTG. Together, these factors only explained a non-significant 1.5% of the variability in PTG above and beyond reported tobacco use (see Table 8). There were no significant associations revealed between PTG and these predictors.

The finding that effective SPS factors were positively associated with PTG support the hypothesis that positive attitudes and adaptive strategies in problem-solving play a role in the process of perceiving growth after trauma in Veterans. This finding is

consistent with past research showing adaptive and positive coping constructs are associated with increased PTG (Armeli, Gunthert, & Cohen, 2001; Prati & Pietrantonio, 2009). Adaptive SPS factors and positive coping may aid psychological processes suggested to facilitate the development PTG. For example, Calhoun and Tedeschi (2014) suggest that negative core beliefs developed as a result of trauma can be repaired through coping successfully with related psychological distress and through thoughtful, constructive engagement with these challenges (i.e., deliberate rumination). Effective problem-solvers may be able to repair damaged or negative core beliefs through reflective problem-solving cognitions and the successful management of distress. As this study reveals a connection between problem-solving and perceived growth after trauma, future research can expand on our findings by examining the role of SPS in these processes. Although the SPS factors examined here easily figure into models of PTG development, it is unclear at this point whether the relationship observed here may be due to some common factor such as optimism, a personality trait commonly associated with levels of PTG (Preti & Pietrantonio, 2009; Zoellner, Rabe, Karl, & Maercker, 2008). Exploring the role of optimism in this relationship can determine whether attitudes and strategies in problem-solving are directly related to PTG, or whether a positive outlook independently produces increase in these constructs.

The finding that ineffective SPS factors were not associated with PTG contrasts our hypothesis that negative attitudes and ineffective problem-solving strategies would be related to lower levels of PTG. In our sample, levels of PTG were independent of whether a person indicated the use of avoidant strategies or impulsive and careless approaches in solving their problems. The lack of a relationship between ineffective SPS

factors contradicts previous research showing relationships between negative coping constructs (e.g., avoidance, repression; Gerber, Boals, & Schuettler, 2011; Widows, Jacobsen, Booth-Jones, & Fields, 2005). Although this study was not able to address the important question of whether PTG constitutes actual growth or solely perceived growth, it provides insight to the question of whether perceived growth is actually a negative or avoidant strategy for coping with psychological trauma (Zoellner & Maercker, 2006). If PTG was in fact a negative or avoidant reaction, we should likely observe positive associations of perceived growth with the ineffective SPS factors of NPO, ICS, and AS.

Further, this study examined whether SPS factors predict symptomatology of PTSD in our sample of Veterans. Consistent with previous literature (Greenfield, 2015; Nezu & Carnevale, 1987; Kasckow et al., 2012), ineffective SPS factors (e.g., NPO, ICS, AS) significantly predicted symptom levels of PTSD when controlling for covariates (i.e., alcohol use, combat experience). Together, these ineffective factors explained roughly 10% of the variability in PTSD symptom levels above and beyond an individual's reported alcohol use and endorsement of combat experience (see Table 9). However, the only significant individual predictor of PTSD symptom levels in this model was NPO. Contrary to our expectations, adaptive SPS factors did not significantly predict PTSD symptom levels when controlling for the same covariates, accounting for only 1% of the variability in PTSD symptoms above and beyond an individual's reported alcohol use and endorsement of combat experience (see Table 10).

The finding that NPO was a significant predictor of PTSD symptoms when controlling for important covariates provides confirmation to previous research examining SPS factors and posttraumatic stress. Greenfield (2015) found that increased

negative problem-solving attitudes were associated with higher levels of PTSD, and the results of our study confirm this association and provide the important evidence of its reliability. The fact that ineffective problem-solving strategies or styles did not appear to contribute to PTSD symptom levels in either of these studies can be explained by the prominence of attitudes toward problem-solving over strategies or abilities in problem solving. In the SPS model, a specific emphasis has been placed on the importance of addressing problem-solving attitudes (i.e., problem orientation) in the treatment of psychopathology and behavioral health disorders (Nezu et al., 2013), and two separate meta-analyses of PST found its efficacy was dependent on whether problem orientation was adequately addressed in treatment implementation (Bell & D’Zurilla, 2009; Malouff, Thorsteinsson, & Schutte, 2007).

The differential associations of SPS factors with PTG and PTSD in this study reveal an interesting phenomenon. While the adaptive factors of SPS are predictors of PTG, the ineffective SPS factor of NPO is a predictor of PTSD. This finding suggests that in terms of coping constructs, that the ‘good’ may correlate well with the ‘good’, and the ‘bad’ may only correlate well with the ‘bad’. Baumeister, Bratlavsky, Finkenauer, & Vohs (2001) advance the argument that ‘bad’ events and emotions in everyday life have a much stronger effect than the positive ones. In terms of our study findings, this appears to be the case with NPO and PTSD, in which the only predictor of posttraumatic stress symptom levels was a negatively-valenced. However, our findings that PPO and RPS significantly predict PTG while the ineffective SPS factors made no contributions suggests that the ‘good’, or positively-valenced, constructs are more likely to have an impact on other positively-valenced constructs.

Secondary Findings and Implications

The first exploratory aim of this study was to explore the consistency of our sample to provide context to our main findings and explore differences among recruitment sub-groups. Overall, the sample examined in this study appears to conform to the common sex distribution of the Veteran population, but overall appeared to be somewhat younger, more ethnically diverse, and more educated than the general population of Veterans in the United States. Divergence on these characteristics from the general population of Veterans is likely due to the sampling strategies that were utilized in this study. The recruitment of Veterans from a local organization that provides resources to Veterans likely impacted the composition of ethnic diversity and behavioral health in our sample. However, Veterans recruited through Amazon's Mechanical Turk did not differ greatly from other internet participants recruited through snowball sampling techniques, indicating that Mechanical Turk can be a useful resource for accessing Veterans in behavioral sciences research. These differences between our sample and the typical Veteran population should be acknowledged when interpreting the generalizability of our findings, and may have important implications for the applicability of the observed relationships between our main study variables.

An additional exploratory aim was to examine the relationships between PTG and trauma-related variables in the study (e.g., perceived event intensity, perceived event stressfulness). The extant literature on PTG reveals ongoing differences in the findings and conclusions of researchers concerning the relationships between these variables and PTG, and exploring these basic associations can contribute valuably to the resolving these discrepancies. Contrasting previous research examining the contributions of

perceived event impact and stressfulness to PTG (Boals & Schuettler, 2011; Groleau, Calhoun, Cann, & Tedeschi, 2013; Schuettler & Boals, 2011), we did not find relationships between either of these trauma characteristics and levels of perceived growth after trauma. The trauma measurement approach taken here may explain these inconsistencies with the findings of previous studies, as the reported times since a traumatic event varied widely. In some cases, study participants reported a traumatic event that occurred in the last year and others reported an event that occurred over 30 years ago, a difference which is likely to impact the current association between trauma-related characteristics and PTG.

Finally, we explored the nature of the relationship between PTG and PTSD symptoms to provide additional clarity to discrepancies in form and direction of this association in the existing literature. While some previous studies have found either positive linear relationships between PTG and PTSD symptoms or no relationship at all, others have revealed this relationship to take a curvilinear form (Kleim & Ehlers, 2009; Levine, Laufer, Hamama-Raz, Stein, & Solomon, 2008). In the present study, we found that the inclusion of a curvilinear PTSD term explained a significant amount of variability in PTG above and beyond a basic linear association. These results indicate that for PTG to occur, Veterans must have experienced some traumatic event and report some level of PTSD symptoms. However, if these symptoms are severe they will be less likely to perceive or report the experience of positive psychological changes because of this event.

Limitations

Several important limitations should be considered when interpreting the conclusions of this study. A main limitation can be found in the mixed methods recruitment strategy utilized to gather observations. Some participants were recruited through a local organization and completed the study instruments in-person, while others participated online and were recruited through snowball sampling and an online crowdsourcing platform (i.e., Amazon Mechanical Turk). As such, the heterogeneity of the sample may have produced additional variance in the data and impacted the results in some way. A between-groups analysis of the different recruitment types revealed some significant differences between these groups of Veterans on important study variables, however, the size of our sample did not allow for separate testing of the main hypotheses within these groups.

Second, the method of online participation in this study may have produced additional error in the data due to the limitations of this research approach. One major complication with this approach is the inability to regulate and observe valid responding among study participants. This is reflected in the variability of survey completion time that was observed among snowball sampling and Amazon Mechanical Turk participants, which ranged from five minutes to 117 hours. Despite this variability in response time producing validity concerns, we did not exclude participants based on completion time. Additionally, the recruitment of Veterans through these online methods made it more difficult to verify status as former military members. Although we included or excluded participants based on the probability of being a Veteran as determined by appropriate and consistent responses on military-related questions (i.e., MOS/Rate, time served,

campaigns served), certain participants who were not Veterans may have been able to pass these screening methods.

In terms of measurement, self-report methods were utilized to gather observations on the study variables, which are notably susceptible to the influence of social desirability, response set, and other instrumentation bias. The concerns of bias may be particularly relevant to certain constructs measured in this study such as social problem-solving, posttraumatic growth, and posttraumatic stress. Most questions that participants respond to in instruments corresponding to these constructs have an explicit negative or positive valence; participants may be hesitant to report symptoms of posttraumatic stress or discuss their worst event, while also being inclined to report higher levels of perceived growth. Further, the standardized instruments measuring PTSD and PTG in this study have inherent difficulties in identifying and operationalizing traumatic events. These measures ask participants to respond to instrument items in relation to a traumatic event, but do not require that these events must have happened recently. For some participants, the reported 'worst event' came in the past year, while others reported an event that happened as many as 55 years ago. The wide range among participants for the time since the event limits our ability to make explicit conclusions about how the study's outcomes vary in the immediate time after the event or in the long-term.

In terms of research design and statistical analysis, this research examined multiple hypotheses and additional exploratory aims using a cross-sectional and non-experimental design. Given that all responses were gathered using a cross-sectional design, our analyses did not provide insight into the temporal or causal relations between these variables. It may be that increases in posttraumatic growth are not preceded by increases

in adaptive social problem-solving, but the limitations in this design did not allow for the analysis of time-lagged relationships of the study variables. Lastly, the inclusion of secondary analyses not accounted for in the initial power analysis led to increases in the probability of Type I error.

Future Directions

Despite limitations, the present study has made valuable contributions to the existing literature on social problem-solving, posttraumatic stress disorder, and posttraumatic growth. This study represents the first investigation of the relationship between social problem-solving and posttraumatic growth, and future studies should aim to replicate our research design to establish the reliability of these findings. Further, additional investigations will be important in understanding the factors underlying the connection between these two constructs. Many plausible explanations for this relationship, all of which have divergent implications for the practical implementation of our findings. For example, if trait optimism confounded this relationship between these two variables, this would suggest different expectations of perceived growth in therapy compared to other hypothesized mechanisms such as narrative reconstruction.

Future research on these relationships will benefit from addressing the previously discussed limitations in this research design. Gathering data on these constructs utilizing clinical interviews or narrative analysis may produce less biased scores, and longitudinal data measurement techniques can illuminate how these variables change with each other over time following traumatic events. Future studies addressing the limitations of this research and examining additional variables that may account for the unexplained

variance observed in our analyses can provide a fuller understanding of the role of social problem-solving and other predictors in posttraumatic growth and posttraumatic stress.

The findings of this study connecting certain factors of social problem-solving to posttraumatic growth and symptoms of posttraumatic stress disorder indicate that Problem-Solving Therapy can be an important intervention for military Veterans who have experienced stressful or traumatic events. Fostering adaptive problem-solving attitudes and strategies may lead to increased perceptions of positive psychological changes following these events, while decreasing ineffective or counterproductive perceptions toward solving problems may improve the severity of current symptoms of posttraumatic stress disorder. Future studies investigating the effectiveness of Problem-Solving Therapy for Veterans who have experienced psychological trauma should include measures of posttraumatic growth to determine whether this treatment can lead to increased perceptions of growth in the wake of trauma. More generally, Problem-Solving Therapy approaches and programs may be best suited to facilitate posttraumatic growth by improving attitudes towards solving problems and fostering adaptive problem-solving skills.

List of References

- Abdullah, M. F. I. L., Jafaar, N. R. N., Zakaria, H., Rajandram, R. K., Mahadevan, R., Yunus, M. R. M., & Shah, S. A. (2015). Posttraumatic growth, depression, and anxiety in head and neck cancer patients: Examining their patterns and correlations in a prospective study. *Psycho-Oncology*, *24*(8), 894-900.
- Akbar, Z. (2014). Post-traumatic growth, coping, and social support among disaster survivors in the province of Yogyakarta, Indonesia. In C. Pracana (Eds), *Psychology Applications & Developments*: Lisboa, Portugal: In Science Press
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5*. Washington, D.C: American Psychiatric Association.
- Armeli, S., Gunthert, K. C., & Cohen, L. H. (2001). Stressor appraisals, coping, and post-event outcomes: The dimensionality and antecedents of stress-related growth. *Journal of Social and Clinical Psychology*, *20*(3), 366–395.
- Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, *5*(4), 323–370.
- Beaulieu, G. R., Latini, D. M., Helmer, D. A., Powers-James, C., Houlette, C., & Kauth, M. R. (2015). An exploration of returning Veterans' sexual health issues using a brief self-report measure. *Sexual Medicine*, *3*(4), 287-294.
- Benetato, B. B. (2011). Posttraumatic growth among Operation Enduring Freedom and Operation Iraqi Freedom amputees. *Journal of Nursing Scholarship*, *43*(4), 412–420.
- Bell, A. C., & D’Zurilla, T. J. (2009). Problem-solving therapy for depression: A meta-analysis. *Clinical Psychology Review*, *29*, 348-353.
- Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, J. L. (2015). The Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5): Development and initial psychometric evaluation. *Journal of Traumatic Stress*, *28*(6), 489–498.
- Bovin, M. J., Marx, B. P., Weathers, F. W., Gallagher, M. W., Rodriguez, P., Schnurr, P. P., & Keane, T. M. (2015). Psychometric properties of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (PCL-5) in Veterans. *Psychological Assessment*. Advance online publication.
- Cadell, S., Hemsworth, D., Smit Quosai, T., Steele, R., Davies, E., Liben, S., ... Siden, H. (2014). Posttraumatic growth in parents caring for a child with a life-limiting illness: A structural equation model. *American Journal of Orthopsychiatry*, *84*(2), 123–133.

- Calhoun, L. G., & Tedeschi, R. G. (2014). *Handbook of posttraumatic growth: Research and practice, 2nd edition*. New York, NY: Psychology Press.
- Cann, A., Calhoun, L. G., Tedeschi, R. G., Kilmer, R. P., Gil-Rivas, V., Vishnevsky, T., & Danhauer, S. C. (2010). The Core Beliefs Inventory: A brief measure of disruption in the assumptive world. *Anxiety, Stress, & Coping, 23*(1), 19-34.
- Clarke, P. M., Gregory, R., & Salomon, J. A. (2015). Long-term disability associated with war-related experience among Vietnam Veterans. *Medical Care, 53* (5), 401-408.
- Cormio, C., Romito, F., Viscanti, G., Turaccio, M., Lorusso, V., & Mattioli, V. (2014). Psychological well-being and posttraumatic growth in caregivers of cancer patients. *Frontiers of Psychology, 5*.
- Dekel, S., Ein-Dor, T., Solomon, Z. (2012). Posttraumatic growth and posttraumatic distress: A longitudinal study. *Psychological Trauma: Theory, Research, Practice, and Policy, 4*(1), 94-101.
- Department of Veterans Affairs (2016). *Profile of Post-9/11 Veterans 2014: Data from the American Community Survey*. Washington, DC: National Center for Veterans Analysis and Statistics.
- Department of Veterans Affairs, Veterans Health Administration, Office of Public Health, Post Deployment Health Group, Epidemiology Program. (2015). *Analysis of VA Health Care Utilization among OEF, OIF, and OND Veterans*.
- D'Zurilla, T.J., Nezu, A.M., & Maydeu-Olivares, A. (2002). *Social Problem-Solving Inventory-Revised (SPSI-R)*. North Tonawanda, NY: Multi-Health Systems, Inc.
- Easton, S. D., Coohy, C., Rhodes, A. M., & Moorthy, M. V. (2013). Posttraumatic growth among men with histories of child sexual abuse. *Child Maltreatment, 18*(4), 211-220.
- Fergus, T. A., Valentiner, D. P., Wu, K. D., & McGrath, P. B. (2014). Examining the symptom-level specificity of negative problem orientation in a clinical sample. *Cognitive Behaviour Therapy, 44*(2), 153–161.
- Fergusson, D. M., Boden, J. M., Horwood, L. J., & Mulder, R. T. (2014). Perceptions of distress and positive consequences following exposure to a major disaster amongst a well-studied cohort. *Australian & New Zealand Journal of Psychiatry, 49*(4), 351–359.
- Foa, E. B., Ehlers, A., Clark, D. M., Tolin, D. F., & Orsillo, S. M. (1999). The Posttraumatic Cognitions Inventory (PTCI): Development and validation. *Psychological Assessment, 11*(3), 303–314.

- Frazier, P., Tennen, H., Gavian, M., Park, C., Tomich, P., & Tashiro, T. (2009). Does self-reported posttraumatic growth reflect genuine positive change. *Psychological Science, 20*(7), 912-919.
- Fulton, J. J., Calhoun, P. S., Wagner, H. R., Schry, A. R., Hair, L. P., Feeling, N., Elbogen, E., & Beckham, J. C. (2015). The prevalence of posttraumatic stress disorder in Operation Enduring Freedom/Operation Iraqi Freedom Veterans: A meta-analysis. *Journal of Anxiety Disorders, 31*, 98-107.
- Gallaway, M. S., Millikan, A. M., & Bell, M. R. (2011). The association between deployment-related posttraumatic growth among U.S. army soldiers and negative behavioral health conditions. *Journal of Clinical Psychology, 67*(12), 1151–1160.
- Garcia, F. E., Paez-Rovira, D., Zurtia, G. C., Martel, H. N., & Reyes, A. R. (2014). Religious coping, social support, and subjective severity as predictors of posttraumatic growth in people affected by the earthquake in Chile on 27/2/2010. *Religions, 5*, 1132-1145.
- Gerber, M. M., Boals, A., & Schuettler, D. (2011). The unique contributions of positive and negative religious coping to posttraumatic growth and PTSD. *Psychology of Religion and Spirituality, 3*(4), 298–307. doi:10.1037/a0023016
- Godshall, F. J., & Elliott, T. R. (1997). Behavioral correlates of self-appraised problem-solving skills and health-compromising behaviors. *Journal of Applied Social Psychology, 27*(11), 929–944.
- Grace, J. J., Kinsella, E. L., Muldoon, O. T., & Fortune, D. G. (2015). Post-traumatic growth following acquired brain injury: a systematic review and meta-analysis. *Frontiers of Psychology, 6*, 1162.
- Greenfield, A. (2015). *Social problem-solving and posttraumatic stress symptomatology in Veterans* (Master's thesis). Retrieved from <https://idea.library.drexel.edu/islandora/object/idea%3A6550>
- Groleau, J. M., Calhoun, L. G., Cann, A., & Tedeschi, R. G. (2013). The role of centrality of events in posttraumatic distress and posttraumatic growth. *Psychological Trauma: Theory, Research, Practice, and Policy, 5*(5), 477–483.
- Gunty, A. L., Frazier, P. A., Tennen, H., Tomich, P., Tashiro, T., & Park, P. (2011). *Psychological Trauma: Theory, Research, Practice, and Policy, 3*(1), 61-66.
- Hall, B. J., Hobfoll, S. E., Canetti, D., Johnson, R. J., & Galea, S. (2009). The defensive nature of benefit finding during ongoing terrorism: An examination of a national sample of Israeli Jews. *Journal of Social and Clinical Psychology, 28*(8), 993–1021.

- Hijazi, A. M., O'Brien, C., & Keith, J. A. (2015). Predictors of Posttraumatic Growth in a Clinical Sample of U.S. Combat Veterans. *Journal of Peace Psychology, 21*(3).
- Hoge, C. W., Castro, C. A., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine, 351*(1), 13–22.
- Janoff-Bulman, R. (1993) *Shattered assumptions: Toward a new psychology of trauma*. New York, NY: The Free Press.
- Kaler, M. E., Erbes, C. R., Tedeschi, R. G., Arbisi, P. A., & Polusny, M. A. (2011). Factor structure and concurrent validity of the Posttraumatic Growth Inventory-Short Form among veterans from the Iraq War. *Journal of Traumatic Stress, 24*(2), 200–207.
- Kalpakjian, C. Z., McCullumsmith, C. B., Fann, J. R., Richards, J. S., Stoelb, B. L., Heinemann, A. W., & Bombardier, C. H. (2014). Posttraumatic growth following spinal cord injury. *The Journal of Spinal Cord Medicine, 37*(2), 218-225.
- Kasckow, J., Brown, C., Morse, J., Begley, A., Bensasi, S., & Reynolds, C. F., 3rd. (2012). Post-traumatic stress disorder symptoms in emotionally distressed individuals referred for a depression prevention intervention: Relationship to problem-solving skills. *International Journal of Geriatric Psychiatry, 27*(11), 1106-1111.
- Kleim, B., & Ehlers, A. (2009). Evidence for a curvilinear relationship between posttraumatic growth and posttrauma depression and PTSD in assault survivors. *Journal of Traumatic Stress, 22*(1), 45–52. doi:10.1002/jts.20378
- Klingensmith, K., Tsai, J., Mota, N., Southwick, S. M., & Pietrzak, R. H. (2014). Military sexual trauma in US Veterans. *The Journal of Clinical Psychiatry, e1133–e1139*.
- Levine, S. Z., Laufer, A., Hamama-Raz, Y., Stein, E., & Solomon, Z. (2008). Posttraumatic growth in adolescence: Examining its components and relationship with PTSD. *Journal of Traumatic Stress, 21*(5), 492–496.
- Lindstrom, C. M., Cann, A., Calhoun, L. G., & Tedeschi, R. G. (2013). The relationship of core-belief challenge, rumination, disclosure, and sociocultural elements of posttraumatic growth. *Psychological Trauma: Theory, Research, Practice, and Policy, 5*(1), 50-55.
- Litz, B. T., Stein, N., Delaney, E., Lebowitz, L., Nash, W. P., Silva, C., & Maguen, S. (2009). Moral injury and moral repair in war veterans: A preliminary model and intervention strategy. *Clinical Psychology Review, 29*(8), 695-706. doi:

- Maguen, S., Vogt, D. S., King, L. A., King, D. W., & Litz, B. T. (2006). Posttraumatic growth among Gulf War I Veterans: The predictive role of deployment-related experiences and background characteristics. *Journal of Loss and Trauma, 11*(5), 373–388.
- Martin, L. L., & Tesser, A. (1996). Some ruminative thoughts. In Wyer, S. (Ed), *Ruminative thoughts: Advances in social cognition* (Vol. 9, pp. 1-47). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Malouff, J., Thorsteinsson, E., & Schutte, N. (2007). The efficacy of problem solving therapy in reducing mental and physical health problems: A meta-analysis. *Clinical Psychology Review, 27*(1), 46–57.
- Mason, W., & Suri, S. (2011). Conducting behavioral research on Amazon’s Mechanical Turk. *Behavior Research Methods, 44*(1), 1–23.
- McMurrin, M., & Christopher, G. (2009). Social problem solving, anxiety, and depression in adult male prisoners. *Legal and Criminological Psychology, 14*(1), 101–107.
- Moore, S. A., Varra, A. A., Michael, S. T., & Simpson, T. L. (2010). Stress-related growth, positive reframing, and emotional processing in the prediction of post-trauma functioning among veterans in mental health treatment. *Psychological Trauma: Theory, Research, Practice, and Policy, 2*(2), 93–96.
- Michael, C., & Cooper, M. (2013). Post-traumatic growth following bereavement: A systematic review of the literature. *Counselling Psychology Review, 28*(4), 18-33.
- Mustillo, S. A., Kysar-Moon, A., Douglas, S. R., Hargraves, R., Wadsworth, M., Fraine, M., Fazer, N. L. (2015). Overview of depression, post-traumatic stress disorder, and alcohol misuse among active duty service members returning from Iraq and Afghanistan, self-report and diagnosis. *Military Medicine, 180*(4), 419-427.
- Nezu, A. M. & Carnevale, G. J. (1987). Interpersonal problem solving and coping reactions of Vietnam veterans with posttraumatic stress disorder. *Journal of Abnormal Psychology, 96*(2), 155-157.
- Nezu, A. M., Nezu, C. M., D’Zurilla, T. J. (2013). *Problem-Solving Therapy: A treatment manual*. New York, NY: Springer
- Nezu, A. M., Nezu, C. M., & Jain, D. (2008). Social problem solving as a mediator of the stress-pain relationship among individuals with noncardiac chest pain. *Health Psychology, 27*(6), 829–832.
- Norris, F. H., & Slone, L. B. (2013). Understanding research on the epidemiology of trauma and PTSD. *PTSD Research Quarterly, 24*(2-3), 1-13.

- Parikh, D., Ieso, P. D., Garvey, G., Thachil, T., Ramamoorthi, R., Penniment, M., & Jayaraj, R. (2015). Post-traumatic stress disorder and post-traumatic growth in breast cancer patients – A systematic review. *Asian Pacific Journal of Cancer Prevention, 16*(2), 641–646.
- Park, C. L., Cohen, L. H., & Murch, R. L. (1996). Assessment and prediction of stress-related growth. *Journal of Personality, 64*(1), 71-105.
- Pietrzak, R. H., Goldstein, M. B., Malley, J. C., Rivers, A. J., Johnson, D. C., Morgan, C. A., & Southwick, S. M. (2010). Posttraumatic growth in Veterans of Operations Enduring Freedom and Iraqi Freedom. *Journal of Affective Disorders, 126*(1-2), 230–235.
- Pollard, C., & Kennedy, P. (2007). A longitudinal analysis of emotional impact, coping strategies and post-traumatic psychological growth following spinal cord injury: A 10-year review. *British Journal of Health Psychology, 12*(3), 347–362.
- Prati, G., & Pietrantonio, L. (2009). Optimism, social support, and coping strategies as factors contributing to posttraumatic growth: A Meta-Analysis. *Journal of Loss and Trauma, 14*(5), 364–388.
- Proctor, S. P., Heeren, T., White, R. F., Wolfe, J., Borgos, M. S., Davis, J. D., Pepper, L., . . . Oznoff, D. (1998). Health status of Persian Gulf War Veterans: Self-reported symptoms, environmental exposures and the effect of stress. *International Journal of Epidemiology, 27*(6), 1000-1010.
- Reich, C. M., Blackwell, N., Simmons, C. A., & Beck, J. G. (2015). Social problem solving strategies and posttraumatic stress disorder in the aftermath of intimate partner violence. *Journal of Anxiety Disorders, 32*, 31–37.
- Roepke, A. M. (2015). Psychosocial interventions and posttraumatic growth: A meta-analysis. *Journal of Consulting and Clinical Psychology, 83*(1), 129–142.
- Rumann, C. B., & Hamrick, F. A. (2010). Student Veterans in transition: Re-enrolling after war zone deployments. *The Journal of Higher Education, 81*(4), 431–458.
- Sayer, N., Noorbaloochi, S., Frazier, P., Carlson, K., Gravely, A., & Murdoch, M. (2010). Reintegration problems and treatment interests among Iraq and Afghanistan combat Veterans receiving VA medical care. *Psychiatric Services, 61*(6). doi:10.1176/appi.ps.61.6.589
- Sayer, N. A., Orazem, R. J., Noorbaloochi, S., Gravely, A., Frazier, P., Carlson, K. F., . . . Oleson, H. (2015). Iraq and Afghanistan War Veterans with reintegration problems: Differences by Veterans Affairs Healthcare user status. *Administrative Policy and Mental Health, 42*(4), 493–503.

- Schroevers, M. J., Helgeson, V. S., Sanderman, R., Ranchor, A. V. (2010). Type of social support matters for prediction of posttraumatic growth among cancer survivors. *Psycho-Oncology*, 19(1), 46-53.
- Segal, A. G., Diaz, C. E., Nezu, C. M., & Nezu, A. M. (2014). Social problem-solving as a predictor of attitudes toward seeking mental health care and medical care among Veterans. *Military Behavioral Health*, 0, 1-12. Doi:.
- Shand, L. K., Cowlshaw, S., Brooker, J. E., Burney, S., & Ricciardelli, L. A. (2014). Correlates of post-traumatic stress symptoms and growth in cancer patients: A systematic review and meta-analysis. *Psycho-Oncology*, 24(6), 624–634.
- Shamia, N. A., Thabet, A. A. M., & Vostanis, P. (2015). Exposure to war traumatic experiences, post-traumatic stress disorder and post-traumatic growth among nurses in Gaza. *Journal of Psychiatric and Mental Health Nursing*, 22(10), 749–755.
- Shen, Y., Arkes, J., & Williams, T. V. (2012). Effects of Iraq/Afghanistan deployments on Major Depression and Substance Use Disorder: Analysis of active duty personnel in the US military. *American Journal of Public Health*, 102(1), 80-87.
- Sherman, M. D., Larsen, J., & Borden, L. M. (2015). Broadening the focus in supporting reintegrating Iraq and Afghanistan veterans: Six key domains of functioning. *Professional Psychology: Research and Practice*, 46(5), 355–365.
- Sherr, L., Nagra, N., Kulubya, G., Catalan, J., Clucas, C., & Harding, R. (2011). HIV infection associated post-traumatic stress disorder and post-traumatic growth – A systematic review. *Psychology, Health & Medicine*, 16(5), 612–629.
- Siqveland, J., Nygaard, E., Hussain, A., Tedeschi, R. G., & Heir, T. (2015). Posttraumatic growth, depression and posttraumatic stress in relation to quality of life in tsunami survivors: A longitudinal study. *Health and Quality of Life Outcomes*, 13(18).
- Speckens, A. E. M., & Hawton, K. (2005). Social problem-solving in adolescents with suicidal behavior: A systematic review. *Suicide and Life-Threatening Behavior*, 35(4), 365–387.
- Spence, S. H., Sheffield, J., & Donovan, C. (2002). Problem-solving orientation and attributional-style: Moderators of the impact of negative life events on the development of depressive symptoms in adolescence? *Journal of Clinical Child & Adolescent Psychology*, 31(2), 219–229.
- Taku, K., Cann, A., Tedeschi, R. G., Calhoun, L. G. (2009). Intrusive versus deliberate rumination in posttraumatic growth across US and Japanese samples. *Anxiety, Stress, & Coping*, 22(2), 129-136.

- Tedeschi, R. G., & Calhoun, L. G. (1995). *Trauma and transformation: Growing in the aftermath of suffering*. Thousand Oaks, CA: Sage Publications.
- Tedeschi, R. G. & Calhoun, L. G. (1996). The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress, 9*(3),
- Teixeira, R. J., & Pereira, M. G. (2013). Factors contributing to posttraumatic growth in its buffering effect in adult children of cancer patients undergoing treatment. *Journal of Psychosocial Oncology, 31*(3), 235–265.
- Tomich, P. L., & Helgeson, V. S. (2004). Is finding something good in the bad always good? Benefit finding among women with breast cancer. *Health Psychology, 23*(1), 16–23.
- Tsai, J., El-Gabalawy, R., Sledge, W. H., Southwick, S. M., & Pietrzak, R. H. (2015). Post-traumatic growth among veterans in the USA: results from the National Health and Resilience in Veterans Study. *Psychological Medicine, 45*(01), 165–179.
- Tsai, J., Mota, N. P., Southwick, S. M., & Pietrzak, R. H. (2016). What doesn't kill you makes you stronger: A national study of U.S. military veterans. *Journal of Affective Disorders, 189*, 269–271.
- Tuncay, T. & Musabak, I. (2015). Problem-focused coping strategies predict posttraumatic growth in Veterans with lower-limb amputations. *Journal of Social Service Research, 41*(4), 466-483.
- Ullman, S. E. (2014). Correlates of posttraumatic growth in adult sexual assault victims. *Traumatology, 20*(3), 219–224.
- Weathers, F.W., Litz, B.T., Keane, T.M., Palmieri, P.A., Marx, B.P., & Schnurr, P.P. (2013). *The PTSD Checklist for DSM-5 (PCL-5)*. Scale available from the National Center for PTSD at www.ptsd.va.gov
- Widows, M. R., Jacobsen, P. B., Booth-Jones, M., & Fields, K. K. (2005). Predictors of posttraumatic growth following bone marrow transplantation for cancer. *Health Psychology, 24*(3), 266–273.
- Wisco, B. E., Marx, B. P., Wolf, E. J., Miller, M. W., Southwick, S. M., & Pietrzak, R. H. (2014). Posttraumatic stress disorder in the US Veteran population. *The Journal of Clinical Psychiatry, 1338–1346*.
- Zerach, G., Solomon, Z., Cohen, A., & Ein-Dor, T. (2013) PTSD, resilience and posttraumatic growth among ex-prisoners of war and combat veterans. *Israeli Journal of Psychiatry and Related Sciences, 50*(2), 91-9.

Zoellner, T., & Maercker, A. (2006). Posttraumatic growth in clinical psychology — A critical review and introduction of a two component model. *Clinical Psychology Review*, 26(5), 626–653.

Zoellner, T., Rabe, S., Karl, A., & Maercker, A. (2008). Posttraumatic growth in accident survivors: openness and optimism as predictors of its constructive or illusory sides. *Journal of Clinical Psychology*, 64(3), 245–263. doi:10.1002/jclp.20441

APPENDIX A. Tables

Table 1. Demographic Characteristics of Study Participants

Variable	Frequency or Range	Percent or Mean (SD)
Age	23-73	48.37(13.94)
Sex		
Male	121	78.6
Female	33	21.4
Self-Defined Race/Ethnicity		
White/Caucasian	114	74.0
Black/African-American	24	16.1
Hispanic/Latino	8	5.2
Native Hawaiian or Pacific Islander	3	1.9
Asian/Asian-American	1	.6
Multi-Racial/Ethnic	2	1.3
Other	1	.6
Sexual Orientation		
Heterosexual/Straight	147	95.5
Lesbian	2	1.3
Bisexual	1	.6
Other	1	.6
Prefer Not to Say	3	1.9
Marital Status		
Married/Living with Partner	81	52.6
Divorced/Separated	30	19.4
Widowed	6	3.9
Single/Never Married	37	24.0
Number of Children		
0	58	37.7

1	33	21.4
2	33	21.4
3	11	7.1
4	10	6.5
5	4	2.6
>5	5	3.2
Current Student		
Yes	33	21.4
No	121	78.6
Current Education Level (If a Current Student)		
College Freshman	2	1.3
College Sophomore	6	3.9
College Junior	7	4.5
College Senior	7	4.5
Graduate Student	9	5.8
Highest Education Level		
Some High School	1	.6
High School Diploma	22	14.3
Some College	50	32.5
College Degree	46	29.9
Graduate Education	34	22.1
Current Work Status		
Full-Time Employee	68	44.2
Part-Time Employee	24	15.5
Unemployed/Seeking to Work	17	11.0
Disabled/Unable to Work	18	11.7
Retired	23	14.9
Volunteer	4	2.6
Household Income		

Less than \$20,000	39	25.3
\$20-40,000	31	20.1
\$40-60,000	26	16.9
\$60-80,000	18	11.7
\$80-100,000	19	12.3
>\$100,000	21	13.6
Self-Identified Religious Affiliation		
Christian	93	60.3
Jewish	4	2.6
Muslim	1	.6
Hindhu	1	.6
Buddhist	1	.6
Other	5	3.0
Agnostic	13	8.4
Athiest	13	8.4
Unaffiliated	23	14.9
Tobacco Use		
Yes	63	40.9
No	91	59.1
Alcohol Use (Average Number of Drinks Per Week)		
0	56	36.3
1-3	46	29.8
4-7	29	18.8
8-12	12	7.7
>12	11	7.1
Psychiatric Diagnosis		
Posttraumatic Stress Disorder	30	19.5
Generalized Anxiety Disorder	16	10.4
Major Depressive Disorder	15	9.7

Bipolar Disorder	6	3.9
Schizophrenia	5	3.2
Other	3	1.9
Psychiatric Treatment (Medication or Therapy)		
Yes	41	26.6
No	113	73.4

Table 2. *Military-Related Characteristics of Study Participants*

Variable	Frequency	Percent
Branch of Service		
Army	83	53.90
Navy	25	16.23
Air Force	24	15.58
Marine Corps	18	11.69
National Guard	15	9.74
Reserve Forces	8	5.19
Campaigns Served		
Operation Iraqi Freedom	68	44.16
Operation Enduring Freedom	44	28.57
Operation New Dawn	13	8.44
Operation Desert Storm	25	16.23
Vietnam War	20	12.98
Other	9	5.8
Peacetime/None	29	18.83
Deployment History		
0	48	31.17
1	47	30.52
2	32	20.78
3	11	7.14
> 3	16	10.39
Length of Longest Deployment (Months)		
2 – 6	30	19.48
7 – 9	24	15.58
10 – 12	29	18.83
13 – 16	13	8.44
> 16	11	7.14

Most Recent Deployment (Years Before)

1 – 3	17	11.04
4 – 6	22	14.29
7 – 10	18	11.69
11 – 20	24	15.58
21 – 30	11	7.14
> 30	15	9.74
Combat Experience		
Yes	58	37.7
No	96	62.3
Military-Related Injury or Disability		
Yes	70	45.5
No	84	54.5

Note. $N = 154$.

Table 3. *Descriptive Statistics for Study Variables*

Variable	Min	Max	Mean	Std. Deviation
SPSI				
PPO	5.00	25.00	16.92	4.40
NPO	0.00	20.00	10.25	4.55
RPS	7.00	26.00	15.47	3.63
ICS	0.00	20.00	10.77	3.90
AS	0.00	23.00	10.34	4.56
PCL-5	2.00	88.00	42.31	20.18
PTGI	4.00	126.00	73.47	26.55

Note. $N = 154$

Table 4. Descriptive Statistics of Study Variables Among Recruitment Types and Analysis of Variance Results Testing for Group Differences

Variable	In-Person Recruitment (<i>n</i> = 29)		Snowball Sampling (<i>n</i> = 50)		Amazon mTurk (<i>n</i> = 75)		Analysis of Variance <i>F</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
SPSI							
PPO	13.66	4.69	16.98	3.39	18.13	4.29	12.455**
NPO	6.93	4.99	11.44	3.70	10.73	4.32	11.184**
RPS	13.36	3.16	14.32	3.37	17.95	3.28	17.750**
ICS	9.48	4.68	11.64	3.37	10.68	3.81	2.912
AS	7.69	4.78	12.30	4.23	10.07	3.90	10.927**
PCL-5	36.64	21.25	47.10	21.59	41.32	18.25	2.704
PTGI	59.5	26.73	77.00	27.84	76.52	24.06	5.227**

Note. *N* = 154, **p* < .05, ***p* < .01.

Table 5. *Bivariate Relationships Among Study Variables*

	1	2	3	4	5	6	7
1. PPO	-						
2. NPO	-.25**	-					
3. RPS	.48**	.19*	-				
4. ICS	-.15	.39**	-.06	-			
5. AS	-.33**	.62**	-.16	.56**	-		
6. PCL-5	-.09	.40**	.05	.23**	.26**	-	
7. PTGI	.31**	-.04	.35**	-.10	-.06	-.07	-

Note. $N = 154$, * $p < .05$, ** $p < .01$.

Table 6. Bivariate Relationships Among Demographic and Military-Related Variables, Posttraumatic Growth, and Posttraumatic Stress Symptomatology

	1	2	3	4	5	6	7	8	9	10	11
1. Age	-										
2. Sex	-.25**	-									
3. Number of Children	.32**	.04	-								
4. Household Income	.06	.07	.02	-							
5. Religious/Spiritual	.18*	-.12	.15	-.08	-						
6. Tobacco Use	.12	-.21**	.05	-.35**	-.04	-					
7. Alcohol Consumption	-.01	-.06	.05	-.01	-.15	.13	-				
8. History of Deployment	-.02	-.14	-.04	.15	-.04	.02	.05	-			
9. Combat Experience	-.06	-.15	-.03	.19	.13	.06	-.03	.08	-		
10. PTG	-.05	.11	.07	.05	.12	-.22**	-.03	.08	.09	-	
11. PCL-5	-.13	.02	.05	-.04	.07	.12	.17*	.17*	.35**	-.07	-

Note. $N = 154$, * $p < .05$, ** $p < .01$.

Table 7. Summary of Hierarchical Regression Analysis for Predicting Posttraumatic Growth from Positive Social Problem-Solving Factors

Variable	Model 1			Model 2		
	<i>b</i>	<i>SE_b</i>	β	<i>b</i>	<i>SE_b</i>	β
Tobacco	-11.61**	4.26	-.22**	-9.15*	4.03	-.17*
PPO				1.02*	.51	.17*
RPS				1.83**	.62	.25**
<i>R</i> ²		.047			.176	
ΔR^2		.047			.129	
<i>F</i> for ΔR^2		7.418**			11.772**	

Note. *N* = 154, **p* < .05, ***p* < .01, ****p* < .001.

Table 8. Summary of Hierarchical Regression Analysis for Predicting Posttraumatic Growth from Negative Social Problem-Solving Factors

Variable	Model 1			Model 2		
	<i>b</i>	<i>SE_b</i>	β	<i>b</i>	<i>SE_b</i>	β
Tobacco	-11.61**	4.26	-.22**	-12.24	4.31	-.23**
NPO				-.03	.65	.01
ICS				-.65	.66	-.10
AS				-.18	.66	-.03
<i>R</i> ²		.047			.060	
ΔR^2		.047			.014	
<i>F</i> for ΔR^2		7.418**			.726	

Note. *N* = 154, **p* < .05, ***p* < .01, ****p* < .001.

Table 9. Summary of Hierarchical Regression Analysis for Predicting Posttraumatic Stress Symptomatology from Positive Social Problem-Solving Factors

Variable	Model 1			Model 2		
	<i>b</i>	<i>SE_b</i>	β	<i>b</i>	<i>SE_b</i>	β
Alcohol	.58*	2.44	.18*	-.57*	.25	.18*
Deployment	-1.15	3.86	-.03	-1.51	-.39	-.03
Combat	15.71**	3.64	.38**	15.63**	4.29	.38**
PPO				-.51	1.29	-.11
RPS				.37	.77	.07
<i>R</i> ²		.161			.170	
ΔR^2		.161			.010	
<i>F</i> for ΔR^2		9.450**			.848	

Note. *N* = 154, **p* < .05, ***p* < .01, ****p* < .001.

Table 10. Summary of Hierarchical Regression Analysis for Predicting Posttraumatic Stress Symptomatology from Negative Social Problem-Solving Factors

Variable	Model 1			Model 2		
	<i>b</i>	<i>SE_b</i>	β	<i>b</i>	<i>SE_b</i>	β
Alcohol	.58*	2.44	.18*	.53*	.24	.17*
Deployment	-1.15	3.86	-.03	-2.00	3.69	-.05
Combat	15.71**	3.64	.38**	12.68**	3.54	.30**
NPO				1.32**	.41	.30**
ICS				.20	.45	.04
AS				.04	.46	.01
<i>R</i> ²		.161			.257	
ΔR^2		.161			.096	
<i>F</i> for ΔR^2		9.450**			6.266**	

Note. *N* = 154, **p* < .05, ***p* < .01, ****p* < .001.

APPENDIX B. Measures**B1. Demographic Information**

1. Age: _____

2. Sex:

Male

Female

3. Self-defined race/ethnicity:

White

Asian

Black/African-American

Hispanic/Latino

Native Hawaiian/Pacific Islander

Multi-racial/ethnic

Other (Please specify) _____

4. Sexual orientation:

Heterosexual

Homosexual

Bisexual

Other (Please specify) _____

4. Marital status:

- Married / Living with partner
- Divorced / Separated
- Widowed
- Single / Never married

5. Do you have children?

- Yes (If yes, how many?): _____
- No

6. Are you a student?

- Yes
- No

7. If you are a student, what is your current academic standing?

- College freshman
- College sophomore
- College junior
- College senior
- Graduate student (If so, what type of program are you in?)
- _____
- Not a current student

8. If you are a student, what is your current major/area of study?

9. If you are not a current student, what is the highest level of education you have completed?

- Some high school
- High school diploma
- Some college
- College degree
- Graduate education

10. Are you currently:

- Working full-time
- Working part-time
- Volunteering
- Student
- Retired
- Unemployed / Seeking to work
- Disabled / Unable to work

11. What is your current household income?

- Less than \$20,000
- \$20-40,000

- \$40-60,000
- \$60-80,000
- \$80-100,000
- Greater than \$100,000

12. Is English your first/native language? If not, what is your first/native language?

- Yes
- No, other (please specify) _____

13. Do you consider yourself to be religious or spiritual?

- Yes
- No

14. What is your self-identified religious affiliation?

- Christian
- Jewish
- Muslim
- Buddhist
- Hindhu
- Athiest
- Agnostic
- Unaffiliated

Other (please specify) _____

15. Do you currently use tobacco products?

Yes (If so, how much?): _____

No

16. How many alcohol drinks do you have per week on average?

17. Have you ever been diagnosed with a psychiatric disorder?

Yes (if so, please specify) _____

No

18. Are you currently receiving medication or counseling for emotional problems such as depression or anxiety?

Yes (if so, please specify) _____

No

19. Are you a Veteran of the US Armed Forces? We define Veteran as anyone who has served as active duty or in reserve components of the United States Air Force, Army, Coast Guard, Marine Corps, National Guard, or Navy.

Yes

No, other (please specify) _____

20. What branch(es) did you serve in?

- Army
- Navy
- Air Force
- Coast Guard
- Marine Corps
- National Guard
- Reserve Forces
- Other (please specify) _____

21. Please list any campaigns in which you might have participated.

- Operation New Dawn
- Operation Iraqi Freedom
- Operation Enduring Freedom (i.e. Global War on Terror)
- Persian Gulf War
- Vietnam War
- Other (please specify) _____

22. What was your MOS/rate?: _____

23. While serving in the military, were you ever deployed?

- Yes

No

24. If you were deployed, did you ever experience direct combat?

Yes

No

25. If you were deployed, please list the number of deployments you had.

26. If you were deployed, please list the length of your longest deployment in months.

27. If you were deployed, how long ago was your most recent deployment?

28. During your time in the military, did you ever experience a military-related physical injury or physical disability?

Yes (please specify) _____

No

29. When were you discharged from the military? (if you have served in Reserve components or National Guard in addition to other branches, list time since your most recent discharge)

Thank you for providing this information. Please do not provide us with any information that identifies you, as we desire to maintain your confidentiality and anonymity.

B2. Social Problem-Solving Inventory – Revised: Short Form (SPSI-R:S)

Instructions. Below are some ways that you might think, feel, and act when faced with problems in everyday living. We are not talking about the ordinary hassles and pressures that you handle successfully every day. In this questionnaire, a problem is something important in your life that bothers you a lot, but you don't immediately know how to make it better or stop it from bothering you so much. The problem could be something about yourself (your thoughts, feelings, behavior, health, or appearance), your relationships with other people (your family, friends, teachers, or boss), or your environment and the things you own (your house, car, or money).

Please read each statement carefully and choose one of the numbers below that best shows how much the statement is true of you. See yourself as you usually think, feel, and act when you are faced with important problems in your life these days. Circle the number that is most true of you. For example, using the following rating scale (which is at the top of each page), if you believe that the statement "Whenever I have a problem, I believe that it can be solved" is "*Very True of Me*," then you would circle the number "3."

0	1	2	3	4
<i>Not at All True of Me</i>	<i>Slightly True of Me</i>	<i>Moderately True of Me</i>	<i>Very True of Me</i>	<i>Extremely True of Me</i>

- | | | | | | |
|---|---|---|---|---|---|
| 1. I feel threatened and afraid when I have an important problem to solve. | 0 | 1 | 2 | 3 | 4 |
| 2. When making decisions, I do not evaluate all my options carefully enough. | 0 | 1 | 2 | 3 | 4 |
| 3. I feel nervous and unsure of myself when I have an important decision to make. | 0 | 1 | 2 | 3 | 4 |
| 4. When my first efforts to solve a problem fail, I know if I persist and do not give up too easily, I will be able to eventually find a good solution. | 0 | 1 | 2 | 3 | 4 |
| 5. When I have a problem, I try to see it as a challenge, or opportunity to benefit in some positive way from having the problem. | 0 | 1 | 2 | 3 | 4 |
| 6. I wait to see if a problem will resolve itself first, before trying to solve it myself. | 0 | 1 | 2 | 3 | 4 |
| 7. When my first efforts to solve a problem fail, I get very frustrated. | 0 | 1 | 2 | 3 | 4 |

8. When I am faced with a difficult problem, I doubt that I will be able to solve it on my own no matter how hard I try. 0 1 2 3 4
9. Whenever I have a problem, I believe that it can be solved. 0 1 2 3 4
10. I go out of my way to avoid having to deal with problems in my life. 0 1 2 3 4
11. Difficult problems make me very upset. 0 1 2 3 4
12. When I have a decision to make I try to predict the positive and negative consequences of each option. 0 1 2 3 4
13. When problems occur in my life, I like to deal with them as soon as possible. 0 1 2 3 4
14. When I am trying to solve a problem, I go with the first good idea that comes to mind. 0 1 2 3 4
15. When I am faced with a difficult problem, I believe that I will be able to solve it on my own if I try hard enough. 0 1 2 3 4
16. When I have a problem to solve, one of the first things I do is get as many facts about the problem as possible. 0 1 2 3 4
17. When a problem occurs in my life, I put off trying to solve it for as long as possible. 0 1 2 3 4
18. I spend more time avoiding my problems than solving them. 0 1 2 3 4
19. Before I try to solve a problem, I set a specific goal so that I know exactly what I want to accomplish. 0 1 2 3 4
20. When I have a decision to make, I do not take the time to consider the pros and cons of each option. 0 1 2 3 4
21. After carrying out a solution to a problem, I try to evaluate as carefully as possible how much the situation has changed for the better. 0 1 2 3 4

22. I put off solving problems until it is too late to do anything about them. 0 1 2 3 4
23. When I am trying to solve a problem, I think of as many options as possible until I cannot come up with any more ideas. 0 1 2 3 4
24. When making decisions, I go with my “gut feeling” without thinking too much about the consequences of each option. 0 1 2 3 4
25. I am too impulsive when it comes to making decisions. 0 1 2 3 4

*Please be sure that you completed all 25 questions.
Thank you!*

B3. Posttraumatic Stress Disorder Checklist (PCL-5)

PCL-5 with Criterion A & Study Supplement

Instructions. This questionnaire asks about problems you may have had after a very stressful experience that has impacted your life. It could be something that happened to you directly, something you witnessed, or something you learned happened to a close family member or close friend. Some examples are serious accidents (i.e. disaster such as a hurricane, tornado, earthquake; physical or sexual attack or abuse; war; homicide; or suicide), interpersonal events (i.e. divorce, death of a family member or close friend), or health-related event (i.e. diagnosis of a serious illness or psychological disorder).

First, please answer a few questions about your worst event, which for this questionnaire means the event that currently bothers you the most. This could be one of the examples above or some other very stressful experience. Also, it could be a single event (for example, a car crash) or multiple similar events (for example, stressful events in a war-zone or repeated sexual abuse).

Briefly identify the worst event you have experienced (if comfortable doing so):

How long ago did it happen? _____ (Please estimate if you are not sure)

Did it involve actual or threatened death, serious injury, or sexual violence?

___ It happened to me directly

___ I witnessed it

___ I learned about it happening to a close family member or close friend

___ I was repeatedly exposed to details about it as part of my job (for example, paramedic, police, military, or other first responder)

___ Other, please describe: _____

If the event involved the death of a close family member or close friend, was it due to some kind of accident or violence, or was it due to natural causes?

___ Accident or violence

___ Natural causes

___ Not applicable (the event didn't involve the death of a close family member or close friend)

Please rate the extent that this event has negatively impacted your life.

-4	-3	-2	-1	0	1	2	3	4
Very Negatively		Somewhat Negatively		Not at all		Somewhat Positively		Very Positively

Please rate how stressful or intense you feel that this event was at the time.

0	1	2	3	4
Not at all		Somewhat Intense or Stressful		Very Intense or Stressful

Third, below is a list of problems that people sometimes have in response to a very stressful experience. Keeping your worst event in mind, please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by that problem in the past month.

In the past month, how much were you bothered by?	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Repeated, disturbing, and unwanted memories of the stressful experience?	0	1	2	3	4
2. Repeated, disturbing dreams of the stressful experience?	0	1	2	3	4
3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?	0	1	2	3	4
4. Feeling very upset when something reminded you of the stressful experience?	0	1	2	3	4
5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?	0	1	2	3	4
6. Avoiding memories, thoughts, or feelings related to the stressful experience?	0	1	2	3	4

7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?	0	1	2	3	4
8. Trouble remembering important parts of the stressful experience?	0	1	2	3	4
9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?	0	1	2	3	4
10. Blaming yourself or someone else for the stressful experience or what happened after it?	0	1	2	3	4
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?	0	1	2	3	4
12. Loss of interest in activities that you used to enjoy?	0	1	2	3	4
13. Feeling distant or cut off from other people?	0	1	2	3	4
14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?	0	1	2	3	4
15. Irritable behavior, angry outbursts, or acting aggressively?	0	1	2	3	4
16. Taking too many risks or doing things that could cause you harm?	0	1	2	3	4
17. Being "superalert" or watchful or on guard?	0	1	2	3	4
18. Feeling jumpy or easily startled?	0	1	2	3	4
19. Having difficulty concentrating?	0	1	2	3	4
20. Trouble falling or staying asleep?	0	1	2	3	4

PCL-5 Study Supplement

Instructions. The following brief questions are follow-up questions regarding the stressful experience you just identified for the previous set of questions.

1. Please select any of the below descriptors that describe the event you experienced and described in the previous section. Please select all that apply.

- Sexual assault
- Physical assault
- Motor-vehicle accident
- Combat incident
- Non-combat military trauma
- Abuse/neglect
- Natural disaster
- None of the above
- Other

2. When did this experience occur?

- Prior to military service
- While I was an active service member, but was not military related (i.e. did not occur in the confines or context of a military location, job, responsibility and/or duty)
- During military service and was military related (e.g. occurred in the confines or context of a military location, job, responsibility, and/or duty, or with another military personnel)
- Post-military service

B4. Posttraumatic Growth Inventory (PTGI)

Indicate for each of the statements below the degree to which this change occurred in your life as a result of your crisis or most stressful/worst experience identified on the previous survey using the following scale.

0= I did not experience this change as a result of my crisis.

1= I experienced this change to a very small degree as a result of my crisis.

2= I experienced this change to a small degree as a result of my crisis.

3= I experienced this change to a moderate degree as a result of my crisis.

4= I experienced this change to a great degree as a result of my crisis.

5= I experienced this change to a very great degree as a result of my crisis.

1. I changed my priorities about what is important in life.	0	1	2	3	4	5
2. I have a greater appreciation for the value of my own life.	0	1	2	3	4	5
3. I developed new interests.	0	1	2	3	4	5
4. I have a greater feeling of self-reliance.	0	1	2	3	4	5
5. I have a better understanding of spiritual matters.	0	1	2	3	4	5
6. I more clearly see that I can count on people in times of trouble.	0	1	2	3	4	5
7. I established a new path for my life.	0	1	2	3	4	5
8. I have a greater sense of closeness with others.	0	1	2	3	4	5
9. I am more willing to express my emotions.	0	1	2	3	4	5
10. I know better that I can handle difficulties.	0	1	2	3	4	5
11. I am able to do better things with my life.	0	1	2	3	4	5
12. I am better able to accept the way things work out.	0	1	2	3	4	5
13. I can better appreciate each day.	0	1	2	3	4	5

14. New opportunities are available which wouldn't have been otherwise. 0 1 2 3 4 5
15. I have more compassion for others. 0 1 2 3 4 5
16. I put more effort into my relationships. 0 1 2 3 4 5
17. I am more likely to try to change things which need changing. 0 1 2 3 4 5
18. I have a stronger religious faith. 0 1 2 3 4 5
19. I discovered that I'm stronger than I thought I was. 0 1 2 3 4 5
20. I learned a great deal about how wonderful people are. 0 1 2 3 4 5
21. I better accept needing others. 0 1 2 3 4 5