The Struggle to Grow: Reaching Constructive Posttraumatic Growth Among Veterans Exposed to Combat Related Trauma

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THE STRUGGLE TO GROW: REACHING CONSTRUCTIVE POSTTRAUMATIC

GROWTH AMONG VETERANS EXPOSED TO COMBAT RELATED TRAUMA

A dissertation
by

LEIA Y. SALTZMAN

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of the requirements for a degree of
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THE STRUGGLE TO GROW: REACHING CONSTRUCTIVE

POSTTRAUMATIC GROWTH AMONG VETERANS EXPOSED TO COMBAT

RELATED TRAUMA

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LEIA Y. SALTZMAN

Dissertation Chair: Dr. Margaret Lombe

Abstract

Over the past several decades trauma research has expanded to recognize the heterogeneity in post-exposure reactions. Posttraumatic stress disorder, the most commonly researched mental health outcome associated with trauma, does not develop in all trauma survivors. Rather, more common trajectories of adaptation following a trauma include normative health adaptation, resilience, and posttraumatic growth. The aims of the current study were to: (1) describe and characterize post-combat adaptation profiles in a sample of Israeli male military veterans ($N = 448$) based on the combination of posttraumatic distress symptoms, types of coping strategies, and level of posttraumatic growth; (2) test the utility of latent class membership on predicting the quality of posttraumatic growth (i.e. constructive growth); and (3) explore the protective factors (i.e. social support and adaptive coping) that promote constructive posttraumatic growth for each profile of post-combat adaptation. The current study used latent profile mixture modeling to identify profiles of post-combat adaptation, Heckman-probit regression models, and logistic regression analysis. Demographic controls, combat related variables,

type of coping strategies utilized, and baseline reports of social support were not significant predictors of constructive growth in either the *resilient* or *struggling* latent classes. However, for those in the *struggling* subset of the sample, reported improvement in perceived social support during the intervention increased the odds of reaching constructive growth. This relationship did not hold for the *resilient* subset of the sample. The study extends existing literature and theory by proposing a more complex and nuanced examination of posttrauma adaption, and specifies conditions under which protective factors may influence positive adaptation outcomes such as constructive growth. These findings highlight the importance of tailored clinical interventions that account for more complex profiles of post-combat adaptation and provide additional support for the unique effects of group intervention modalities. Further, these findings provide evidence that adaptation takes place over time and as such services should continue to be available for veterans long after combat exposure. Finally, these findings call for future research to build on existing longitudinal investigation by examining the complex temporal components of adaptation in trauma survivors.

DEDICATION

For My Father And My Brother

A A

"I carry your heart with me (I carry it in my heart)
I am never without it (anywhere I go you go…)
And whatever is done by only me is your doing…
I carry your heart (I carry it in my heart)"
~ e. e. Cummings

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Chapter I. Introduction

The introductory chapter outlines the main constructs discussed in this dissertation. The definition of trauma is followed by a brief overview and definition of three important terms that appear throughout the current study: (1) posttraumatic stress disorder; (2) resilience; and (3) posttraumatic growth. These terms reflect overlapping bodies of literature on a broad spectrum of posttrauma adaptation. The introduction is intended to provide background information and highlight the significance, scope, and broad aims of the current study; beginning with the definition of the term *trauma*.

Definition of Trauma

The word *trauma* is derived from a Greek word meaning wound. Prior to the 19th century, the term trauma was used almost exclusively to refer to *physical* injury and carried little association in the mental health field (Jones & Wessely, 2007). The origins of trauma in a mental health context can be traced to documentation regarding the negative psychological and emotional outcomes of military combat. In this framework physicians began to elucidate the psychological wounds that can emerge following exposure to violent or horrific events. In 1761 Josef Leopold, an Austrian physician, first documented the negative emotional reactions in men serving in war- a concept he referred to as '*Nostalgia*'. The trend of embedding the study of psychological trauma in a military setting has persisted throughout history, resulting in a variety of mental health syndromes (e.g. soldier's heart, railway spine, shell shock, battle fatigue, and combat related stress).

Military combat is one context in which exposure to trauma can occur. Within a combat environment military personnel are at greater risk for severe injury or threat of

injury, witnessing death or injury of another, and, perhaps the most detrimental to mental health, *contributing* the injury or death of another (Hijazi, Keith, & O'Brien, 2015). In 2013 the number of active armed forces personnel worldwide exceeded 27,000,000 (World Health Organization, 2015); indicating the vast number of military personnel globally, who are at risk for combat related traumatic exposure. As such, there has been an increase of attention in the empirical literature on understanding the mental health implications of combat related trauma.

But, where is the line between a stressful life event and a traumatic one? The criteria for defining an event as *traumatic* has been widely argued and debated; in part because previous definitions of trauma have been overly subjective, using the emergence of distress as evidence of traumatic exposure. For example, Bonanno and Mancini (2008) use the term "potentially traumatic event" highlighting the individualized nature of trauma, that is, an event may not be equally traumatic for everyone. But is the absence of distress an indication that traumatic exposure has not occurred? Or does it reflect a healthy, or even positive, adaptation to the trauma that does not require symptoms of distress?

To make that kind of distinction an objective definition of trauma is necessary. In her seminal work, Judith Herman (1992) defines trauma as an event that "overwhelms ordinary human adaptation" (Herman, 1992 p.33) laying the foundation for universal norms of traumatic events. The need for concrete and objective criterion of trauma began to be formally addressed in 1980 when, definitional criterion of trauma was included in the Diagnostic and Statistical Manual (DSM) for the first time. The most recent version of the DSM (DSM-V; APA, 2013) expands the definition of trauma to include:

A catastrophic event in which a person was exposed to: death, threatened death, actual or threatened injury, or actual or threatened sexual violence. The individual is required to have (a) experienced directly; or (b) witnessed in person; or (c) exposed indirectly by learning a relative or close friend was exposed to trauma; or (d) repeated indirect exposure to aversive details of a traumatic event. (Criteria A; American Psychological Association, 2013).

Criterion A, as it is referred to in the DSM-V, delineates the type of events that would constitute an exposure to a trauma. By itself, meeting this criterion is not sufficient to warrant a diagnosis of posttraumatic stress disorder (PTSD), thereby leaving room for healthy or positive adaptation to emerge as a potential trajectory posttrauma. The ability to differentiate between *exposure* to trauma and the *reaction* to trauma has, in part, led to a growing recognition of the heterogeneity in posttrauma reactions.

Posttraumatic Stress Disorder

The broadening perspective of posttrauma adaptation is not intended to minimize the importance of PTSD in the trauma literature. Indeed PTSD is a potential outcome of trauma- one that has been prominently researched, particularly in military samples. The criteria for PTSD are as follows: (B) One or more intrusive symptoms (e.g. recurrent distressing dreams or flashbacks); (C) one or more avoidance symptoms (e.g. avoidance of places connected with the trauma); (D) two or more negative cognitions or mood symptoms (e.g. negative beliefs about self, others, and world); and (E) two or more arousal symptoms (e.g. hyper-vigilance). The duration of the disturbance must be longer than one month and significantly impair functioning in the social or occupational realms

(APA, 2013). However, the goal of a more nuanced perspective of posttrauma adaptation, is to appropriately recognize that PTSD is not the only, nor the most common, posttrauma adaptation profile.

Resilience

Rather, the majority of trauma survivors demonstrate healthy coping and adapt well (Zoellner & Feeny, 2014). Resilience, or the notion that survivors can "do well" in the face of adversity, is appealing. The roots of the term *resilience* extend as far as the fields of engineering and ecology. In an engineering context, the term resilience is used to describe the characterization of material based on: (1) the degree to which a material can bend when external force is applied; (2) the rate at which material returns to its original condition when this force is removed; and (3) the threshold of force, at which point the material would break rather than bend (Martin-Breen & Anderies, 2011). In this framework, the two essential components of resilience are: (1) an external force; and (2) the ability to return to an original condition.

Alternatively, ecology proposes a systems based approach, in which an ecological system is considered to be resilient when it can continue to function despite environmental stress (Martin-Breen & Anderies, 2011). In order to maintain continuity in functioning, a system either has to adapt or transform when faced with stress (Martin-Breen & Anderies, 2011). Similar to the conceptualization of resilience in engineering, the framework in ecology requires external force or disruption to the system. But unlike engineering, resilience in the field of ecology, and indeed in psychology, is conceptualized as a *process* and therefore does not require a return to original functioning; but rather the *continued* functioning of the system despite stress.

One consistent point of similarity in the criteria for resilience across fields is the requirement of external stress, or adversity; almost always a component of resilience models in psychology (Fletcher & Sarkar, 2013). This aspect of the criteria has become more nuanced as our ability to measure exposure to adversity, stress, and trauma improves. However, beyond that, there is little consistency in the operationalization and measurement of resilience. Masten refers to resilience as "ordinary magic" capturing the common, yet unexpected nature of resilience (Masten, 2001).

Resilience has also been used as a dependent variable or outcome potentially characterized by: (1) the absence of pathology (e.g. Bonanno, 2008; Levine, Laufer, Stein, Hamama-Raz, & Solomon, 2009); (2) a return to pretrauma functioning, termed by Walsh (2002) as "bouncing back" (Martin-Breen & Anderies, 2011; Walsh, 2002); (3) successful achievement of normative milestones (e.g. Luthar & Cicchetti, 2000); and occasionally (4) growth (Manyena, O'Brien,O'Keefe, & Rose, 2011). As a result, resilience, as a concept is at risk for becoming an umbrella term used as a catchall for all non-pathology related outcomes. This concern reflects some of the criticism around resilience research – namely the inability to differentiate among positive or healthy adaptation trajectories.

Extending Resilience - Posttraumatic Growth

Of particular concern is the differentiation between bouncing *back* to an original state after a trauma and bouncing *forward* (Walsh, 2002). Concepts that capture the potential for psychological *gains* following trauma have been described in the literature for decades - for example hardiness (Kobasa, 1979); stress related growth (Park, Cohen, & Murch, 1996); flourishing (Ryff & Singer, 1998); benefit finding (McMillen, Smith, &

Fisher, 1997); thriving (Abraido-Lanza, Guier, & Colon, 1998); adversarial growth

(Linley & Joseph, 2004); and most commonly posttraumatic growth (PTG) (Tedeschi &

Calhoun, 1996) - but have received more attention in the last decade.

Tedeschi and Calhoun (1996), describe PTG as the phenomenon of experiencing

positive psychological gains, or changes, as a result of *coping* with a traumatic event. The

theoretical conceptualization and measurement of PTG has taken many forms. Some

propose that PTG is a uni-dimensional concept (Taku, Cann, Calhoun, & Tedeschi,

2008), as compared to a more nuanced approach, suggesting three areas in which changes

reflective of growth are expected: (1) self-perception (e.g. greater personal strength); (2)

interpersonal relationships (e.g. closer relationships with others); and (3) philosophy of

life (e.g. a greater appreciation of everyday) (Taku et al., 2008; Tedeschi & Calhoun,

1996). The most common, and perhaps the most specific, operationalization of PTG

hypothesizes five domains in which growth occurs including: (1) a greater appreciation of

life and change in priorities; (2) closer relationships with others; (3) a greater sense of

personal strength; (4) realization of new opportunities; and (5) spiritual development

(Tedeschi & Calhoun, 1996).

The criticism regarding the distinguishability of PTG from other psychological

constructs, such as resilience and distress, has resulted in a recent reconceptualization of

PTG that focuses on the *quality* of growth. More specifically, some have suggested that

growth is not objectively or verifiable and as such may be an inconsistent and unreliable

measure of positive adaptation (Hobfoll, Hall, Canetti-Nisim, Galea, Johnson, &

Palmieri, 2007; Wortman, 2004). Of particular concern is the ability to differentiate PTG

from other positive adaptation profiles (e.g. resilience), and the ability to explain

inconsistent findings regarding the relationship between PTG and measures of distress (Bower, Meyerowitz, Desmond, Bernards, Rowland, & Ganz, 2005; Helgeson, Reynolds, & Tomich, 2006; Wortman, 2004).

In answer to these criticism, Maerker and Zoellner (2004; 2006) propose the *Janus Face Model*; a two-component model of PTG. They hypothesize a constructive element of PTG, which should be highly correlated with measures of well-being; and a second, illusory component of growth, which is described as a mechanism to reduce initial distress following a trauma, and as such should be highly correlated with measures of emotion regulation. Ultimately, illusory growth may give way to constructive growth over time as coping improves. However, few studies have empirically operationalized and tested the two-component model of growth (e.g. Pat-Horenczyk, Hamama-Raz, Schramm-Yavin, & Stemmer, 2015; Pat-Horenczyk, Saltzman, Hamama-Raz, Ziv, Ginat-Frolich, & Stemmer, in press) resulting in limited empirical support for the *Janus Face Model*.

Rationale and Significance

There is a growing body of literature examining the variability in posttrauma adaptation trajectories beyond posttraumatic stress disorder. Among them positive adaptations such as resilience and posttraumatic growth are emerging as promising constructs in understanding the nuances in adaptation. Yet, despite this evolving attitude towards trauma adaptation, the differentiation among positive adaptation trajectories is in its preliminary phases. Further, there remains a gap in the empirical literature regarding the emergence of these trajectories over time, and the factors that facilitate the shifts in adaptation over time to promote more positive outcomes.

The current study begins to contribute to this body of literature by mapping the heterogeneity of posttrauma adaptation profiles in a sample of Israeli military veterans. More specifically, the study aimed to differentiate between the traditional profiles of adaptation (i.e. PTSD, resilience, and PTG) by highlighting the differences in the quality of *positive* adaptation profiles. Further, the study adds to the understanding of the complex relationship between growth, resilience, and distress. As such, the study contributes to the gap in the literature by distinguishing between resilience and posttraumatic growth, as well as providing new insight into the relationship between growth and distress.

Further, the study attempted to identify protective factors within each of the posttrauma adaptation profiles that enhance positive outcomes over time. In doing so the study proposes a unique relationship between protective factors and profiles of adaptation. This approach recognizes the heterogeneity of adaptation, as well as the variability in the effectiveness of previously identified protective factors, such as healthy coping and social support, between adaptation profiles.

In addition to these theoretical advances, this line of inquiry also carries clinical implications for interventions with trauma-affected individuals. More specifically, combining our understanding regarding the unique characteristics of post-combat adaptation profiles, and the context in which psychosocial factors promote positive adaptation, provides an opportunity to tailor specific intervention programs that are more efficient and effective for particular profiles of post-combat adaptation. This is especially relevant given the growing global numbers of military personnel exposed to combat trauma.

Although this study specifically focused on a veteran sample, the complexity of these relationships likely holds across trauma-affected populations. As such the findings of the current study are expected to have implications that reach beyond the context of military trauma and elaborate on the existing literature regarding trauma adaptation more generally. The primary aim of the study, to further differentiate among positive adaptation profiles, seems to be in line with the adherence to the strength based principle of social work practice. Further, the social work perspective offers a unique multi-systemic lens by which to view trauma adaptation; and, as a result, the implications that emerge from the findings of the current study not only comment on the individual level, but also touch upon the role of the social environment in the adaptation process.

Israeli Context

This study utilizes the Israeli context as a case example to examine the effect of combat exposure on mental health trajectories in veterans. As a nation Israel, since its establishment in 1948, has been involved in multiple wars and military operations. Within the timeframe of the current study, Israeli military personnel were active in the following conflicts: the Second Intifada (2000-2005), the Second Lebanon War (2006), Operation Cast Lead (2008-2009), Operation Pillar of Defense (2012), and most recently Operation Protective Edge (2014).

Although the majority of traumatic events in the context of combat can be generalized to other military and veteran populations, Israeli veterans are unique in that National Service (i.e. military service) is mandatory for all youth beginning at age 18, reserve duty is enforced until age 40, and the 'front line' of combat is within the nations boarders (i.e. domestic rather than international deployment). As such Israeli veterans

represent a unique group that are characterized by high intrinsic motivation for service, strong and intensive support networks (friends, family, and nationally), and have greater access to families and communities during periods of active duty. Despite these unique features, their exposure to trauma in the combat arena is expected to be similar to other military samples, and as such it is expected that these results will have implications for other military veteran populations.

Scope and Aims

The recent shift in the empirical literature reflects a growing awareness that healthy, positive adaptation (e.g. resilience and PTG) are in fact the most common trajectories for trauma-affected populations (Zoellner & Feeny, 2014; Bonanno, 2004; Masten, 2001; Tedeschi & Calhoun, 1996). Although traumatic events have the potential to cause significant psychological distress, most often trauma related distress diminishes naturally over time when psychosocial resources, such as adaptive coping strategies and social support, are used well by survivors (Bonanno & Mancini, 2008; Hobfoll, 2002; Zoellner & Feeny, 2014).

The current study further examined post-combat adaptation in a sample of male Israeli veterans following participation in an intensive building resilience group intervention program. The study focused on the interrelationship of posttraumatic growth; posttraumatic distress; resilience; coping; and social support in the adaptation process over time. The specific aims of the study were:

Aim 1: To describe and characterize post-combat adaptation profiles based on the patterns of endorsement to indicators of posttraumatic distress symptoms, coping, and posttraumatic growth.

Aim 2: To test the utility of latent class membership on predicting constructive posttraumatic growth.

Aim 3: To explore the protective factors (social support and adaptive coping) that promote constructive posttraumatic growth for each profile of post-combat adaptation.

Chapter II. Characteristics of Posttrauma Adaptation

A review of the literature and presentation of the

theoretical perspective guiding the study

This chapter provides an overview of relevant literature regarding the impact of

trauma and the characteristics of posttrauma adaptation. More specifically, this chapter

highlights empirical literature that discusses symptomatic reactions to trauma, health

coping trajectories, and posttraumatic growth; and emphasizes the important factors that

influence these adaptation profiles.

Background Information

To be able to understand the process and characteristics of adaptation following

trauma, one must first appreciate the complexity and diversity in traumatic events

themselves. As previously mentioned, the definition of *trauma* as a concept has evolved

over time. So too has the understanding regarding the different elements of traumatic

events that influence posttrauma adaptation. The following section will highlight the role

of: (1) event centrality; (2) duration of exposure; (3) the source of trauma (i.e. natural

disaster/accident versus man-made trauma); and finally, (4) the unique aspects of military

trauma that influence the characteristics of adaptation.

Trauma. Trauma is complex, and as such there are many characteristics of a

traumatic event that are thought to play a role in mental health trajectories following

exposure. Some models identify the duration of exposure as the central predictor of

mental health outcomes, suggesting that repeated or prolonged exposure to trauma places

survivors at greater risk for negative mental health outcomes including PTSD,

depression, anxiety disorders, and greater functional impairment (Briere, Kaltman, &

Green, 2008; Cloitre et al., 2009; Herman, 1992; Turner & Lloyd, 1995). To that end, Karam and colleagues (2014) identified a trauma risk threshold of four or more traumatic events. That is, respondents who met or surpassed this threshold presented with more complex symptomology than respondents who reported fewer than four traumatic events. Similar results have been found in the stress-coping literature on allostatic load (Ruini, Offidani, & Vescovelli, 2015), supporting the detrimental impact of prolonged or repeated exposure to stress, adversity, and trauma.

Although more recent research has shifted to a more objective set of criterion for traumatic events, historically the subjective experience of trauma was thought to play a role in posttrauma reactions. To that end, some research has suggested that the perceived amount of threat registered during a trauma is predictive of mental health outcomes (Elhers and Clark, 2000). Perceived threat may be closely related to event centrality, which has been found to be highly associated with psychological distress following trauma (Blix, Solberg, & Heir, 2014; Brown, Antonius, Kramer, Root, & Hirst, 2010). More recently, centrality has also been shown to predict posttraumatic growth (Barton, Boals, & Knowles, 2013; Blix, Skogbrott Birkeland, Bang Hansen, & Heir, 2015; Boals & Schuettler, 2011; Groleau, Calhoun, Cann, & Tedeschi, 2013), highlighting Janoff-Bulman's (1992) hypothesis, that growth emerges when a trauma is ascribed with importance *and* causes a rupture in core assumptions- thereby requiring survivors to rebuild the assumptive world (Janoff-Bulman, 2004).

Lastly, there is a significant body of literature suggesting that man-made disaster or interpersonal traumas have a greater psychological impact on survivors; evidenced by a higher risk for negative mental health outcomes as compared to survivors of natural

disaster (Brewin, Andrews, & Valentine, 2000; Frans, Rimmo, Aberg, Fredrikson, 2005; Kelley, Weathers, McDevitt-Murphy, Eakin, & Flood, 2009). In part, the uniquely negative impact of interpersonal trauma is thought to arise because these events are perceived as targeted with the intention of causing harm (see Freyd, Deprince, & Gleaves, 2007).

This logic may be extended to explain the higher rates of PTSD in military samples as compared with survivors of other kinds of traumatic events (Amir, Kaplan, & Kotler, 1996; Brewin et al., 2000; Yasan Saka, Ozkan, & Ertem, 2009). In an online survey of 2,960 participants Merritt, Tharp and Furnham (2014) found that respondents exposed to military related trauma were over five times more likely to be diagnosed with PTSD as compared to respondents with other types of traumatic exposure (e.g. sexual assault or motor vehicle accident). Military trauma is unique in that veterans may also experience higher levels of guilt and moral injury, factors known to contribute to negative mental health sequelae (Litz, et al., 2009).

It seems, that trauma type is not only predictive of negative mental health outcomes, but also predicts positive adaptation trajectories (Kira, Aboumediene, Ashby, Odenat, Mohanesh, & Alamia, 2013; Shakespeare-Finch & Armstrong, 2010; Shakespeare-Finch & Beck, 2014). In their study, Shakespeare-Finch and De Dassel (2009) found that trauma type significantly predicted both PTG and PTSD scores, and the rates of PTG varied by trauma type; demonstrating congruence with previous literature regarding the effect of trauma type on mental health.

Characteristics of Posttrauma Adaptation

Despite the differences in opinions regarding the aspects of traumatic events thought to predict mental health outcomes, there is agreement that the picture of adaptation posttrauma is as diverse as traumatic events themselves. To that end, our understanding and perspectives on trauma adaptation have evolved significantly over the last several decades. No longer is adaptation to trauma viewed in a black and white lens that categorizes reactions as either pathological or non-pathological. Rather, there is a growing recognition that adaptation following traumatic events is a complex, nuanced, and dynamic process (Bonanno, Westphal, & Mancini, 2011). The expansion of traditional views of trauma adaptation has led to extensive development in the literature on positive posttrauma adaptation, particularly in research on resilience and PTG. Further, advancements in longitudinal methodologies have recently raised awareness that adaptation is not stagnant, but rather evolves over time allowing for variability within a given adaptation category (e.g. Bonanno et al., 2012; Danhauer et al., 2015; Wang, Chang, Chen, Chen, & Hsu, 2014).

In 2004, Bonanno presented four potential trajectories of adaptation following bereavement or potentially traumatic events, marking a shift in the resilience literature from variable centered approaches to process oriented models. He outlined the following prototypes of reactions as they emerge over two years: (1) chronic – characterized by severe and continuous disturbances in functioning; (2) delayed – which involved increasing disruption in functioning that emerges slowing over the course of two years and becomes severe; (3) recovery – in which respondents demonstrated an improvement in level of functioning over two years; and finally (4) resilience – characterized by

continuous mild disruptions suggesting that the individuals adapted relatively well over time.

Expanding his model, in 2015, Bonanno incorporated a more explicit temporal component, suggesting that even within a resilience trajectory there is variability and nuance. Although his work expanded the view of posttrauma adaptation to recognize a greater heterogeneity in trauma reactions, Bonanno's proposed trajectories do not sufficiently differentiate among positive adaptation profiles, including the potential for growth following trauma.

Layne and colleagues (2007) hypothesized four similar trajectories of posttrauma adaptation: (1) stress resistance- characterized by the ability to maintain adaptive functioning despite stress; (2) resilience – which involved early and quick adjustment; (3) protracted recovery – differentiated from resilience by a slower ability to adjust and restore functioning; and finally (4) severe persistent distress – characterized by the inability to return to healthy functioning (i.e. adaptation failure).

Including three new trajectories of posttrauma adaptation, Layne and colleagues expanded their model in 2009 to include: (1) decline – characterized by initial maintenance of healthy adaptation followed by a de-compensation in functioning; (2) stable maladaptive – which involved persistent maladaptive pre and post trauma functioning; and finally (3) posttraumatic growth- characterized by an initial disruption in functioning followed by an improvement above and beyond pre-trauma levels.

It is becoming more common in the literature for adaptation following trauma to be recognized as a diverse group of trajectories involving unique combinations of distress symptomology, resistance to distress, recovery from distress, growth, and coping. In

general, these complex trajectories can be organized into three broad categories of adjustment (1) predominantly symptomatic; (2) healthy adaptation; and (3) growth related trajectories (Bonanno, 2005a; Bonanno & Mancini, 2012; Linley & Joseph, 2004).

Predominantly Symptomatic

Despite advances in recognizing resilience and growth as potential outcomes to traumatic events, it cannot be ignored that distress related symptomology is a potential outcome of trauma exposure. In particular, trauma affected populations are at greater risk for experiencing posttraumatic stress disorder (PTSD) (Brewin et al., 2000; Ozer, Best, Lipsey, & Weiss, 2003) in combination with; depression (Mandelli, Petrelli, & Serretti, 2015; Panagioti, Gooding, & Tarrier, 2012); anxiety (Fernandes & Osorio, 2015); substance use disorders (Chilcoat & Breslau, 1998); and other related or comorbid negative mental health sequelae.

Posttraumatic stress disorder. Posttraumatic stress disorder is the most publicized and commonly investigated diagnosable mental health condition associated with trauma exposure. Yet the prevalence of PTSD within the general population is 6.8%, 3.6% for men and 9.7% for women (Kessler, Berglund, Delmer, Jin, Merikangas, & Walters, 2005) demonstrating that survivors with PTSD represent only a small portion of trauma affected individuals, and that PTSD may have historically receive a disproportionate amount of attention in the trauma literature. Although, the proportion of military personnel with PTSD can be drastically higher than in the average population, with reported rates ranging from 1.09% to as high as 34.84% (Xue et al., 2015), they still do not represent that majority of this unique population. Higher rates of PTSD in military

personnel may reflect the higher than average, and complex nature of trauma exposure that takes place in the context of combat. More specifically, factors such as multiple deployments, discharging a weapon in combat, witnessing someone being wounded or killed in combat, and longer periods of time deployed have been found to increase the risk of developing PTSD in military veterans (Xue et al., 2015).

To broaden the understanding of factors that contribute to the elevated risk of PTSD in veterans, Xue and colleagues (2015) identified three broad categories of risk factors including: (1) pre-trauma factors; (2) peri-trauma factors; and (3) and post-trauma factors. They found that being female, an ethnic minority, having a lower education level, lower military rank, a greater number of deployments, a greater amount of time (cumulatively) deployed, experiencing previous traumatic events, and previous psychological concerns were all significant pre-trauma risk factors that increased the likelihood of developing PTSD post-combat. Conversely, Xue and colleagues (2015) found that higher levels of post-deployment support buffered the detrimental impact of the above-mentioned risk factors in the development of PTSD. These findings are consistent with other literature regarding the protective nature of social support (Grills-Taquechel, Littleton, & Axsom, 2011; Ozer et al., 2003).

Despite higher rates of PTSD in military personnel, there remain barriers in help seeking that are distinctive for this population that may delay intervention for those who are distressed (Sharp et al., 2015). In a recent meta-analysis Sharp and colleagues (2015) highlighted the unique military culture that impacts help seeking behavior including: (1) stigma regarding mental health conditions; (2) masculinity norms; (3) unit cohesion; and (4) the pressure for combat readiness. To that end, between 40 and 60% of military

personnel struggling with mental health conditions do not seek treatment (Sharp et al., 2015).

  Suicidality, depression, and anxiety. In and of itself, a diagnosis of PTSD may increase the risk of other mental health conditions and negative outcomes in trauma affected populations. Panagioti and colleagues (2012) found that experiencing PTSD symptomology increased the risk of suicidal ideation, attempts, and completions in traumatized populations. Overall the risk of suicide is two times higher in veteran samples than in the civilian population (Brinkerhoff, 2013), with a reported 8,000 veterans committing suicide per year in the United States alone (Kemp & Bossarte, 2012). The startling rates of suicide in veterans can be partially explained by increased rates of comorbid mental health disorders following combat (Jakupcak et al., 2010).

  Indeed the risk of suicidality was compounded when survivors were diagnosed with comorbid PTSD and depression (Panagioto et al., 2012). Similarly, in a study of 275 Iraq and Afghanistan war veterans, Jakupcak and colleagues (2010) found that veterans who met partial criteria for PTSD, had comorbid depression, and poor perceptions of social support were three times more likely to report suicidal ideation than veterans without PTSD or depression who were satisfied with their social support – again highlighting the important protective qualities of social support in at risk populations. The relationship between PTSD and depression was also verified in a meta-analysis of studies published between 1997 and 2012, in which, Rytwinski, Scur, Feeny & Youngstrom (2013) found that on average 53% of trauma survivors with PTSD also reported comorbid depression across studies. The type of trauma did differentiate the risk

of comorbid PTSD and depression, with an elevated risk of comorbidity in military samples.

Contractor and colleagues (2015) used latent profile analysis to further examine the relationship between PTSD and depression. They expanded previous research by including anxiety related symptoms in the latent profiles. The results led to the identification of three profiles using combinations of PTSD, depression, and generalized anxiety disorder (GAD) symptomology in trauma exposed soldiers ($n = 1266$). They found that approximately 11% of the sample was expected to have severe comorbid symptomology (i.e. high levels of PTSD, depression and GAD symptoms), 27% moderate comorbidity, and the majority of the sample (62%) with mild comorbidity. Interestingly, all latent classes reported experiencing comorbidity among the three symptom clusters, but differed in the severity of their reported scores.

One explanation for the high rates of comorbidity between depression and PTSD is that indicators do not clearly differentiate between the two disorders (Gros, Simms, & Acierno, 2010). For example, Gros and colleagues (2010) found that items assessing negative affect in PTSD (e.g. dysphoria and numbing) loaded just as strongly as items assessing depression. A second explanation could be that depression may arise as a secondary reaction to PTSD, or as a byproduct of the psychological and emotional disregulation associated with PTSD symptomology (Horesh, Lowe, Galea, Uddin, & Koenen, 2015). However, there are inconsistencies regarding the causal relationship between PTSD and depression (Horesh et al., 2015). Finally, a third explanation is that the coping strategies used by veterans to manage PTSD symptomology may also play a role in the development of secondary depression. To that end, substance use disorders

may make a unique contribution to the comorbidity of PTSD and depression, as the use of substances is thought to function as a self-medicating technique to manage PTSD, depression, and anxiety symptoms (Chilcoat & Breslau, 1998).

Substance use and interpersonal violence. Military personnel, may also be particularly at risk for substance use disorders, relying heavily on self-medicating techniques as an alternative to formal mental health care, as they are less likely than other trauma affected groups to seek formal support (Sharp et al., 2015). Furthermore, the culture of coping with stress, and the context in which social support is garnered, often includes access to alcohol (Dolan & Ender, 2008). Current rates of alcohol use in veteran samples range from 22-40%, a significant increase from the rates of substance use in the general population (Calhoun, Elter, Jones, Judler, Straits-Troster, 2008; Eisen et al., 2012; Seal, Cohen, Waldrop, Cohen, Maguen, & Ren, 2011). In particular, veterans with PTSD or depression are three to four and half times more likely to be diagnosed with an alcohol or drug related disorder (Seal et al., 2011), providing some support that substance use may be a method of coping with distress symptomology.

Substance use disorders, PTSD, depression, and anxiety have behavioral and social consequences as well. For example, comorbid mental health disorders and substance misuse place veterans at greater risk for engagement in intimate partner violence (IPV). Overall the rate of IPV is between 13.5% and 58% in military populations (Jones, 2012; Marshall, Panuzio, & Taft, 2005). Interestingly, 33% of veterans with PTSD, as compared with 13.5% without PTSD, perpetrated IPV demonstrating a significant increase in risk for veterans with PTSD diagnoses (Marshall

et al., 2005). A similar trend was observed for veterans who had sought treatment for alcohol use; with 39% reporting engagement in IPV.

Given the higher rates of trauma exposure, the unique aspects of trauma in the context of combat, hesitancy in seeking formal mental health supports, higher rates of PTSD, depression, suicidality, substance use disorders, and violence, veteran samples are a unique and complex group of trauma affected individuals. Despite the range of negative mental health conditions that may emerge as a result of combat exposure, PTSD seems to be a central figure. As such, greater understanding is needed regarding the nature of the relationship between PTSD and healthy adaptation trajectories.

Healthy Adaptation

Despite the reality that PTSD is a potential outcome of trauma exposure, evidence indicates that the majority of trauma-affected individuals seem to cope well; even among subgroups, such as military personnel, with elevated risk and greater exposure (Bonanno, 2004; Grych, Hamby, & Banyard, 2015; Layne, Beck, Rimmasch, Southwick, Morena, 2009; Masten, 2001; Zoellner & Feeney, 2014). It is widely accepted that the process of adaptation occurs over time (Bonanno, Romero, & Klein, 2015; Janoff-Bulman, 2004; Tedeschi & Calhoun, 2004; Zoellner & Maercker, 2006). As such, initial distress should not be relied upon as an indication of pathology. Rather, initial distress may naturally resolve when appropriate psychosocial resources are available, and therefore does not preclude an overall positive trajectory (Bonanno, 2004; Grych et al., 2015; Layne et al., 2009; Zoellner & Feeney, 2014).

As in primarily symptomatic reactions to trauma, the range of healthy coping is vast. In this regard, healthy adaptation should not be combined into one large category.

Often, healthy coping trajectories are commonly labeled as *resilience*, resulting in an operationally loose concept. One step in separating resilience into distinct healthy adaptation typologies is to differentiate between resistance, recovery, and resilience (Bonanno, 2005b).

The term *resistance* is often viewed as the ability to withstand stress, and as such is not associated with either decompensation or improved functioning. Rather, resistance implies a stable continuity in the trajectory of functioning pre and post trauma (Layne et al., 2009). Whereas in a *recovery* trajectory, decompensation in functioning is expected post-trauma, but improves as individuals return to pre-trauma levels of functioning (Bonanno, 2004). Lastly, *resilience* typically carries a positive connotation, implying that some individual "do well" in the face of trauma; thereby extending resistance and recovery to incorporate an aspect of improvement as comparted to pre-trauma functioning (Bonnano, 2004; Masten, 2001).

The differences among these three trajectories should be noted regarding the degree of decompensation in functioning, as well as the rate of restoring normative functioning following exposure to trauma. Yet, resilience and resistance are often not clearly differentiated from each other in individual studies, and are often used interchangeably. Bonanno and Mancini (2012) suggest that the differentiation between resilience and resistance may lay in the quality and chronicity of the traumatic exposure. That is *resistance* may be more appropriately applied to individuals who are exposed to chronic adversity, whereas *resilience* may describe individuals exposure to brief and sudden trauma (Bonanno & Manicni, 2012).

An alternative perspective is suggested by Lepore and Revenson (2014) who, rather than considering resilience, recovery, and resistance as independent entities, propose a multi-faceted model in which they describe resilience as an overarching concept with three components: recovery, resistance, and reconfiguration. In this framework, *recovery* implies that exposure to a stressor results in temporary disruption to normative functioning that resolves when exposure to the stressor ends. Lepore and Revenson further define *resistant* trajectories as those that demonstrate consistent and stable normative functioning at all stages (i.e. pre, peri, and post trauma). This trajectory is distinguishable from recovery in that there is no disruption to normative functioning, even while being exposed to the stressor. Lastly, *reconfiguration* implies that disruptions in functioning occur following a trauma, but results in an adaptation in functioning rather than return to pre-trauma functioning. Reconfiguration in this model has flavors of growth or in Walsh's term (2002) "bouncing forward".

Resilience. Despite the numerous models of resilience, the definition and measurement of the concept is highly variable. The study of resilience first gained popularity in the child development literature- examining how some children living in chronic adversity overcome challenges to meet normative developmental milestones, and demonstrate relatively healthy trajectories despite adversity (Garmazy, 1971; Masten, 2001). The extension of the resilience concept into the adult adaptation literature provides a new context in which to study, and define, resilience. More specifically, the concept of resilience in adulthood is typically directed towards adaptation following a brief, sudden, and traumatic event (Bonanno, 2005a). To some extent the process of redefining the concept of resilience in adulthood is still underway. This is evident in the lack of

consistency and clarity in the conceptualization and measurement of resilience in adulthood.

Recent definitions of resilience encompass a broad ecological, and often multi-systemic (Wu et al., 2013), perspective that acknowledges the external resources (e.g. strong social networks) that may promote resilience (Masten, 2007). Typically there are two overarching concepts that appear in almost all definitions of resilience: (1) exposure to adversity, stress, or trauma, and (2) positive adaptation (Fletcher & Sarkar, 2013; Luthar, Cicchetti, & Becker, 2000). In 2013, Bonanno & Diminich differentiated between two types of resilience defined by the nature of the stressor. *Emergent resilience* – is characterized as positive adaptation that occurs in the context of ongoing exposure to trauma and adversity in which adaptation occurs gradually over time; while *minimal-impact resilience*, is characterized as positive adaptation that is consistent with pre-trauma functioning, and occurs within the context of a single traumatic event (i.e. stable healthy trajectory pre and post trauma) (Bonanno & Diminich, 2013). In part, this differentiation attempts to settle some of the inconsistencies in the conceptualization of resilience. However, these definitions rely heavily on the availability of pre-trauma data, which is often not available, to allow for a comparison between pre and post trauma levels of functioning (Bonanno et al., 2015; Mancini & Bonanno, 2009).

A second source of confusion resulting in inconsistent definitions of resilience can be found in the operationalization of positive adaptation (Fletcher & Sarkar, 2013). Most often, favorable outcomes are measured as: (1) a lack of pathology (e.g. Bonanno, 2008; Levine et al., 2009); (2) a return to pre-trauma functioning (Martin-Breen & Anderies, 2011); (3) the on-time achievement of normative milestones (e.g. Luthar &

Cicchetti, 2000); or (4) finding positive meaning in experiences of adversity (Green, Beckham, Youssef, & Elbogen, 2014; Pietrzak et al., 2010b) (see for review Castellano-Tejedor, Blasco-Blasco, Perez-Campdepadros & Capdevila, 2014; Fletcher & Sarkar, 2013). As such, there is no singular measure of positive adaptation- resulting in some inconsistency in the measurement of positive adaptation across studies.

Despite the challenges in defining resilience, there is an expectation, at theoretical level, that resilience is positively associated with other indicators of wellbeing and negatively related to negative mental health outcomes (Duan, Guo, & Gan, 2015; Hu, Zhang, & Wang, 2015; Lee, Sudom, Zamorski, 2013; Martin-Breen & Anderies, 2011). Empirically there is support for these hypothesized relationships. For example, in a study of 965 U.S. Veterans, Green and colleagues (2014) found that resilience was associated with a decreased risk of PTSD symptomology, and was particularly protective in military personnel who had higher trauma exposure during combat. Resilience was also negatively associated with depression, risk of suicide, alcohol use and number of medical problems.

Similarly, in a sample of 272 Operation Enduring and Iraqi Freedom veterans, resilience and post-deployment social support were negatively associated with depression and PTSD; regardless of degree of trauma exposure (Pietrzak, Johnson, Goldstein, Malley, & Southwick, 2009). In a follow up study, Pietrzak et al., (2010b) found that lower unit and post-deployment social support was associated with lower levels of resilience. Further, resilience fully mediated the relationship between unit social support and PTSD, and unit social support and depression symptomology. However, both of these studies were cross sectional, and as such cannot provide insight into the

directionality of these relationships, particularly the causal relationship between resilience and PTSD.

For example, in a study of 588 Israeli veterans Levine and colleagues (2009) found an inverse relationship between resilience and PTG, providing preliminary evidence that the two profiles are distinct entities (Levine et al., 2009). However, in this study resilience was measured as a lack of PTSD; as such, the inverse relationship may say more about the relationship between PTSD and PTG than is does about differentiating between resilience and PTG.

Criticism of Resilience. Resilience, as a psychological construct, has received heavy criticism as a result of the previously outlined challenges in defining the concept, limited examination of the concept of resilience in diverse environments, and inconsistent or inaccurate measurement tools (Luthar et al., 2000; Southwick, Bonanno, Masten, Panter-Brick, & Yehuda, 2014). Resilience has become an umbrella term used to capture multiple positive adaptation trajectories. However, the qualities of these positive adaptations profiles are distinct and should be examined independently (Bonanno & Mancini, 2012). Of particular interest, and importance, is the delineation between resilient and growth related trajectories.

Much of the literature on PTG does differentiate between growth and resilience, at least conceptually. Often this delineation is tied to the amount of processing that takes place after a trauma. If resilient profiles are characterized by a continuous healthy trajectory then they imply that resilient individuals experience little distress, and as such a minimal need to struggle and cope with that distress (Westphal and Bonanno, 2007). Alternatively, PTG is thought to emerge as a result of the coping process, and therefore

requires a threshold of distress to be met in order to trigger coping and meaning making processes (Tedeschi & Calhoun, 1996). As such resilient groups would be expected to be less likely to report growth because they do not engage in the process thought to bring about growth, nor do they experience the need to make meaning of their experiences (Westphal and Bonanno, 2007). To that end, the debate regarding the differentiation between PTG and resilience also raises the question of the need for PTG. Some caution the notion that PTG should be considered a superior outcome to resilience, suggesting that positive adaptation may occur without the presence of PTG (Westphal and Bonanno, 2007).

Growth Related Trajectories

The notion of benifits, or growth, emerging from trauma has been described in the trauma literature for decades by many different names, for example hardiness (Kobasa, 1979); stress related growth (Park et al, 1996); flourishing (Ryff & Singer, 1998); benefit finding (McMillen et al., 1997); thriving (Abraido-Lanza et al., 1998; Carver, 1998); adversarial growth (Linley & Joseph, 2004); and most commonly posttraumatic growth (Tedeschi & Calhoun, 1996). Posttraumatic growth, a term defined by Tedeschi and Calhoun (1996), describes the phenomenon of reporting psychological gains or positive changes following a traumatic event; generally attributed to the process of coping that occurs in the aftermath of trauma.

Posttraumatic growth. The theoretical conceptualization and measurement of PTG has taken many forms. Some propose that PTG is a singular or uni-dimensional concept (Taku et al., 2008; Tedeschi & Calhoun, 1996), while others take a more complex approach and suggest three areas of life in which changes that reflect growth are

expected, these include: (1) changes in self-perception (e.g. greater personal strength); (2) changes in interpersonal relationships (e.g. closer relationships with others); and (3) changes in philosophy of life (e.g. a greater appreciation of everyday) (Taku et al., 2008; Tedeschi & Calhoun, 1996). The most common, and perhaps the most specific, operationalization of PTG hypothesizes five domains in which growth occurs including: (1) a greater appreciation of life and change in priorities; (2) closer relationships with others; (3) a greater sense of personal strength; (4) realization of new opportunities; and (5) spiritual development (Tedeschi & Calhoun, 1996).

Posttraumatic growth as a concept has been studied in a variety of trauma-affected populations including: (1) Ex-prisoners of war (Feder et al., 2008); (2) cancer patients (Sumalla, Ochoa, & Blanco, 2008); (3) survivors of motor vehicle accident (Zoellner, Rabe, Karl, & Maercker, 2011); (4) assault survivors (Kleim & Ehlers, 2009); and (5) military personnel and veterans (Solomon & Dekel, 2007). In general, there are many factors associated with the emergence of growth, these include: (1) cognitive re-appraisals (Janoff-Bulman, 1989; 2004; Linley & Joseph, 2004); (2) emotion regulation (Tedeschi & Calhoun, 2004); (3) deliberate rumination (Kolokotroni, Anagnostopoulos, & Tsikkinis, 2014; Su & Chen, 2015; Tedeschi & Calhoun, 2004); (4) meaning making (Larner & Blow, 2011); (5) experiences of social support (Kolokotroni et al., 2014; Linley & Joseph, 2004; McDonough, Sabiston, & Wrosch, 2014); (6) flexibility in coping (Cohen & Katz, 2015; Collins Taylor and Skokan, 1990; Keith, Velezmoro, & O'Brien, 2015); (7) personality traits such as optimism and openness to new experiences (Kolokotroni et al., 2014); (8) secure attachment (Schmidt, Blank, Bellizzzi, & Park,

2012) (9) self-efficacy; and (10) sense of mastery (Mystakidou et al., 2015; Park & Fenster, 2004).

In a sample of 1,838 military veterans Tsai and colleagues (2015b) identified five trajectories of PTG over two years. These trajectories included: (1) consistently low; (2) moderately declining; (3) dramatically declining; (4) increasing; and (5) consistently high PTG. Factors such as agreeableness, conscientiousness, extraversion, greater purpose in life, and gratefulness were positive predictors of higher levels of PTG (i.e. consistently high or increasing trajectories). Those who maintained their level of PTG over the course of two years were more likely to be Caucasian, have lower education levels, higher number of new traumatic events, higher rates of altruism, more active lifestyles, and were less likely to use substances (Tsai, Sippel, Mota, Southwick, & Pietrzak, 2015b).

Recently, studies of PTG have begun to differentiate the *quality* of growth as an important factor that has implications for successful adaptation (Hobfoll et al., 2007; Maerker & Zoellner, 2004; Pat-Horenczyk et al., 2015). In a recent study, Pat-Horenczyk et al., (2015) empirically test a two-component model of growth as it is conceptualized by Maercker and Zoellner's (2004) Janus Face Model. They examined the differences in the quality of PTG reported by women participating in a building resilience intervention program following the completion of treatment for breast cancer. They operationalized the first component of growth, constructive PTG, as both an increase in PTG and an improvement in coping (either an increase in positive coping strategies or a decrease in negative ones); while the second component, illusory PTG, was operationalized as an increase solely in measures of PTG without improvements in coping.

Their findings supported the operationalization of two kinds of growth. Further they found that over the six-month period, more than 50% of women reported an increase in PTG, suggesting an overall upward trajectory of adaptation.. In a follow up study, Pat-Horenczyk et al (in press) expanded this operationalization by identifying four profiles of post-cancer adaptation. They identified a new profile of growth that they termed "struggling growth." Struggling growth was characterized by simultaneous reports of PTG, PTSD, depression, as well as endorsement of reliance on both positive and negative coping strategies. This profile seemed to reflect a group of women who were trying hard to resolve the psychological and emotional challenges associated with a cancer diagnosis, but who had yet to reach constructive growth. To date, the literature regarding the variables associated with growth, more generally, have increasingly identified factors that promote growth. Yet, little is known about the factors that influence the *quality* of growth. The following section provides an overview of important psychosocial factors that influence posttrauma adaptation in general, and the emergence of posttraumatic growth more specifically.

Factors Associated with the Development of PTG

There is no single predictive factor that is exclusively responsible for positive outcomes following traumatic events. Overall, protective factors can be divided into (1) individual characteristics such as: trait optimism (Scheier & Carver, 1992; Zoellner & Maercker, 2006); a physically active lifestyle (Tsai et al., 2015b) and religiosity (Schmidt et al., 2012; Tsai, El-Gabalawy, Sledge, Southwick, & Pietrzak, 2015a; Tsai et al., 2015b); (2) psychological or emotional factors such as: coping strategies (see Helgeson et al., 2006; Zoellner & Maercker, 2006); emotion regulation (Tedeschi & McNally, 2011);

attachment style (Schmidt et al., 2012); and coping flexibility (Bonanno, Pat-Horenczyk, & Noll, 2011); and finally (3) contextual resources such as: social support (Schmidt et al., 2012; Tsai et al., 2015a).

Coping Strategies

Coping strategies refer to a broad range of strategies and mechanisms used by survivors to manage distress, as well as emotional or cognitive disregulation following exposure to trauma (Thoits, 1986). Carver, Scheier, Kumari Weintraub (1989) propose three dimensions of coping (1) problem focused coping (active coping, planning, suppression, restraint, and seeking instrumental support); (2) emotion focused coping (positive re-appraisal, acceptance, denial, religiosity, and seeking emotional social support); and (3) negative coping strategies (e.g. disengagement), suggesting a wide range of coping behaviors that influence adaptation. In general, coping strategies that are more active and flexible are thought to have a positive impact on reducing distress and facilitating positive adaptation profiles like PTG (Boden, Bonn-Miller, Vujanovic, & Drescher, 2012; Galatzer-Levy, Burton, & Bonanno, 2012; Schmidt et al., 2012; Iacoviello & Charney, 2014). Similarly, higher coping self-efficacy, that is a belief that one can cope effectively, is also associated with more positive psychological outcomes following traumatic events (Smith, Benight, & Cieslak, 2013).

In the past several years, researchers have begun to study survivors who are able to utilize a multitude of coping techniques, broadly referred to as coping flexibility. Coping flexibility is described by Bonanno, Pat-Horenczyk, and Noll (2011) as the ability to tailor coping in response to changing demands within the environment. More specifically, flexibility is measured by the ability to shift between forward focused coping

strategies (e.g. "*reminding myself that things will get better*") and trauma focused coping strategies (e.g. *"remembering the details of the event"*). The premise is that the ability to shift between forward and trauma focused coping strategies allows for a combination of two essential coping patterns rather than a rigid reliance on only one area of coping (Bonanno et al., 2011).

Higher flexibility in coping is associated with improved outcomes, including constructive growth (Bonanno et al., 2011; Pat-Horenczyk et al., in press). Higher coping flexibility has also been found to reduce the risk of PTSD and depression (Park, Ryang, & You, 2015). In a recent study of 579 American veterans cognitive flexibility was negatively associated with PTSD symptom severity, such that those with a higher degree of flexibility were less symptomatic (Keith et al., 2015). Further, cognitive flexibility was positively associated with posttraumatic growth and optimism, and was the only significant predictor of growth when controlling for PTSD symptom severity, family functioning (e.g. communication and closeness), and guilt cognitions (Keith et al., 2015).

In addition to flexibility in utilization, reliance on positive coping strategies such as deliberate and productive rumination (Tedeschi & Calhoun, 2004; Zoellner & Maercker, 2006), positive reframing or appraisals (Helgeson et al., 2006; Zoellner and Maercker, 2006), and problem focused coping (i.e. strategies that focus on changing or managing problems) (Schuettler and Boals 2011; Sattler, Assanangkornchai, Moller, Kesavatana-Dohrs, & Graham, 2014) have been found to be positively associated with PTG. While, reliance on negative coping strategies such as: avoidant coping (Schuettler & Boals, 2011; Galor & Hentschel, 2012; Romero, Riggs, & Ruggero, 2015), emotion focused coping (i.e. strategies that aim to reduce emotional distress) (Sattler et al., 2014),

and strategies that rely heavily on blame (either self or others) tend to be predictive of greater PTSD symptom severity (Hussain & Bhushan 2011).

In a military sample (*n* =218) Rodrigues and Renshaw (2010) found that higher rates of combat exposure were associated with greater reliance on emotion focused coping. Further, higher rates of emotion focused coping demonstrated a quadratic interaction with PTSD symptom severity and combat exposure. That is for those with average levels of combat exposure, emotion focused coping was associated with an increase in PTSD symptom severity. But for those with high levels of combat exposure, emotion focused coping decreased symptom severity, implying that the relationship between coping and PTSD may be more complex than initially thought (Rodrigues & Renshaw, 2010).

Gender also seems to be an important factor that influences coping strategy selection. For example, men were more likely to blame others and focus heavily on planning strategies as compared to women (Hussain & Bhushan, 2011). These strategies were both negatively associated with PTSD symptom severity; and planning strategies was predictive of higher scores on measures of PTG (Hussain & Bhushan, 2011). Similarly, in a meta-analysis of 103 studies Prati & Pietrantoni (2009) found that in general, positive reappraisal, religious coping, and coping strategies that focused on active methods of managing emotional consequences of trauma were more likely to promote PTG than optimism and social support (Prati & Pietrantoni, 2009). These findings suggest that gender may interact with other factors that promote PTG, and should be considered in studies that examine predictors of posttrauma adaptation.

Lastly, coping is thought to evolve and change over time. In general, reliance on avoidant coping techniques is expected to decrease over time as initial distress is reduced (Boden et al., 2012). Simultaneously, active coping is expected to increase over time (Boden et al., 2012). There is some evidence to suggest that these patterns are critical in managing the development of PTSD. For example, increases in avoidant coping or decreases in active coping have been linked with a higher risk for developing PTSD (Boden et al., 2012). Further, gender, coping, and time may interact and influence the process of adaptation. In sample of 336 university students, Palus, Fang, and Prawitz (2013) found that men decreased their use of active coping strategies over time, while women increased over time. Similarly, they found that women were more likely than men to use religion as a mechanism for coping, and that women demonstrated a more drastic increase in positive reinterpretation than men (Palus et al., 2013).

Overall, there is a strong body of literature regarding the relationship between various coping strategies and positive mental health outcomes following trauma. There are a number of influential factors that are expected to influence the types of coping strategies survivors rely on. Despite an overall trend regarding the relationship between active, future focused, and positive coping strategies on positive adaptation, there remains a gap in the literature regarding the role of specific coping strategies within distinct positive adaptation trajectories. That is, research has yet to link specific coping strategies with unique positive adaptation trajectories; and further have yet to identify the role of various coping strategies in predicting the *quality* of PTG.

Coping and social support overlap and share many commonalities, and as such social support can be thought of as providing a context in which other forms of coping

occur (Thoits, 1986; Overdale & Gardner, 2012). In a study of 89 combat veterans, Smith and colleagues (2013) found that received and perceived degree of social support indirectly predicted decreases in PTSD symptom severity by way of coping self-efficacy. That is, individuals who perceived higher levels of social support were more likely to feel capable of coping well with their trauma, and those who felt more capable of coping were more likely to demonstrate a decrease in PTSD symptom severity (Smith et al., 2013).

Social Support

Social support has been consistently identified as an important factor in posttrauma adaptation (Ozbay, Fitterling, Charnye, & Southwick, 2008), and a key predictor of *resilience* and PTG (Cadell, Regehr, & Hemsworth, 2003; Currier, Lisman, Harris, Tait, & Erbes, 2013; Grills-Taquechel et al., 2011; Hall, Hobfoll, Canetti, Johnson, Palmieri, & Galea, 2010; Rajandram, Jenewin, McGrath, Zwahlen, 2011; Pietrzak & Cook, 2013; Pruitt & Zoellner, 2007; Tedeschi & Calhoun 2004). In particular a high level of social support has been found to be positively associated with PTG (Pietrzak et al., 2010b), and has been shown to buffer the risk of suicide (Jakupcak et al., 2010); depression (Romero et al., 2015); PTSD (Jakupcak et al., 2010; Romero et al., 2015) and anxiety symptoms (Romero et al., 2015) in military samples.

To that end, Lee and colleagues (2013) tested a model of psychological resilience in 1,926 veterans following combat exposure. Their findings suggest that positive social interactions, and higher social support, buffered the negative impact of combat trauma and predicted resilience in trauma-exposed veterans. Alternatively, Brancu and colleagues (2014) found that the ameliorative effect of social support was not consistent among veterans. Rather, social support had minimal influence on distress for veterans

who met criteria for PTSD, or those with PTSD and a secondary co-morbid disorder as compared to those without PTSD (Brancu et al., 2014). These findings offer some evidence that social support may vary in its ability to protect against distress for different subsets of veterans.

Pietrzak and colleagues (2009) identify one factor that may explain these nuances. They found that veterans who reported higher levels of PTSD or depression symptomology were more likely to report low social support within their military unit *and* in the amount of perceived social support available post deployment (Pietrzak et al., 2009). These results suggest that unit cohesion, and social support within the military unit, may be a unique aspect of social support in military samples that acts a distinctive protective factor in this population (Pietrzak et al., 2009; Wilxoc, 2010).

Clearly, there is some evidence that not all social support is equal (Dolan & Ender, 2008; Gleason & Iida, 2015; Pietrzak et al., 2009). Rather, the source, type, and quality of social support may operate differently in various contexts, and some may not necessarily promote positive adaptations following trauma (Dolan and Ender, 2008; Gleason & Iida, 2015). One potential solution is to deconstruct the overarching concept into smaller components. This approach recognizes the potential variability in the quality, source, and type of support given, the unique interaction between these aspects of social support and context in which support is offered, and the congruence with the recipient's needs (Gleason and Iida, 2015).

Historically, there have been multiple attempts to tease apart the broader concept of social support. In their 2015 chapter on social support, Gleason and Iida summarize these attempts, including Weiss' six typologies of support (advice or guidance, reliable

tangible assistance, caring, social integration, reassurance of worth, and fulfillment of other's needs), Barrera and Ainlay's (1983) model of social support (tangible, directive, nondirective, and positive social interactions), Thoits' (1986) three typologies (instrumental support, emotional support, and informational support), and finally, the most common differentiation: the distinction between perceived and received social support (Gleason & Iida, 2015).

Indeed some studies have shown that received social support is positively associated with distress while perceived was associated with decreases in distress (Barerra & Ainlay, 1983; Maisel & Gable, 2009). Maisel and Gabel (2009) refer to these counterintuitive findings as the "paradox" of social support. In part, this paradox may arise because receiving support may feel stigmatizing and reduce feelings of coping efficacy (Maisel & Gable, 2009; Shrout, Herman, & Bolger, 2006). Alternatively, if the support that is received is *not* perceived by the recipient as being highly responsive, it is likely to be less effective in buffering negative affect and mental health disorders (Maisel & Gable, 2009). To that end, understanding the quality of received social support may help explain the puzzling relationship between received social support and mental health outcomes.

Similarly, the source of social support may also have an important influence on adaptation posttrauma (Rafaeli & Gleason, 2009). As previously noted, the role of social support within military units may play a unique role in posttrauma adaptation among veteran samples (Pietrzak et al., 2009). But more generally, social support provided by family and friends may differ in its ability to predict positive posttrauma adaptation (Romero et al., 2015; Nyaronga & Toma, 2015; Wilcox, 2010).

Indeed, Romero and colleagues (2015) found that the degree of familial social support was a direct predictor of reduction in depression and generalized anxiety symptoms in a sample of 136 veterans. Further, social support from the family significantly moderated the relationship between avoidant and problem focused coping and depression, as well as between avoidant coping and generalized anxiety symptoms; suggesting that social support buffered the negative effects of avoidant and problem focusing coping strategies (Romero et al., 2015). Yet Nyaronga and Toma (2015) found that high levels of perceived social support from peers and friends significantly decreased PTS symptomology, whereas social support from family had no impact on PTS symptoms in their sample of veterans (Nyaronga & Toma, 2015).

Lastly, social support interacts closely with the passage of time, and it can be expected that the type, source, and quantity of social support will vary over time (Holden, Dobson, Ware, Jockey, & Lee, 2015; Lowe & Willis, 2015). In their recent study, Holden and colleagues (2015) identified four trajectories of social support that emerged over 12 years: high, decreasing, low, and increasing. Those in the decreasing social support trajectory also demonstrated deterioration in both physical and mental health over time; whereas, those in the increasing social support trajectory demonstrated an improvement in mental health over time (Holden et al., 2015). These findings highlight the long-term impact of fluctuations in social support on mental health. However, it should be noted, that this study was conducted exclusively with women and did not focus on trauma, posttraumatic stress disorder or posttraumatic growth in particular. As such there may be variation in these patterns and findings among males who have been exposed to trauma. Given the critical role of social support (overall) on posttrauma adaptation, and the

variability in the perceived availability of social support as time passes, it is likely that the efficacy of social support in promoting positive adaptation and ameliorating negative symptomology will fluctuate (Holden et al., 2015). As such, it is essential to consider the role of time, and the timing of social support in the examination of posttrauma adaptation.

In sum, there is growing evidence that social support is an influential factor in the development of positive adaptation. Above and beyond promoting positive adaptation, social support has been found to reduce negative symptomology such as PTSD, depression, and anxiety. These patterns have been demonstrated in a multitude of trauma-affected population including military veterans. Yet, there remains a gap in the social support literature regarding the impact of type, source, quantity, and quality of social support the *quality* of PTG.

Theoretical Perspective

The differentiation in the quality of posttraumatic growth and evolution of constructive growth over time are relatively new areas of research in the trauma field. Although there are established theoretical models that outline the development and maintenance of other posttrauma outcomes (e.g. Ehlers & Clark, 2000; Kleber & Brom, 1992), there is, to my knowledge, a dearth of theoretical models that examine the process and mechanisms related to the development of *constructive* growth over time. Calhoun, Tedeschi, Cann, & Hanks (2004) offer a theoretical model, which proposes a pathway to the development of posttraumatic growth more generally. However, their model focuses heavily on the role of deliberate rumination in rebuilding the assumptive world and the role of cognitive processing; factors that are not explored in the current study. Rather than attempting to modify their theory, the current study draws from: (1) existing

theoretical work which highlights the heterogeneity of posttrauma adaptation trajectories (e.g. Bonanno, 2004 and Layne et al., 2009); (2) the *Janus Face Model* of posttraumatic growth (Zoellner & Maercker, 2006); and (3) empirical data suggesting that social support and coping strategies play a role in the process of developing constructive growth. As a result, the current study does not present one over-arching theoretical model; rather I draw from existing theoretical and empirical literature to build a theoretical *framework* in which the current analysis is embedded.

The heterogeneity of posttrauma adaptation. It is becoming more common in the empirical literature for adaptation following trauma to be recognized as a heterogeneous group of trajectories that evolve over time (Bonanno, 2004; Layne et al., 2009). These profiles of adaptation represent theoretically distinct trajectories of coping, distress, adaption, and growth following traumatic events. As previously mentioned, seminal work in this area by Bonanno (2004) has resulted in the identification of four potential trajectories of adaptation following bereavement including: (1) chronic; (2) delayed; (3) recovery; and finally (4) resilience.

Further expanding the variety of posttrauma adaptation profiles, Layne and colleagues (2007) hypothesized four similar trajectories of posttrauma adaptation: (1) stress resistance; (2) resilience ; (3) protracted recovery; and finally (4) severe persistent distress, and included three additional trajectories: (1) decline – characterized by initial maintenance of healthy functioning followed by a marked de-compensation; (2) stable maladaptive – which involved persistent maladaptive pre and post trauma functioning; and finally (3) posttraumatic growth- characterized as an initial disruption in functioning followed by an improvement above and beyond pre-trauma levels.

In combination, these works raised questions regarding the somewhat simplistic perspective previously taken to posttrauma adaptation; and suggested that the process of adaptation should be viewed as much more complex. A simultaneous shift occurred in the posttraumatic growth literature, resulting in a critical re-evaluation of PTG, and a call for a more nuanced reconceptualization that recognized the potential for heterogeneity within growth-related trajectories. We draw from this body of literature to inform the theoretical framework of the current study.

Theoretical debate and reconceptualization of PTG. While previous conceptualizations of PTG treated growth as a theoretically multi-dimensional construct (e.g. five areas of growth) the inconsistencies in the empirical literature, particularly in regards to the relationship between growth and distress, brought to the surface lingering concerns regarding the clarity and strength of PTG as a concept. More specifically, the literature has demonstrated that there is a significant and positive association between PTG and PTSD (Kilmer, Gil-Rivas, Tedeschi, Cann, & Calhoun, 2009; Jin, Xi, Liu, & Liu, 2014; Taku et al., 2008; Xu & Liao, 2011), while others have found a negative correlation between the two (Frazier, Conlon, & Glaser, 2001; Kimhi, Eshel, Zysberg, & Hantman, 2010) and some studies even reporting no relationship at all (Salsman, Segerstrom, Bretchting, Carlson, & Andrykowski, 2009; Shakespeare-Finch & Lurie-Beck, 2014; Zoellner & Maercker, 2006).

Wortman, (2004) takes a spectrum approach, proposing that PTG provides the illusion of meaning making with the goal of reducing distress. As such, she hypothesizes an inverse relationship between distress and PTG, whereby individuals with higher PTG reported lower levels of distress. However, this conceptualization assumes that PTG and

distress are opposite ends of a spectrum of posttrauma adaptation and as such are mutually exclusive states.

Alternatively, in a recently published longitudinal study regarding the relationship between PTSD and PTG, Hall and colleagues (2015) found that early reports of PTSD severity predicted PTG at a later time point. Interestingly, they found that higher reported PTG at baseline did not reduce PTSD symptom severity at a later time point. Although these findings imply that PTG and PTSD are distinct concepts that represent a spectrum of adaptation, these findings do not support the hypothesis that PTG acts a buffer to reduce distress following trauma exposure.

Conversely, Tsai and colleagues (2015a) found that 50% of veterans in their study reported experiencing at least moderate growth following combat exposure. Interestingly they found that of the total sample who screened positive for PTSD, over 72% reported comorbid growth (Tsai et al., 2015a). Similarly, Pietrzak et al (2010a) found that 72% of their military sample demonstrated significant growth two years post deployment, and found that higher reported PTSD symptomology positively predicted reports of growth. These findings support the theoretical model proposed by Tedeschi & Calhoun (1996; 2004) that growth emerges when the trauma is disruptive enough to require adaptation and meaning making; and offers evidence that growth and distress can co-occur.

As an alternative to a traditional linear model, some have hypothesized curvilinear model for PTG and PTSD (Coroiu, Korner, Burke, Meterissian, & Sabiston, 2015; Kleim & Elhers, 2009; Shakespeare-Finch et al., 2014; Powell, Rosner, Butollo, Tedeschi & Calhoun, 2003) suggesting that PTSD and PTG may co-occur, and that PTG emerges within an optimal threshold of PTSD symptom severity. In a meta-analysis of 42 studies

examining the relationship between PTG and PTSD, Shakespeare-Finch and colleagues (2014) found both a linear and curvilinear relationship between the two constructs, with a significantly stronger curvilinear relationship. These findings were consistent with the threshold approach, suggesting that the relationship between PTSD and PTG is positive until a critical threshold of PTSD is met, at which point the likelihood of reporting simultaneous growth decreases (i.e. an inverted U shape curve). Indeed, in a sample of 253 air force personnel, PTG and PTSD demonstrated this kind of negative quadratic relationship (i.e. inverted U). Suggesting there is an optimal level of PTSD symptomology during which PTG may still emerge. But once PTSD symptomology becomes severe PTG is no longer observed.

To date, there is limited agreement regarding the conceptualization of growth as a phenomenon. As such, we can only expected minimal clarity regarding the identification of predictors that promote growth, and the positive consequences that may emerge following the experience of growth. To address these limitations in the growth literature, researchers and practitioners alike have called for a re-conceptualization of PTG. The goal is to tease apart the complex and dynamic nature of growth; to better understanding both the factors that promote PTG (e.g. coping) and the relationship between PTG and other indicators of adaption (e.g. distress and wellbeing). There are two promising approaches to re-conceptualizing growth. The first is to differentiate between types of growth based on *utility*, or a behavioral component of growth while the second is to differentiate based on the *quality* of growth. Both approaches have led to the identification of two kinds of growth that are expected to relate to distress and wellbeing differently.

The Utility of the Construct PTG. Hobfoll and colleagues (2007) put forward a model, which highlights the nuances in growth by examining the *utility* between growth cognitions and growth actions. They propose that growth is only beneficial when paired with actions that demonstrate the existence of growth (i.e. helping others). In their article they link PTG closely with the search for meaning and propose that meaning may be found in action. As such, PTG may be differentially related to wellbeing and distress, and in part these different relationships may be determined by factors such as self-efficacy, and access to psychosocial resources as they relate to the ability to engage in actions that reflect growth.

In a study of 122 undergraduate students, Frazier and colleagues (2009) examined the differences in *perceived* and *actual* growth, which they measured using behavioral indicators that were thought to reflect the domains in which growth emerges (i.e. the domains measured by the PTGI). They found that perceived growth was associated with increased levels of distress, whereas actual growth was associated with decreased levels of distress (Frazier, Tennen, Gavian, Park, Tomich, & Tashiro, 2009). Providing some support that one component of growth may reflect positive illusions that are not associated with behavioral changes, but may be related to reducing psychological distress in the early stages of adaptation.

Extending this line of research Shakespeare-Finch & Barrington (2012) propose a similar model in which they assess behavioral changes (both objectively and subjectively reported) in a sample of 176 undergraduate students reporting PTG. They found of those who reported growth, over 96% reported simultaneous behavioral changes, with 93% of significant others corroborated these behavioral changes. However, a purely behavioral

perspective on assessing growth may be limited as some aspects of growth are difficult to observe and quantify (e.g. greater appreciation of life). Further, the differentiation between growth cognition and growth action may be too polarized (Tedeschi & Calhoun, & Cann, 2007) and may inaccurately suggest that growth is either cognitive or behavioral when in fact growth may include components of both (Tedeschi et al., 2007).

  The Quality of the Construct PTG. Alternatively, Maercker and Zoellner propose a model of PTG that accounts, in part, for the *quality* of growth. Utilizing the Janus Face as a metaphor, their theory proposes two components, illusory and constructive growth. Constructive growth refers to a functional component of growth, suggesting that it is associated with other measures of wellbeing such as positive adjustment, emotional regulation, and effective cognitive processing following a trauma (Maercker & Zoellner, 2006). Alternatively, illusory growth is conceptualized as a form of self-deception that may promote strategies such as cognitive avoidance, or denial, in an effort to reduce emotional distress immediately following exposure to a trauma (Taylor, 1983; Maercker & Zoellner, 2004; Zoellner & Maercker, 2006). The unique component of this model is the assumption that illusory and constructive growth are temporally associated. That is, once emotional distress decreases, and coping improves, the illusory component of PTG is expected to fade and give way to the constructive side of PTG (Tedeschi et al., 2007; Zoellner & Maercker, 2006).

  These two components of growth are hypothesized to co-exist (Zoellner & Maercker, 2006). As such there is a strong temporal component to this model in which illusory and constructive growth demonstrate different courses over time (Maercker & Zoellner, 2004; Zoellner & Maercker, 2006). Further, illusory and constructive growth

are thought to be related to measures of distress and wellbeing differently at different points in time - in part dependent on engagement in purposeful coping and processing of the trauma (Zoellner & Maercker, 2006).

Profiles and Trajectories of PTG. Pat-Horenczyk and colleagues (in press) extended previous theoretical conceptualization of illusory and constructive PTG to also incorporate the complex relationship among these constructs over time, providing greater insight into the differential relationship between growth, distress, and coping. They propose four profiles of adaptation: (1) resistant; (2) distressed; (3) struggling growth; and (4) constructive growth. The resistant profile is characterized by low levels of distress, coping, and PTG; while the distressed group demonstrates high levels of distress but low reported growth and coping. Interestingly, the struggling profile is characterized by high reports of distress, growth, and coping – suggesting that these individuals work hard to adapt but report both distress and growth in the process. Lastly, the constructive profile is analogous to that proposed by Maeker and Zoellner (2004; 2006) and is characterized by high reported growth, positive coping, and was associated with low levels of distress.

The profile of struggling growth reflects the co-occurrence of growth and distress without diminishing the possibility that growth is real. In line with previous findings that the emergence of growth, as well as quality of growth, fluctuates as a function of time, it is hypothesized that those who are struggling to grow are in a state that is highly malleable and as such, this state reflects a window of opportunity to transition into constructive growth. Over time, the struggling PTG group decreased in size, suggesting that some women were able to resolve the struggle and transition to another profile of

adaptation. Indeed, being classified within the struggling PTG status as six month was associated with an increase in the odds of transitioning to either resistance (no growth and no distress) or constructive growth at 12 months, supporting Zoellner & Maercker's claim. These findings provide preliminary evidence that there may be greater heterogeneity among growth profiles that is not captured by the constructive and illusory designation. Rather, the dual model of constructive and illusory growth, while more specific, may still be an over-simplification of the growth phenomenon.

Factors associated with the development of PTG. There is significant empirical support for the positive effect of adaptive coping strategies (e.g. forward focused and positive coping strategies) and social support on the process of posttrauma adaptation generally. Social support is thought to attenuate the negative mental health outcomes associated with trauma, and promote PTG, because positive social support provides a framework in which survivors can utilize adaptive coping strategies to verbally process traumatic experiences (Currier et al., 2013; Prati & Pietrantoni, 2009), create a meaningful narrative (Cryder, Kilmer, Tedeschi, & Calhoun, 2006; Tedeschi & Calhoun 2004), express emotion (Cryder et al., 2006), challenge distorted cognitive thinking regarding the traumatic event (Robinaugh et al., 2011), and integrate traumatic experiences in a positive manner (Tedeschi & Calhoun, 2004). In other words social support provides a context in which coping and processing of the traumatic event occurs; implying that there may be an interaction between social support and coping that influences the process of adaptation.

The current theoretical framework highlights the positive role of coping and social support in promoting PTG (Keith et al., 2015; Pietrzak et al., 2010a) as well as in

buffering negative mental health outcomes of trauma such as PTSD (Jakupcak et al., 2010). In doing so, the current study refers to social support and coping as central mechanisms in the process of adaptation. Yet it should be noted, that there is, to my knowledge, a scarcity of information regarding the role of social support and coping in predicting the *quality* of PTG following combat.

The Current Study

There is a growing recognition that posttrauma adaptation is a complex and dynamic process that emerges over time. The heterogeneity in trauma reactions and adaptations posttrauma has resulted in an emerging line of inquiry focusing on the differentiation among positive adaptation trajectories. Yet, there remains a lack of consistency and clarity in our conceptualization and definitions of resilience and growth. In part this is a reflection of the fact that our understanding PTG is still in its early stages, making it difficult to differentiate growth from other aspects of positive adaptation. Recent research has begun to investigate the *quality* of PTG in the hopes that it may lead to greater clarification of the construct and its relationship with other measures of wellbeing and distress, including resilience.

Similarly, there is a need to further understand the role of factors that are expected to influence positive adaptation trajectories, particularly as they related to the quality of PTG. In particular there is a growing body of literature regarding the positive outcomes associated with adaptive, active and flexible coping; yet there remains a gap in the coping literature regarding the role of specific coping strategies on predicting the *quality* of PTG. Similarly, despite the recognition that, as a whole, social support is an important component in facilitating positive adaptation following trauma, there is a dearth in the

literature regarding the specific relationship between social support and the *quality* of PTG, and as such the literature continues to lack a nuanced understanding of this relationship.

The current study begins to address these gaps in the literature by characterizing nuanced post-combat adaptation profiles that differentiate between positive adaptation typologies. Further, the study explores the predictive utility of previously identified protective factors, such as social support, engagement in positive coping strategies (e.g. acceptance and positive reappraisal), as well as *forward focused* and *trauma focused* coping strategies, on the *quality* of posttraumatic growth. Lastly, the study suggests that these protective factors may function differently in their ability to promote constructive growth based on initial adaptation profiles. That is, characteristics of initial adaptation may play a role in the ability of protective factors in predicting the *quality* of growth.

The current study emphasized the importance of the quality of growth that emerges following an intensive group intervention for military veterans. The operationalization of the quality of growth was inspired by that proposed by Maercker and Zoellner (2004; 2006). First, the current study investigates the factors that predict constructive versus non-constructive growth. The use of non-constructive growth more broadly (rather than illusory growth as proposed by Maercker and Zoellner) recognizes that there may be heterogeneity within non-constructive growth typologies, and that illusory growth may only represent a subset of that variability. Secondly, the operationalization of constructive growth incorporates a measure of coping improvement (i.e. a reduction of negative coping strategies), in an attempt to address previous

criticisms regarding the lack of behavioral measures included in the operationalization of PTG.

In line with previous literature, the theoretical model of the proposed study assumes that there are multiple factors that influence positive mental health outcomes such as constructive growth following exposure to a traumatic event. To that end, two primary sets of protective factors are proposed in the theoretical model, these include: forward focused and trauma focused coping strategies, and social support. However, the current model extends previous literature by recognizing that these protective factors may work differently for different groups of trauma survivors. As such, latent profiles of post-combat adaptation were developed in order to examine the context in which these protective factors function well and assist in the development of constructive growth (see figure1).

Aims and Research Questions

The specific research questions are divided within three primary aims, which are:

Aim 1: To describe and characterize post-combat adaptation profiles based on the pattern of endorsement to indicators of posttraumatic distress symptoms, positive coping, and posttraumatic growth.

RQ 1: How many distinct latent class profiles will emerge?

RQ 2: In what ways will the profiles differ on level of positive coping strategies, posttraumatic growth, and distress?

RQ 3: In what ways will profiles share similarities in level of positive coping strategies, posttraumatic growth, and distress?

RQ 4: Which is the most commonly observed latent class? Which is the least?

Aim 2: To test the utility of latent class membership on predicting constructive posttraumatic growth.

RQ 5: Is there a difference in level of constructive growth among latent classes?

Aim 3: To explore the protective and risk factors (i.e. social support, forward focused coping strategies, and trauma focused coping strategies) that impact the ability to reach constructive posttraumatic growth for each profile of post-combat adaptation.

RQ 6: Under what conditions does social support promote constructive posttraumatic growth?

RQ 7: Under what conditions does the quality of coping strategies engaged in promote constructive posttraumatic growth?

RQ 8: Is there a situation in which social support is more beneficial than the quality of coping strategies selected

Figure 1. Conceptual Model for the Current Study.

Chapter III. Methods

Program and Data

    Program description. The *Peace of Mind* program targets organic military units who have been involved in combat during their military service and were exposed to traumatic events during combat (e.g. loss of a unit member, friendly fire, mass causalities). It is not a necessary inclusion criterion that members of the unit receive a clinical diagnosis of posttraumatic stress disorder- although some unit members may indeed suffer from PTSD. The intervention is organized into three phases: (1) a workshop that focuses on building safety and trust within the unit, and between the unit and the facilitator. This phase of the intervention combines outdoor activities with group processing and takes place in Israel; (2) An eight-day workshop (36 hours of group counseling) that takes place in a community outside of Israel (abroad) and focuses on psycho-education, building self-regulation skills, as well as individual and group processing of traumatic events related to combat. Further, the abroad intervention fosters group cohesion and builds strong social support among unit members to develop the foundation for a sustainable support network once the intervention protocol is completed. Lastly, (3) a concluding one-day follow-up session is used to debrief and make plans for continued use of the skills acquired during the intervention. The eight-day workshop abroad takes place approximately 6 weeks after the initial workshop, and the follow up workshop takes place approximately 6 weeks after the unit returns to Israel.

    Sampling procedure. The study uses a longitudinal data file collected by a research team at the Israel Center for the Treatment of Psychotrauma (ICTP). The data were originally collected in the context of an evaluation for a group intervention program,

referred to as *Peace of Mind* (POM). *Peace of Mind* is a group curriculum designed to build resilience, enhance coping and social support, and foster posttraumatic growth in veterans who engaged in combat during their military service. The intervention team at ICTP collaborates with the Israeli Defense Forces (IDF) in a referral process by which organic military units are referred by the IDF for the POM program based on known exposure to traumatic events during combat (e.g. friendly fire or loss of unit member). It should be noted that some groups are not referred by the IDF but rather seek out the POM intervention based on word-of-mouth from former participants.

Combat units participate in the intervention one at a time, as such the total timeline for one unit to move through the treatment protocol is approximately four and half months. During the original data collection (i.e. the program evaluation of the POM intervention) a waitlist control condition using a matching procedure (in which unit members were compared on demographic and combat variables) was employed. The current study does not seek to evaluate the efficacy of the POM intervention; the control data for these groups were not included in the analysis. Rather only the data from three of the control groups who had also completed the intervention (i.e. moved off of the waitlist) were included. Although the intervention program is still running and data collection is ongoing, the current study uses only data collected between 2007 and October 2015.

Data collection procedure. Participants were asked to complete a battery of self-report questionnaires at three time points that coincided with the three workshops noted above. The first is a pre-intervention screening given during intake; the second measurement is collected directly after the intervention group returns to Israel from the

abroad workshop; and the final measurement is collected at the third workshop (i.e. follow up session). Based on this structure, pre-intervention and follow-up data (time one and three respectively) are typically collected 12 weeks apart.

The data collection protocol for the wait-list control groups follows two formats. Model A is structured such that the control group has four data points in total- the first takes place at intake and the second 12 weeks later. The second data collection point is intended to coincide with the follow-up data point for intervention groups. As the control group moves into the intervention component the second time point is used as their pre-intervention data. They are then surveyed at two additional time points (upon returning from the abroad intervention and six weeks after the abroad intervention), which replicates the intervention data collection procedure.

Model B adds an additional pre-intervention measurement when the amount of time elapsed between the second data point in the control condition and the abroad intervention exceeds 12 weeks. In this structure the group is surveyed at intake and again 12 weeks later (i.e. control condition). The group is then surveyed a third time at the pre-intervention workshop, which corresponds to the first data collection point for the regular intervention groups. Following the abroad intervention the group is surveyed at two additional points in time – following the abroad intervention and at the concluding workshop six weeks later. Both control group structures attempt to keep the amount of time between data collection as consistent as possible with the intervention model. These models are diagramed in Appendix B.

Sample

  Derivation. An emerging body of literature suggests that posttraumatic adaptation

is a process that unfolds over time, and that PTG emerges as a result of the coping

process rather than as a result of the traumatic event itself (Danhauer et al., 2015;

DeRoon-Cassini, Mancini, Rusch, & Bonanno, 2010; Pat-Horenczyk et al., in press;

Tedeschi & Calhoun, 2004). As such, the current study examines the emergence of

constructive growth in a longitudinal framework. As a result of the relatively brief nature

of the POM intervention, and the limited amount of expected change in psychological

constructs (e.g. PTG) and distress symptomology within six weeks, the second time point

(i.e. data from immediately after the abroad intervention – six weeks post baseline data)

was omitted from the current analysis. The goal was to select two data points that would

capture the effect of time as much as possible (i.e. the most amount of time elapsed

between data points). As such, data collected during the preliminary workshop (Time 1)

for the regular intervention groups, at the second point in measurement for waitlist-

controls following Model A, and at the third point of measurement for waitlist-controls

following Model B; and data from the follow-up workshop (Time 3) (time three for

intervention groups, time four for Model A, and time five for Model B). In total, 26

intervention groups were included out of a possible 28 groups; two groups were omitted

as a result of coding errors.

  Characteristics. The data files consist of over four hundred male veterans ($N =$

478) who participated in the *Peace of Mind* program between 2007 and October 2015. Of

these, 30 respondents were omitted as a result of coding errors resulting in a final sample

of $N = 448$. These veterans belonged to 26 intervention groups who had ended their

active duty military service on average five years ($M = 5.35$; $SD = 2.45$) prior to

participating in the POM program. The groups ranged in size from 14 to 21 men. The

sample consists of male Israeli veterans who, on average were 27.5 years old ($M = 27.50$;

$SD = 2.7$). The majority 72% ($n = 310$) reported being single, and approximately 30% of

the sample met full criteria for PTSD ($n = 137$). Further, approximately 35% ($n = 120$)

reported reaching constructive growth. Seventy six percent ($n = 341$) reported

experiencing between 1-2 additional traumatic events above and beyond exposure in

combat, while only about 14% ($n = 62$) reported experiencing three or more additional

traumatic events. Sample characteristics are presented in table 1.

Table 1. Demographic Characteristics of the Sample

Item	Mean (sd)	Frequency (%)
Married	-	116 (27.04)
Single	-	313 (72.96)
Duration since combat	5.35 (2.45)	-
Age	27.50 (2.70)	-
Death of someone close	-	325 (75.76)
Danger of death or severe injury	-	295 (69.25)
War or terror event	-	112 (72.26)
Total	-	448

Established Measures

  Posttraumatic Growth. The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) consists of 21 items designed to measure five subscales that reflect perceived benefits of coping with a traumatic event ($\alpha = .924$). These include: (1) realization of new possibilities ($\alpha = 0.841$); (2) an increased sense of personal strength ($\alpha = 0.769$); (3) a greater appreciation of life ($\alpha = 0.676$); (4) an increased sense of closeness with others ($\alpha = 0.842$); and (5) spiritual growth ($\alpha = 0.690$). Responses are reported on a 6-point Likert scale ranging from 0 *"I did not experience this change as a result of my crisis"* to 5 *"I experienced this change to a very great degree as a result of my crisis."* This scale was forward and back translated, into Hebrew for use with Israeli samples and has been validated in previous studies (see Laufer & Solomon, 2006; Solomon & Laufer, 2005). Mean values and alpha coefficients for the PTGI subscales and items are presented in table 2.

  Previous research suggests that various subscales of the PTGI may be more salient for different traumatized populations (Feder et al., 2008; Hijazi et al., 2015). In particular, veteran samples tend to endorse items related to the *appreciations of life* and *personal strength* subscales more strongly than other subscales on the PTGI (see Feder et al., 2008; Hijazi et al., 2015; Tsai et al., 2015a). Given the total score for PTG is calculated as an average of all subscales, subscales that are not as meaningful and therefore not highly endorsed may result in an underestimation of overall growth.

  Selecting particularly relevant subscales of the PTGI was discussed with five members of the clinical team at ICTP who facilitate POM groups. Each of the team members was asked to independently rate the salience of PTGI subscales based on their

clinical experience working with a veteran population. There was 100% agreement

regarding the importance of the *increased sense of personal strength* and the *increased*

sense of closeness with others subscales among the five-team members. Although an

increased sense of closeness with others is not typically noted in the literature as a

particularly salient subscale of the PTGI for veteran populations, building social support

is a central component of the POM intervention program. As such, assessing growth in

the realm of relationships with others may be particularly important for this unique

sample. Combining these anecdotal accounts and findings in previous literature, three

subscales of the PTGI were selected to measure total PTG in this sample. These include:

(1) a greater appreciation of life; (2) increased sense of personal strength; and (3)

increased sense of closeness with others (total $\alpha = 0.889$).

Table 2. PTGI Subscales and Items: Mean and Alpha Coefficients

Subscale and Item	Mean (sd)	Alpha
Appreciation of Life	3.49 (1.14)	0.676
I changed my priorities about what is important in life	3.40 (1.53)	
I have a greater appreciation for the value of my own life	3.68 (1.44)	
I can better appreciate each day	3.39 (1.41)	
Closer Relationships with others	3.10 (1.01)	0.842
I more clearly see that I can count on people in times of trouble	3.79 (1.14)	
I have a greater sense of closeness with others	3.24 (1.35)	
I am more willing to express my emotions	2.66 (1.45)	
I have more compassion for others	3.14 (1.41)	
I put more effort into my relationships	2.85 (1.50)	
I learned a great deal about how wonderful people are	3.22 (1.48)	
I better accept needing others	2.81 (1.49)	
Personal Strength	3.78 (0.96)	0.769
I have a greater feeling of self-reliance	2.87 (1.21)	
I know better that I can handle difficulties	4.16 (1.06)	
I am better able to accept the way things work out	3.51 (1.32)	
I discovered that I'm stronger than I thought I was	3.56 (1.38)	
Total Score	3.45 (0.87)	0.889

Note: N=448. Each item ranges from 0 ("*I did not experience this change as a result of my crisis*")
to 5 ("*I experienced this change to a very great degree as a result of my crisis*").

Coping Flexibility. The Perceived Ability to Cope with Trauma Scale (PACT; Bonanno et al., 2011) measures respondent's perceptions regarding their ability to cope with trauma, and the degree of variability in coping strategies. More specifically, the scale assesses the ability of respondents to switch between various coping strategies depending on the situation; a quality thought to be associated with adaptive coping (Bonanno et al., 2011).

The scale includes 20 items, accounting for two subscales focusing on two processes of coping with trauma: trauma focus subscale (8 items) and the forward focus (12 items) subscale. Participants are asked to report to what degree they would be able to use different kinds of behaviors and strategies in the weeks following a traumatic event using a 7-point scale ranging from 1 "*not at all able*" to 7 "*extremely able.*" Scores are obtained for the two aspects of coping, as well as a total combined flexibility score. In the current data internal reliability was highly satisfactory ($\alpha = 0.917$ for the Forward Focus scale and $\alpha = 0.810$ for the Trauma Focus scale). The structural, convergent, discriminant, and cross-cultural validity of the questionnaire has been tested in previous literature and supports the use in this study (Bonanno et al., 2011). This scale was translated, and back-translated, into Hebrew by one of the original authors of the scale. It has been used in Hebrew by ICTP research staff in multiple prior research studies with Israeli samples (see Pat-Horenczyk et al., 2015; Pat-Horenczyk et al., in press). Alpha coefficients and mean values for PACT items and subscales are presented in table 3.

Table 3. PACT Subscales and Items: Mean and Alpha Coefficients

Subscale and Item	Mean (sd)	Alpha
Forward Focused Coping	5.28 (1.04)	0.979
Keep my schedule and activities as constant as possible	5.25 (1.49)	
Comfort other people	5.51 (1.35)	
Look for a silver lining	5.49 (1.34)	
Stay focused on my current goals and plans	5.28 (1.40)	
Find activities to help me keep the event off my mind	5.13 (1.47)	
I would be able to laugh	5.43 (1.55)	
Try to lessen the experience of painful emotions	4.70 (1.53)	
Distract myself to keep from thinking about the event	4.69 (1.62)	
Enjoy something that I would normally find funny or amusing	5.16 (1.48)	
Focus my attention on or care for the needs of other people	5.50 (1.29)	
Remind myself that things will get better	5.56 (1.26)	
Keep myself serious and calm	5.68 (1.30)	
Trauma Focused Coping	5.04 (1.00)	0.810
Let myself fully experience some of the painful emotions linked to the event	4.41 (1.69)	
Spend time alone	5.45 (1.44)	
Reduce my normal social obligations	4.81 (1.48)	
Alter my daily routine	4.91 (1.47)	
Reflect upon the meaning of the event	5.22 (1.48)	
Face the grim reality head on	5.14 (1.52)	
Remember the details of the event	5.32 (1.61)	
Pay attention to the distressing feelings that result from the event	5.09 (1.51)	
Total	5.25 (14.52)	0.920

Note: N=448. Each item ranges from 1 ("*not at all able*") to 7 ("*extremely able*").

Posttraumatic Stress Symptoms. The Posttraumatic Stress Diagnostic Scale

(PDS; Foa, Cashman, Jaycox, & Perry, 1997) is a 19-item self-report measure for adults

yielding a total severity score (ranging from 0 to 57) that reflects the frequency of PTSD

symptomology. The scale also includes nine additional items that measure functional

impairment. Each of the symptom severity item is rated on a 4-point scale ranging from 0

" *Not at all or only once in the past month*" to 3 "*Almost always or 5 or more times a*

week in the past month." Based on these items and the diagnostic criteria for PTSD in the

DSM-IV TR, four binary indicators of PTSD diagnosis were generated. These four

variables denote meeting clinical criteria for: (1) re-experiencing (Criteria B: one of more

of five items); (2) avoidance (criteria C: three or more of seven items); (3) hyperarousal

(criteria D: two or more of five items); and (4) functional impairment (criteria F:

significant distress or impairments in important areas of functioning such as social or

occupational realms) (APA, 2000).

The concurrent validity of the PDS with the PTSD scale of the Structured

Clinical Interview for DSM-III (SCID) is $r = .94$ (Foa, Riggs, Dancu & Rothbaum,

1993). In the current study internal reliability of the total PDS score was highly

satisfactory ($\alpha = 0.954$). This scale has been translated to Hebrew and back translated by

native Hebrew/ English speakers and has been validated in Israeli populations in previous

research (see DeKeyser Ganz, Raz, Gothelf, Yaniv, & Buchval, 2010; Pat-Horenczyk et

al., 2015). Mean values, frequencies, and alpha coefficients for PDS items and subscales

are presented in table 4.

Table 4. PDS Subscales and Items: Means and Alpha Coefficients

Subscale and Items	N (%) Mean (sd)	Alpha
Re-Experiencing - Criteria B	310 (73.20%)	0.839
Having upsetting thoughts or images about the traumatic event that come into your head at unwanted times	0.744 (0.79)	
Having bad dreams or nightmares about the traumatic event	0.42 (0.72)	
Reliving the traumatic event, acting or feeling as if it was happening again	0.35 (0.66)	
Feeling emotionally upset when you were reminded of the traumatic event	0.70 (0.83)	
Experiencing physical reactions when you were reminded of the traumatic event	0.35 (0.66)	
Avoidance – Criteria C	182 (42.82%)	0.824
Trying not to think about, talk about, or have feelings about the traumatic event	0.75 (0.93)	
Trying to avoid activities, people, or places that remind you of the traumatic event	0.47 (0.84)	
Not being able to remember an important part of the traumatic event	0.58 (0.89)	
Having much less interest or participating much less often in important activities	0.41 (0.74)	
Feeling distant or cut off from people around you	0.49 (0.83)	
Feeling emotionally numb	0.66 (0.92)	
Feeling as if your future plans or hopes will not come true	0.46 (0.80)	
Hyper-Arousal – Criteria D	233 (54.95%)	0.840
Having trouble falling or staying asleep	0.57 (0.93)	
Feeling irritable or having fits of anger	0.56 (0.82)	
Having trouble concentrating	0.75 (0.97)	
Being overly alert	0.70 (0.95)	
Being jumpy or easily startled	0.72 (0.93)	
Functional Impairment – Criteria F	294 (65.62%)	0.952
Symptoms interfere with work	0.74 (1.25)	
Symptoms interfere with household chores and duties	0.89 (1.30)	
Symptoms interfere with relationships with friends	0.85 (1.31)	
Symptoms interfere with fun and leisure activities	1.02 (1.43)	
Symptoms interfere with school work	0.82 (1.28)	
Symptoms interfere with relationship with your family	0.61 (1.17)	
Symptoms interfere with sex life	1.04 (1.43)	
Symptoms interfere with general satisfaction with life	0.83 (1.23)	
Total Symptom Severity	9.56 (9.21)	0.916
Full PTSD Diagnosis	137 (30.58%)	

Note: N=448. Each item ranges from 0 (“*not at all/only once in the past month*”) to 3 (“*almost always/ 5+ times in the past month*”).

Cognitive and Emotion Regulation. The Cognitive Emotion Regulation

Questionnaire (CERQ) is a multidimensional, 18-item scale that identifies coping

strategies used by respondents following a traumatic event (Garnefski & Kraaij, 2006).

Responses are coded on a 5-point likert scale ranging from 1 "*almost never*" to 5 "*almost*

always," and are organized into 9 subscales: self-blame ($\alpha = 0.756$), acceptance ($\alpha =$

0.635), rumination ($\alpha = 0.619$), positive refocusing ($\alpha = 0.667$), refocus on planning ($\alpha =$

0.706), positive reappraisal ($\alpha = 0.644$), putting into perspective ($\alpha = 0.700$),

catastrophizing ($\alpha = 0.835$), and blaming others ($\alpha = 0.673$). Sum scores for positive

cognitive emotion regulation (acceptance, positive refocusing, refocus on planning,

positive reappraisal, and putting into perspective) ($\alpha = 0.780$), and negative cognitive

emotion regulation (self-blame, rumination, catastrophizing, and other blame) ($\alpha = 0.788$)

were generated. This scale was translated, and back-translated, into Hebrew by the

research team at ICTP and has been used in multiple prior research studies with Israeli

samples (e.g. Pat-Horenczyk et al, 2015; Pat-Horenczyk et al., in press). The means and

alpha coefficients for CERQ items and subscales are presented in table 5.

Table 5. CERQ Subscales and Items: Mean and Alpha Coefficients

Subscale and Item	Mean (sd)	Alpha
Acceptance	3.80 (0.99)	0.635
I think that I have to accept that this has happened	3.87 (1.20)	
I think that I have to accept the situation	3.75 (1.10)	
Positive Refocusing	2.64 (1.04)	0.667
I think of pleasant things that have nothing to do with it	2.77 (1.22)	
I think of something nice instead of what has happened	2.50 (1.18)	
Refocus on Planning	3.24 (1.14)	0.706
I think about how to change the situation	3.32 (1.30)	
I think about a plan of what I can do best	3.18 (1.29)	
Positive Re-appraisal	3.76 (0.96)	0.644
I think I can learn something from the situation	3.94 (1.05)	
I think that I can become a stronger person as a result of what has happened	3.68 (1.19)	
Putting into Perspective	3.22 (1.13)	0.700
I think that it hasn't been too bad compared to other things	2.82 (1.26)	
I tell myself that there are worse things in life	3.62 (1.29)	
Self-Blame	2.57 (1.16)	0.756
I feel that I am the one who is responsible for what has happened	2.84 (1.31)	
I think that basically the cause must lie within myself	2.30 (1.26)	
Rumination	3.06 (1.05)	0.619
I often think about how I feel about what I have experienced	3.22 (1.14)	
I am preoccupied with what I think and feel about what I have experienced	2.90 (1.29)	
Catastrophizing	2.20 (1.07)	0.835
I keep thinking about how terrible it is what I have experienced	2.24 (1.17)	
I continually think how horrible the situation has been	2.16 (1.14)	
Blaming Others	1.87 (0.86)	0.673
I feel that others are responsible for what has happened	1.96 (1.04)	
I feel that basically the cause lies with others	1.79 (0.92)	
Positive Cognitive Emotion Regulation (subscales 1-5)	3.33 (0.70)	0.800
Negative Cognitive Emotion Regulation (subscales 6-9)	2.42 (0.72)	0.728
Total Score	-	0.792

Note: N=448. Each item ranges from 1 ("*almost never*") to 5 ("*almost always*").

Social Support. The Multidimensional Scale of Perceived Social Support (MSPSS: Zimet, Dahlem, Zimet, & Farley, 1988) measures perceived social support from three sources: family ($\alpha = 0.871$), friends ($\alpha = 0.893$) and significant others ($\alpha = 0.889$). Responses to the 12 items are given on a 7-point Likert scale ranging from 1 "*very strongly disagree*" to 7 "*very strongly agree.*" The total score was the average of the item responses, reflecting the perceived satisfaction with social support from all three sources ($\alpha = 0.929$). This scale was translated, and back-translated, into Hebrew by the research team at ICTP and has been used in multiple prior research studies with Israeli samples. Mean values and alpha coefficients for social support items and subscales are presented in table 6.

Table 6. Social Support Subscales and Items: Means and Alpha Coefficients

Subscale and Item	Mean (sd)	Alpha
Significant Other	5.94 (1.27)	0.886
There is a special person who is around when I am in need	5.83 (1.55)	
There is a special person with whom I can share my joys and sorrows	5.93 (1.49)	
I have a special person who is a real source of comfort to me	5.73 (1.58)	
There is a special person in my life who cares about my feelings	6.26 (1.24)	
Family	5.50 (1.45)	0.871
My family really tries to help me	5.87 (1.60)	
I get the emotional help and support I need from my family	5.45 (1.70)	
I can talk about my problems with my family	4.92 (1.93)	
My family is willing to help me make decisions	5.77 (1.58)	
Friends	5.62 (1.31)	0.893
My friends really try to help me	5.37 (1.61)	
I can count on my friends when things go wrong	5.86 (1.37)	
I have friends with whom I can share my joys and sorrows	5.76 (1.44)	
I can talk about my problems with my friends	5.50 (1.55)	
Total	5.69 (1.17)	0.929
	Frequency (%)	
Improvement in social support from baseline to follow-up	210 (60.17%)	

Note: N= 448. Each item ranges from 1 ("*very strongly disagree*") to 7 ("*very strongly agree*").

Created Measures

       Constructive growth. Similar to the operationalization of the quality of posttraumatic growth outlined by Pat-Horenczyk et al (2015) a variable measuring constructive and non-constructive growth was generated using the difference score of the PTGI and negative coping subscale from the CERQ. First, the difference in total score on the three subscales of the PTGI was generated (follow-up – baseline). A difference score in the degree of negative coping was also generated. These two differences scores were combined in a single binary indicator in which 1 (i.e. increases or maintenance of PTG and decreases in negative coping) is coded as constructive growth, while 0 (i.e. decrease in PTG and maintenance or increases in negative coping) was coded as non-constructive growth.

       Exposure. Participants were also asked about additional trauma exposure that occurred outside of the context of military service. Although nine types of traumatic events were listed as potential traumatic events to which participants may have been exposed, only three types of trauma were endorsed: (1) death of someone close; (2) danger of death or being severely wounded; and (2) exposure to war or terror event. A count of additional trauma exposure was generated and ranged from zero- no additional exposure- to three- endorsement of all three types of traumatic events.

       Duration. A variable measuring the amount of time elapsed since the unit ended their military service was generated. To calculate the amount of time that had elapsed between military service and participation in the POM intervention two additional variables were calculated. Military service is mandatory beginning at the age of 18, as

such, the year military service started was calculated by adding 18 to the year of birth for the youngest member in the unit.

$$Year\ military\ service\ started = year\_of\_birth + 18$$

The year military service ended was calculated by adding three to the start of military service date.

$$Year\ military\ service\ ended = year\ military\ service\ started + 3$$

Of the 26 groups included in the analysis – five were special military units that serve four years as opposed to typical three. To that end the calculation for the year military service ended was somewhat modified in these five groups.

$$Year\ military\ service\ ended = year\ military\ service\ started + 4$$

The amount of time elapsed since military service ended was calculated by subtracting the year in which the group participated in the POM intervention by the year military service ended. It should be noted that this variable does not measure the amount of time since the end of military service for individuals – as some individuals may select to stay in active service even once their mandatory service is complete. Further, the majority of veterans are required to serve in reserve duty, which may include additional combat exposure. Rather this variable assesses the length of time on average since the end of service for the unit as a whole, and acts as a proxy measure for length of time since exposed to the target combat related traumatic event.

Age. Participants' age was calculated by subtracting the year of birth from the year the group participated in the POM intervention. Age is used as a continuous variable with no violations of the normality assumption.

Analytic Approach

Missing Data

Screening of missing data was examined on all key variables in the study at both time points with the exception of time-invariant predictors. For the variables, age (4.5% $n = 20$), duration since combat (no missing values), exposure to other traumatic events (3.6% $n = 16$), and marital status (4.2% $n = 19$) the proportion of missing data was estimated at baseline only.

For time varying variables there was, in general, a greater proportion of missing data at the follow-up than at baseline. Overall approximately 3.6% ($n = 16$) of cases were missing responses to all key variables in the study at baseline. The proportion of cases missing data on all key variables at follow-up increased to 18.8% ($n = 84$). A variable measuring attrition, that is cases with responses to at least one item at baseline but who were missing all responses at follow-up was generated to estimate the rate of attrition between waves in the study (18.5% $n = 80$). Each variable in the study was then examined independently to estimate the proportion of missing data and identify factors that may predict attrition over time.

The items assessing posttraumatic stress symptomology were missing in approximately 5% ($n = 20$) of respondents at baseline, but increased to close to 19% ($n = 85$) at follow-up. A variable assessing the degree of attrition, that is, respondents who responded to at least one item on the PDS at baseline but who were missing all PDS items at follow-up was generated (18.5% $n = 79$). To determine factors that may predict attrition, a logistic regression was estimated using age, duration since combat, marital status, POM group, total amount of social support, average forward focused coping

strategies, average trauma focused coping strategies, total positive cognitive emotion regulation, total negative cognitive emotion regulation, and total PTG as predictors. Higher average reliance on trauma focused coping strategies increased the odds of attrition by 61% (b = 0.48, p = 0.009), no other variables were significant predictors of attrition of PDS items.

A similar pattern was observed when examining the proportion of missing data in the PTGI items. Approximately 4.3% of cases (n = 19) were missing all items assessing posttraumatic growth at baseline, while a little over 19% (n = 87) were missing all PTGI items at follow-up. A variable assessing the degree of attrition was generated (18.9% n = 81). To determine factors that may predict attrition on PTGI items a logistic regression was estimated using age, duration since combat, marital status, POM group, total amount of social support, average forward focused coping strategies, average trauma focused coping strategies, total positive cognitive emotion regulation, total negative cognitive emotion regulation, and total PTSD symptom severity as predictors. Higher average reliance on trauma focused coping strategies increased the odds of attrition by 69% (b = 0.53, p = 0.003), no other variables were significant predictors of attrition.

Similarly, for items assessing coping (CERQ and PACT) approximately 4% (n = 18) were missing values on all items at baseline in either the CERQ *or* the PACT. For both questionnaires, the proportion of missing data increased at follow-up; 19.6% (n = 88) and 20% (n = 90) respectively. Binary indicators of attrition were generated for both the CERQ (19.3 % n = 83) and the PACT (19.8% n = 85) scales. To identify predictors of attrition in the CERQ a logistic regression was estimated with age, duration since combat, marital status, total PTG reported, PTSD symptom severity, POM group, total reported

social support, as well as average trauma focused and forward focused coping strategies acting as predictors. Once again in this model, higher reported reliance on trauma focused coping strategies increased the odds of attrition by 62% ($b = 0.48$, $p = 0.006$). Whereas when attrition in the PACT items was regressed on age, duration since combat, marital status, total PTG reported, PTSD symptom severity, POM group, total reported social support, as well as positive and negative cognitive emotion regulation no significant predictors of attrition were found.

Lastly, the proportion of missing data on items assessing social support was estimated. Approximately 4% of cases ($n = 18$) were missing values on all social support items at baseline. The proportion of missing data increased to 19.4% ($n = 87$) at follow-up. A variable assessing the degree of attrition over time was generated (18.8% $n = 81$). A logistic regression was estimated using age, duration since combat, marital status, POM group, total PTG score, PTSD symptom severity, average trauma focused and forward focused coping strategies, positive cognitive emotion regulation, and negative cognitive emotion regulation as predictors. Higher reliance on trauma focused coping strategies significantly increased the odds of attrition by 69% ($b = 0.54$, $p = 0.003$), no other predictors were significant in the model.

Maximum likelihood estimation with robust standard errors (MLR) was used to account for missing data in the LPA analysis; while multiple imputation ($m = 20$) using a chained equation (Graham, Olchowski, & Gilreath, 2007), was used to address the proportion of missing data and the rate of attrition over time in the regression analyses. Multiple imputation generates replications of the data file that include predicted scores for missing data, then estimating the model within each version of the data, and averages

results across all imputations (in this case 20 versions of the data) while accounting for

uncertainty in the imputed data. In other words, the model is estimated on each individual

(imputed) data file; the results are combined such that the regression coefficients

represent the average of all estimates across all imputed data files. Two kinds of standard

errors are estimated; the first within an imputed data file, and the second between

imputed data files thereby producing standard errors that are more accurate in reflecting

the uncertainty of missing values (Rubin, 1987).

Determining the number of imputations necessary is based on two sets of

information: efficiency, and the ability to produce stable standard errors and p-values

across imputed data files. In general, the rule of thumb regarding selecting the

appropriate number of imputations is that the number of imputations should be equal to

the percentage of missing cases in the data file (Allison, 2012). In the current analysis

approximately 19% of cases are missing data on all key variables- as such 20 imputed

data files was thought to sufficiently account for missing data. Based on the rule of

thumb, the efficiency for 20 imputed data files was calculated using the following

equation:

$$1/(1+F/M)$$

$$1/(1+.19/20) = 0.99$$

Where *F* is equal to the fraction of missing data, and *M* is the number of

imputations. This calculation suggests that point estimates using 20 imputed data files are

99% as efficient as those that would be obtained using an infinite number of imputations

(Allison, 2012). Further Graham and colleagues (2007) suggest 20 imputations when

between 10 and 30% of data are missing (with a tolerance of 1% loss in power) (Allison,

2012; Graham et al., 2007). Taken together this evidence supports the decision to use 20 imputed data files to account for missing data in the current study.

Univariate and Bivariate

Univariate. Following data cleaning, and screening for missing data, univariate and preliminary descriptive statistics were conducted on all key variables in the study using STATA 13. No violations of normality and no notable outliers were identified. Alpha coefficients for scales, mean, standard deviations, and frequencies were obtained for key variables and are presented in tables 2 through 6.

Bivariate. To ascertain the relationships among variables the following statistical analyses were conducted: first, a correlation matrix among all key variables was produced. Second, chi-square analyses were conducted to examine the relationships between: (1) constructive growth and latent class membership, specifically between the resilient and struggling latent classes (addressing research question five); (2) constructive growth and marital status; and (3) constructive growth and PTSD diagnosis. Third a series of t-tests were estimated to examine the mean differences on PTSD symptom severity, total PTG scores, reliance on trauma focused coping strategies, reliance on forward focused coping strategies, total social support scores, exposure to additional traumatic events, as well as positive and negative cognitive emotion regulation between respondents who reached constructive growth and those with non-constructive growth. The same series of t-tests were also estimated to examine the mean differences between the resilient and struggling latent class profiles.

Latent Profile Analysis and Multivariate

     Latent Profile Analysis. Latent profile analysis (LPA) is person centered approach that is analogous to factor modeling. As in factor modeling, the pattern of responses to a series of indicators are used to identify latent structures within the data file, in this case mutually exclusive (unobservable) subgroups (Lanza, Bray, & Collins, 2013; Lanza, Collins, Lemmon, & Schafer, 2007). This methodological approach is in line with the evolving recognition in the trauma literature that there are various patterns of post-trauma adaptation. These patterns, by their nature imply a degree of mutual exclusivity (i.e. cannot experience both no distress and distress at the same time), and as such LPA offers a unique methodological approach to model posttrauma adaptation. Further LPA is considered methodologically advantageous as compared with other clustering approaches as it: (1) models the latent structure within the data; (2) provides measures of fit; (3) describes the data using a probabilistic model; and (4) builds subgroups using a top down approach (i.e. the classes emerge from an overarching latent structure) rather than finding similarities at the data level.

     The following measures taken at baseline were used as indicators of latent class membership: (1) total score of posttraumatic growth (includes only the *personal strength*, *sense of closeness with others*, and *appreciation of life* subscales); (2) four binary measures of posttraumatic stress disorder criteria as outlined in the DSM-V TR (criteria B, C, D, and F); and (3) total score of positive cognitive emotion regulation (CERQ positive coping subscale). All indicators for the LPA model will be assessed at baseline. This analysis addresses research questions one through four.

Two parameter estimations were assessed in the LPA analysis; (1) class

membership probabilities (γ); and (2) item response probabilities (IRP). Class

membership probabilities reflect the proportion of the sample classified within each latent

class. In LPA item response probabilities take two forms: (1) means for continuous

variables; and (2) probability of endorsing a positive response (e.g. 1) in categorical

variables. The classes that emerge as a result of this analysis were used in the subsequent

regression models to select different subsamples of the overall population. In particular,

profiles in which respondents reported experiencing growth at baseline were selected for

further analysis. Using a classify analyze approach in which individual cases were

assigned to a latent class based on their maximum posterior probability (i.e. estimates that

assign individuals to their most likely latent class based on their highest class probability)

(Nagin, 2005), a new variable, *class*, was generated and used in subsequent regression

models. Latent profile analysis was completed using MPlus version 7.3.

Heckman Probit Regression. The second phase of the multivariate analysis

included regression models to estimate the likelihood of reaching constructive growth,

and identify the factors that increased the probability of reaching constructive growth for

the subsamples identified in the LPA. Since the subsamples selected for the second phase

of analysis were a non-random subset of the population, and given these subsamples were

selected because of initial reports of growth, the data used in the regression models was

not independent of the outcome variable of interested (i.e. constructive growth). As such,

there was concern of a non-corrected selection bias in a typical logit model. To address

this concern, a Heckman probit model was selected as a more appropriate method of

estimation, as the Heckman regression is specifically designed to test, and account for, selection bias (Bushway, Johnson, & Slocum, 2007).

The Heckman probit model is a two-step model that includes a bias correction factor in the second step (i.e. in the regression model itself). In the first step a probit regression is used to estimate the likelihood of being part of the selected group (i.e. latent class A). The second step estimates the likelihood of a positive outcome in the dependent variable, which in this study was reaching constructive growth. The model tests for a significant correlation between the residuals of the models estimated in steps one and two. If there is a significant correlation between the residuals, than a selection bias has occurred meaning that selection into a given latent class influences the probability of a positive outcome (i.e. reaching constructive growth) on the dependent variable.

Four Heckman probit models were estimated. Model A examined the predictive role of marital status, additional trauma exposure, trauma focused coping strategies, forward focused coping strategies, and total amount of social support at baseline on the likelihood of reaching constructive growth for respondents who were classified as likely to belong to the *struggling* latent class. Model B tested the identical set of predictors for respondents who were likely to belong to the *resilient* latent class. The third and fourth models (model C and D) were estimated using a binary indicator of improvement in social support, in which a score of 1 represented a score of 0 or above in the difference between total score of support at follow-up and baseline measurements. Model C examined the predictive role of marital status, additional trauma exposure, trauma focused coping strategies, forward focused coping strategies, and improvements in social support on the likelihood of reaching constructive growth for respondents who were

classified as likely to belong to the *struggling* latent class. Finally, model D examined the predictive role of marital status, additional trauma exposure, trauma focused coping strategies, forward focused coping strategies, and improvements in social support on the likelihood of reaching constructive growth for respondents who were classified as likely to belong to the *resilient* latent class.

As a result of non-convergence all models were estimated using the nosily option for model estimation with imputed data. To that end imputations that did not converge were eliminated from the analysis. As such Model A was estimated using 17 imputed data files, Model B with 19, Model C with 15, and finally Model D with all 20 imputed data files. The Heckman probit models were estimated using STATA Version13.

Logistic regression replication. Given there was no selection bias found in the Heckman estimation for models C and D, and since the sample selection adjustment were sufficiently unstable, as evidenced by the lack of convergence for the multiple imputed data, a simpler model seemed advisable as a replication method. As such, two hierarchical logistic regression models were estimated (one for the *resilient* sub-set of the sample, and the second for the *struggling* sub-set of the sample) to replicate models C and D. This phase of analysis addresses research questions six through eight.

Chapter IV: Findings

Bivariate Analyses

Bivariate analyses were conducted to explore the relationships among predictors of constructive growth, to ascertain the relationships among key variables with particular attention to the dependent variable – constructive growth; and to identify any potential risk of collinearity among continuous measures; these are presented in table 7.

The trauma focused and forward focused coping subscales of the PACT were strongly correlated with each other ($r = 0.629$, $p < 0.001$). Total score of social support was weakly but significantly correlated with both trauma focused and forward focused coping ($r = 0.315$, $p < 0.001$ and $r = 0.369$, $p < 0.001$ respectively). The correlation between positive cognitive emotion regulation and trauma focused coping ($r = 0.256$, $p < 0.001$), as well as the correlation between positive cognitive emotion regulation and forward focused coping ($r = 0.317$, $p < 0.001$) were both positive, and weak, but statistically significant. Conversely, the correlation between negative cognitive emotion regulation and trauma focused coping ($r = -0.177$, $p = 0.002$) and negative cognitive emotion regulation and forward focused coping ($r = -0.301$, $p < 0.001$) were both weak and negative but statistically significant. Both positive and negative cognitive emotion regulation were significantly correlated with the total score of social support ($r = 0.271$, $p < 0 .001$ and $r = -0.115$, $p = 0.017$ respectively). The positive and negative emotion regulation subscales of the CERQ were significantly correlated with each other ($r = 0.256$, $p < 0.001$).

The correlations between the total score of posttraumatic growth and trauma focused coping ($r = 0.132$, $p = 0.006$), forward focused coping ($r = 0.249$, $p < 0.001$),

social support ($r = 0.249$, $p < 0.001$) and positive cognitive emotion regulation ($r = 0.361$, $p < 0.001$) were all weak, but positive and significant. Posttraumatic growth was not significantly correlated with negative cognitive emotion regulation ($r = 0.072$, $p = 0.137$).

PTSD symptom severity was not statistically significantly correlated with total score of PTG ($r = -0.039$, $p = 0.426$) or with positive cognitive emotion regulation ($r = 0.003$, $p = 0.948$). However, PTSD symptom severity was significantly correlated with trauma focused coping ($r = -0.248$, $p < 0.001$), forward focused coping ($r = -0.365$, $p < 0.001$), and social support ($r = -0.370$, $p < 0.001$) although all three were weak correlations.

Participant's age was not significantly correlated with trauma focused coping, forward focused coping, social support, positive cognitive emotion regulation, negative cognitive emotion regulation, PTG, or PTSD symptom severity.

Table 7. Correlation Matrix of Key Continuous Variables

	Trauma Focused	Forward Focused	Social Support	CERQ Positive	CERQ Negative	Total PTG	PTSD Severity	Age
Trauma Focused	1.00							
Forward Focused	0.627***	1.00						
Social Support	0.315***	0.369***	1.00					
CERQ Positive	0.256***	0.317***	0.271***	1.00				
CERQ Negative	-0.177**	-0.301***	-0.115*	0.256***	1.00			
Total PTG	0.132**	0.249***	0.249***	0.361***	0.072	1.00		
PTSD Severity	-0.248***	-0.365***	-0370***	0.003	0.400***	-0.039	1.00	
Age	0.006	0.027	0.007	0.021	0.023	-0.026	-0.047	1.00

$* p < 0.05$ $** p < 0.01$ $*** p < 0.001$

Chi-square tests were conducted to compare the proportion of the sample that reached constructive versus non-constructive growth based on marital status ($\chi^2 = 0.054$, $p = 0.816$) and PTSD diagnosis ($\chi^2 = 0.113$, $p = 0.736$). There were no significant differences among those who reported constructive growth and the likelihood of being not married or having a diagnosis of PTSD.

Lastly, a series of t-tests were conducted to compare the mean scores on PTSD symptom severity ($t = -1.32$ (338), $p = 0.189$), trauma focused coping strategies ($t = -.32$ (343), $p = 0.75$), forward focused coping strategies ($t = 1.06$ (343), $p = 0.29$), exposure to additional trauma ($t = 0.37$ (343), $p = 0.71$), age ($t = -0.42$ (339), $p = 0.67$), social support ($t = 0.70$ (343), $p = 0.48$), positive cognitive emotion regulation ($t = -1.14$ (343), $p = 0.25$), and negative cognitive emotion regulation ($t = -7.56$ (343), $p < 0.001$). There was a significant difference on the average score of negative cognitive emotion regulation for the constructive and non-constructive groups, with those in the constructive group engaging in a higher number of negative cognitive emotion regulation strategies than those in the non-constructive group ($M = 2.82$, $SD = 0.06$ and $M = 2.24$, $SD = 0.05$ respectively). This was the only significant difference observed between the constructive and non-constructive groups.

Latent Profile Analysis

Latent profile analysis was conducted to identify unobservable subgroups within the data, with the aim of classifying individuals into their most-likely latent classes. The latent profile analysis also provides information regarding the characterization of the subgroups based on the level of endorsement to the following indicators: (1) total score of reported posttraumatic growth at baseline; (2) average number of positive cognitive

emotion regulation strategies employed at baseline; as well as (3) meeting diagnostic criteria for PTSD on four symptom subscales- avoidance, hyper arousal, re-experiencing, and functional impairment. Given total PTG and positive CERQ scores are continuous variables while the four PTSD items are binary indicators of meeting diagnostic criteria all models were conducted as latent profile mixture models in Mplus. Using the baseline data, multiple models varying the number of latent classes, were estimated. The goodness of fit statistics for the two, three, four, and five class models are compared in table 8. Based on the comparative model fit indices and the interpretability of the classes, the four class model was selected as the best fitting model.

The AIC and BIC are used as comparative model fit incidences, with smaller number suggesting better model fit. In both cases the four class solution demonstrated a decrease in AIC and BIC, implying that the addition of a fourth latent class improves model fit. Further, entropy values reflect the degree of accuracy in allocating respondents to latent classes, and the predictive accuracy of latent class profiles. Although there was a slight decrease in entropy levels between the three and four class solution this decrease was marginal and the four class solution still offers strong entropy (0.806) and as such a high degree of accuracy. Lastly, the Lo-Mendell Rubin likelihood ratio test was not significant for this model, suggesting that the four class solution offers no significant improvement from the three class solution. However, in the four class model the differentiation among the latent classes improved the interpretability and was supported by the bootstrapped likelihood ratio test.

Table 8. Latent Profile Analysis Model Comparison and Selection

#Classes	LL(df)	AIC	BIC	Entropy	LMR	Bootstrap LR Test
2	-1944.90(15)	3919.80	3933.77	0.758	345.82***	-2121.86***
3	-1900.53(22)	3845.07	3865.56	0.814	86.70**	-1944.90***
4	-1883.91(29)	3825.83	3852.83	0.806	32.48	-1900.53***
5	-1873.88(36)	3819.76	3853.29	0.782	19.60	-1883.91*

$* p < 0.05$ $** p < 0.01$ $*** p < 0.001$

AIC Akaike's information criterion, *BIC* Bayesian information Criterion, *LMR* Lo-Mendell Rubin adjusted likelihood ratio test

The four latent classes are characterized as: (1) *Distressed* ($n = 25$, 5.58%); (2) *Resistant* ($n = 35$, 7.81%); (3) *Resilient* ($n = 138$, 30.80%); and (4) *Struggling* ($n = 250$, 55.80%). The results of the LPA are summarized in table 9, and presented graphically in figure 2. The *distressed* subgroup is the smallest of the four, and is characterized by a high probability of endorsing PTSD diagnostic criteria ($P_{b-met} = 1.00$, $p < 0.001$; $P_{c-met} = 0.78$, $p < 0.001$; $P_{d-met} = 0.94$, $p < 0.001$; and $P_{f-met} = 1.00$, $p < 0.0001$) coupled with below average reported PTG ($M = 2.18$, $p < 0.001$) and positive cognitive emotion regulation ($M = 2.80$, $p < 0.001$).

Conversely, the *resistant* class is characterized by a low probability of endorsing PTSD symptomology ($P_{b-met} = 0.45$, $p < 0.001$; $P_{c-met} = 0.08$, $p < 0.001$; $P_{d-met} = 0.07$, $p < 0.001$; and $P_{f-met} = 0.36$, $p < 0.001$) as well as below average levels of PTG ($M = 1.75$, $p < 0.001$) and positive cognitive emotion regulation ($M = 2.74$, $p < 0.001$).

Two latent classes reported slightly above average levels of PTG - these were the *resilient* and *struggling* latent classes. The *resilient* latent class was characterized by slightly above average reported PTG ($M = 3.79$, $p < 0.001$) and positive cognitive emotion regulations strategies ($M = 3.44$, $p < 0.001$) with low reported probability of endorsing PTSD diagnostic criteria ($P_{b-met} = 0.43$, $p < 0.001$; $P_{c-met} = 0.03$, $p = 0.171$; $P_{d-met} = 0.20$, $p < 0.001$; and $P_{f-met} = 0.22$, $p < 0.001$). The *struggling* latent class was differentiated from the *resilient* group as this profile had a high probability of endorsing all four PTSD diagnostic criteria ($P_{b-met} = 0.944$, $p < 0.001$; $P_{c-met} = 0.699$, $p < 0.001$; $P_{d-met} = 0.796$, $p < 0.001$; and $P_{f-met} = 0.932$, $p < 0.001$) while simultaneously reporting slightly above average levels of PTG ($M = 3.67$, $p < 0.001$) and positive cognitive

emotion regulation ($M = 3.42$, $p < 0.001$). The *struggling* latent class represented the

largest subset of the sample reflecting the co-occurrence of growth and PTSD.

Table 9. Latent Class Coefficients: Four Class Solution

Indicator	**Distressed** n = 25(6%)	**Resistant** n = 35(8%)	**Resilient** n = 138(31%)	**Struggling** n = 250(55%)
	Mean (SE)	Mean (SE)	Mean (SE)	Mean (SE)
Total Score PTG	2.18 (0.48)***	1.75 (0.23)***	3.79 (0.07)***	3.67 (0.06)***
Positive CERQ	2.80 (0.12)***	2.74 (0.16)***	3.44 (0.07)***	3.42 (0.07)***
	Probability	Probability	Probability	Probability
B Criteria Met	1.00	0.45***	0.43***	0.94***
C Criteria Met	0.78***	0.08	0.03***	0.70***
D Criteria Met	0.94***	0.07	0.20***	0.80***
F Criteria Met	1.00	0.36***	0.22***	0.93***
N	448			

Mean for Total PTGI = 3.46
Mean for Positive CERQ =3.33
*** $p < 0.001$

Figure 2. Latent Class Characteristics

Given the particular focus on the evolution of PTG over time, the two latent classes that reported average, or slightly above average, PTG at baseline were used to select a sub-sample of the population for the second phase of analysis. Using a posterior probability estimation method, individuals in the sample were allocated to their most likely latent class. The classification probabilities for the *struggling* and *resilient* latent class were high ($P_{struggling}$ = 0.944 and $P_{resilient}$ = 0.863 respectively) suggesting a high degree of accuracy in assigning respondents to these latent classes.

Chi-square analysis was conducted to test the proportion of respondents who reached constructive growth in both the *struggling* and *resilient* latent classes (χ^2 = 1.49, p = 0.222). There were no statistically significant differences in the proportion of individuals in each latent class who had reached constructive growth. Similarly, the chi-square analysis was conducted to test the proportion of respondents who reported improvements in social support between baseline and follow-up (1 = difference score of total social support at follow-up and baseline is zero or above) in both the *struggling* and *resilient* class. There were no statistically significant differences in the proportion of individuals who reported improvements in social support in the *resilient* and *struggling* latent class (χ^2 = 0.204, p = 0.651).

A series of t-test were conducted to compare the mean scores on PTSD symptom severity, total score of PTG, additional trauma exposure, trauma focused coping strategies, forward focused coping strategies, positive and negative cognitive emotion regulation, and total social support among participants who were classified as *struggling* and *resilient*. The average degree of additional exposure and the average use of positive cognitive emotion regulation strategies did not significantly differ between the *struggling*

and *resilient* latent classes ($t = $ -1.38 (386), $p = 1.67$ and $t = 0.88$ (369), $p = 0.38$ respectively).

However, there were significant differences between latent classes on PTSD symptoms severity, with the *struggling* latent class exhibiting a significantly higher average severity score than the *resilient* latent class ($t = $ -15.11 (366), $p < 0$ .001). Similarly, the *struggling* latent class reported significantly higher average use of negative cognitive emotion regulation strategies as compared to the *resilient* latent class ($t = $ -5.03 (369), $p < 0.001$). However, the *resilient* latent class reported higher average total PTG score ($t = 2.40$ (367), $p < 0.017$), trauma focused coping ($t = 5.38$ (368), $p < 0$ .001), forward focused coping ($t = 5.32$ (368), $p < 0.001$), and social support ($t = 7.19$ (368), $p < 0.001$) than the *struggling* latent class.

Heckman Probit Regression Models

In the second phase of analysis the subset of the sample who reported growth at baseline (i.e. respondents who were allocated to the *resilient* and *struggling* latent classes) was used to test four regression models predicting the probability of reaching constructive growth. Given latent class membership was expected to be related to constructive growth, a Heckman probit method of estimation was used. The selection equation in models A and C predicts the probability of being in the *struggling* latent class (i.e. *struggling* subset of the sample is uncensored); while the selection equation in models B and D predicts the probability of being in the *resilient* latent class (i.e. *resilient* subset of the sample is uncensored). The second equation in models A and B predict the likelihood of reaching constructive growth while including the total score of perceived social support at baseline. Alternatively, the second equation in models C and D estimate

the likelihood of reaching constructive growth, but use instead, a binary indicator of *improvements* in social support between baseline and follow-up.

Selection Equation Model A. Duration since combat, respondent's age, marital status, degree of additional exposure to other traumatic events, social support, as well as use of trauma and forward focused coping strategies were used to predict the selection model (i.e. allocation to the *struggling* sub-sample). Of these predictors, a one-unit increase in perceived social support at baseline decreased the probability of the selection model being equal to one (i.e. being allocated to the *struggling* sub-sample) ($b = $ -0.41, $p < 0.001$). Duration since combat ($b = 0.01$, $p = 0.945$), respondent's age ($b = 0.01$, $p = 0.816$), being un-married ($b = $ -0.04, $p = 0.808$), degree of additional trauma exposure ($b = 0.17$, $p = 0.098$), and the higher average use of trauma ($b = $ -0.16, $p = 0.070$), and forward ($b = $ -0.11, $p = 0.201$), focused coping skills were not significant predictors of membership in the sub-sample.

Regression Equation Model A. The second step of the model estimated the predicted probability of reaching constructive growth when the selection model is equal to one (i.e. for the *struggling* latent class sub-sample). Marital status ($b = 0.01$, $p = 0.954$), additional trauma exposure ($b = $ -0.10, $p = 0.410$), trauma focused coping ($b = 0.05$, $p = 0.677$), forward focused coping ($b = 0.01$, $p = 0.888$), and total perceived social support ($b = 0.17$, $p = 0.162$) at baseline were included as predictors of reaching constructive growth for the sub-set of the sample characterized as *struggling*. None of these variables were significant predictors of reaching constructive growth. The results of model A are presented in table 10.

Table 10. Heckman Probit Model A: Struggling Class with Total Social Support

Step	Predictor	β (SE)	P-Value
Selection Model:	Duration	0.01 (0.06)	0.945
Struggling	Age	0.01 (0.05)	0.816
	Married	-0.04 (0.17)	0.808
	Exposure	0.17 (0.10)	0.098
	Forward Focused Coping	-0.11 (0.09)	0.201
	Trauma Focused Coping	-0.16 (0.09)	0.070
	Social Support	-0.41 (0.09)***	< 0.000
Probit Model: Constructive Growth			
	Married	0.01 (0.16)	0.954
	Exposure	-0.10 (0.12)	0.410
	Forward Focused Coping	0.01 (0.10)	0.888
	Trauma Focused Coping	0.05 (0.11)	0. 677
	Social Support	0.17 (0.12)	0.162
Intercept		-0.95 (0.93)	0.310
Censored		250	
Uncensored		138	
F-Test (5, .)		-	-
rho (ρ)		-0.99 (0.01)*	< 0.05
Number of Imputations		16	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Selection Equation Model B. Duration since combat, respondent's age, marital status, degree of additional exposure to trauma, social support, as well as use of trauma and forward focused coping strategies were used to predict the selection model for the *resilient* sub-sample. Of these predictors, a one-unit increase in perceived social support at baseline increased the probability of being allocated to the *resilient* sub-set of the sample ($b = 0.39$, $p < 0.001$). Duration since combat ($b = -0.01$, $p = 0.855$), respondent's age ($b = 0.10$, $p = 0.882$), being un-married ($b = -0.02$, $p = 0.923$), degree of additional exposure ($b = -0.18$, $p = 0.072$), and the higher average use of trauma ($b = 0.15$, $p = 0.115$), and forward ($b = 0.14$, $p = 0.142$), focused coping skills were not significant predictors of membership in the sub-sample.

Regression Equation Model B. The second step of the model estimated the predicted probability of reaching constructive growth for respondents allocated to the *resilient* sub-sample. Similar to the model estimated for the *struggling* group, marital status ($b = -.06$, $p = 0.773$), degree of additional trauma exposure ($b = 0.12$, $p = 0.492$), trauma focused coping ($b = -0.01$, $p = 0.937$), forward focused coping ($b = -0.12$, $p = 0.484$), and total perceived social support ($b = -0.26$, $p = 0.529$) at baseline were included as predictors of constructive growth. None of these variables significantly predicted reaching constructive growth in the *resilient* sub-set of the sample. The results of model B are presented in table 11.

Table 11. Heckman Probit Model B: Resilient Class with Total Social Support

Step	Predictor	β (SE)	P-Value
Selection Model:	Duration	-0.01 (0.07)	0.855
Resilient	Age	0.10 (0.07)	0.882
	Married	-0.02 (0.17)	0.923
	Exposure	-0.18 (0.10)	0.072
	Forward Focused Coping	0.14 (0.10)	0.142
	Trauma Focused Coping	0.15 (0.09)	0.115
	Social Support	0.39 (0.08)***	< 0.000
Probit Model:			
Constructive Growth	Married	-0.06 (0.21)	0.773
	Exposure	0.12 (0.17)	0.492
	Trauma Focused Coping	-0.01 (0.16)	0.937
	Forward Focused Coping	-0.11 (0.15)	0.484
	Social Support	-0.26 (0.30)	0.390
Intercept		2.20 (3.46)	0.549
Censored		250	
Uncensored		138	
F-Test (5, .)		-	-
rho (ρ)		-0.99 (0.09)*	< 0.05
Number of imputations		18	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Selection Equation Model C. Duration since combat, respondent's age, marital status, degree of additional exposure to trauma, social support, as well as use of trauma and forward focused coping strategies were used to predict the selection model (i.e. allocation to the *struggling* sub-set of the sample). Of these predictors, a one-unit increase in perceived social support at baseline decreased the probability of being selected as belonging to the *struggling* sub-sample ($b = -0.38$, $p < 0.001$). Duration since combat ($b = -0.02$, $p = 0.800$), respondent's age ($b = 0.02$, $p = 0.730$), being un-married ($b = -0.01$, $p = 0.932$), degree of additional exposure ($b = 0.18$, $p = 0.072$), and the higher average use of trauma ($b = -0.15$, $p = 0.120$), and forward ($b = -0.14$, $p = 0.153$), focused coping skills were not significant predictors of membership in the *struggling* group.

Regression Equation Model C. The second step of the model estimated the predicted probability of reaching constructive growth when the selection model is equal to one (i.e. for the *struggling* latent class sub-sample) using the binary indicators of improvements in social support between baseline and follow-up. Marital status ($b = 0.03$, $p = 0.868$), additional trauma exposure ($b = -0.1$, $p = 0.984$), trauma focused coping ($b = -0.08$, $p = 0.549$), and forward focused coping ($b = -0.09$, $p = 0.484$) at baseline were not significant predictors of reaching constructive growth for the sub-set of the sample characterized as *struggling*. However, improvements in social support did increase the predicted probability of reaching constructive growth ($b = 0.55$, $p = 0.005$). Lastly, there was no selection bias detected in this model as the z-score for ath-ρ (the standard deviation represented as Fisher's Z transformed correlation) was less than the absolute critical value of 1.96 (*ath-ρ* $= 0.60$, $p = 0.960$) (Buis, 2011). As such the model was re-

estimated using a hierarchical logistic regression. The results of model C are presented in

table 12.

Table 12. Heckman Probit Model C: Struggling Class with Improvement in Social Support

Step	Predictor	β (SE)	P-Value
Selection Model:	Duration	-0.02 (0.07)	0.800
Struggling	Age	0.02 (0.06)	0.730
	Married	-0.01 (0.17)	0.932
	Exposure	0.18 (0.10)	0.072
	Forward Focused Coping	-0.14 (0.10)	0.153
	Trauma Focused Coping	-0.15 (0.09)	0.120
	Social Support	-0.38 (0.08)***	<0.000
Probit Model:			
Constructive Growth	Married	0.03 (0.20)	0.868
	Exposure	-0.01 (0.13)	0.984
	Trauma Focused Coping	-0.08 (0.13)	0.549
	Forward Focused Coping	-0.09 (0.12)	0.484
	Improvement in Social Support	0.55 (0.19) **	0.005
Intercept		-0.10 (0.74)	0.896
Censored		138	
Uncensored		250	
F-Test (5, .)		-	-
rho (ρ)		0.54 (8.51)*	> 0.05
Number of Imputations		20	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Selection Equation Model D. Duration since combat, respondent's age, marital status, degree of additional exposure to trauma, social support, as well as use of trauma and forward focused coping strategies were used to predict the selection model (i.e. allocation to the *resilient* latent class). Of these predictors, a one-unit increase in perceived social support at baseline increased the probability of being allocated to the *resilient* latent class ($b = 0.38$, $p < 0.001$). Duration since combat ($b = 0.03$, $p = 0.672$), respondents age ($b = -0.04$, $p = 0.579$), being un-married ($b = 0.03$, $p = 0.856$), degree of additional exposure ($b = -0.18$, $p = 0.081$), and the higher average use of trauma ($b = 0.15$, $p = 0.117$), and forward ($b = 0.14$, $p = 0.156$), focused coping skills were not significant predictors of membership in the *resilient* group.

Regression Equation Model D. The second step of the model estimated the predicted probability of reaching constructive growth for respondents allocated to the *resilient* sub-set of the sample. Marital status ($b = -.11$, $p = 0.694$), degree of additional trauma exposure ($b = 0.02$, $p = 0.903$), trauma focused coping ($b = 0.15$, $p = 0.337$), forward focused coping ($b = -0.06$, $p = 0.749$), and the binary indicator of improvement in social support between baseline and follow-up ($b = 0.08$, $p = 0.761$) were not significant predictors of reaching constructive growth for the *resilient* sub-sample. Lastly, there was no selection bias detected in this model as the z-score for ath-ρ was less than the absolute critical value of 1.96 (*ath-ρ* $= 0.43$, $p = 0.449$). As such the model was re-estimated using a hierarchical logistic regression. The results of model D are presented in table 13.

Table 13. Heckman Probit Model D: Resilient Class with Improvement in Social Support

Step	Predictor	β (SE)	P-Value
Selection Model:	Duration	0.03 (0.07)	0.672
Resilient	Age	-0.04 (0.07)	0.579
	Married	0.03 (0.17)	0.856
	Exposure	-0.18 (0.10)	0.081
	Forward Focused Coping	0.14 (0.10)	0.156
	Trauma Focused Coping	0.15 (0.09)	0.117
	Social Support	0.38 (0.08)***	<0.000
Probit Model:			
Constructive Growth	Married	-0.11 (0.27)	0.694
	Exposure	0.02 (0.17)	0.903
	Trauma Focused Coping	0.15 (0.16)	0.337
	Forward Focused Coping	-0.06 (0.19)	0.749
	Improvement in Social Support	0.08 (0.26)	0.761
Intercept		-1.36 (1.33)	0.308
Censored		250	
Uncensored		138	
F-Test (5, .)		-	-
rho (ρ)		0.40 (0.47)*	> 0.05
Number of imputations		20	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Logistic Regression

Struggling group. A hierarchical logistic regression was estimated using three blocks of variables for the *struggling* subset of the sample. The first block included the following demographic variables: duration since combat ($b = 0.08$, $p = 0.560$), respondent's age ($b = - 0.05$, $p = 0.732$), marital status ($b = 0.04$, $p = 913$), and additional exposure to trauma ($b = -0.06$, $p = 0.790$). The second block introduced trauma focused ($b = -0.02$, $p = 0.675$) and forward focused ($b = -0.01$, $p = 0.707$) coping strategies, while the final block introduced a binary indicator of improvements in social support between baseline and follow-up ($b = 0.87$, $p = 0.011$). Duration since combat, respondent's age, marital status, additional trauma exposure, as well as the use of forward focused coping strategies and trauma focused coping strategies were not significant predictors of constructive growth for the *struggling* sub-set of the sample. However, an improvement in social support between baseline and follow-up increased the odds of reaching constructive growth by 139% ($OR = 2.39$, $p = 0.011$). The results of the logistic regression are presented in table 14.

Table 14. Logistic Regression for Constructive Growth in the Struggling Sample Only

Predictor	Block 1 b (SE)	Block 2 b (SE)	Block 3 b (SE)	Final Model OR (SE)
Duration since combat	0.09 (0.14)	0.09 (0.14)	0.08 (0.14)	1.09 (.16)
Age	-0.05 (0.12)	-0.04 (0.13)	-0.05 (0.13)	0.96 (0.13)
Married	-0.06 (0.38)	-0.02 (0.28)	0.04 (0.39)	1.04 (0.41)
Additional Exposure	-0.01 (0.22)	- 0.03 (0.22)	-0.06 (0.22)	0.94 (0.21)
Forward Focused Coping	-	-0.01 (0.02)	-0.01 (0.03)	0.99 (0.02)
Trauma Focused Coping	-	-0.02 (0.04)	-0.02 (0.04)	0.98 (0.04)
Improvement in Social Support	-	-	0.87 (0.34)**	2.39 (0.81)**
F (7, 1438.7)	-	-	1.10	1.10
N	250	250	250	250
Number of Imputations	20	20	20	20

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Resilient group. A hierarchical logistic regression was estimated using three blocks of variables for the *resilient* sub-sample. The first block included the following demographic variables: duration since combat (b = -0.27, p = 0.196), respondent's age (b = 0.29, p = 0.154), marital status (b = -0.45, p = 0.403), and additional exposure to trauma (b = 0.07, p = 0.804). The second block introduced trauma focused (b = 0.04, p = 0.469) and forward focused (b = -0.03, p = 0.448) coping strategies, while the final block introduced a binary indicator of improvements in social support between baseline and follow-up (b = 0.22, p = 0.632). Duration since combat, respondent's age, marital status, additional trauma exposure, the use of forward focused coping strategies and trauma focused coping strategies, and improvements in social support were not significant predictors of reaching constructive growth in the *resilient* sub-sample.[1] The results of the logistic regression are presented in table 15.

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[1] The equality of coefficients between models C and D were tested. There was no significant difference between the coefficients for improvement in social support between models (b = 0.656, p = 1.18).

Table 15. Logistic Regression for Constructive Growth in the Resilient Sample Only

Predictor	Block 1 b (SE)	Block 2 b (SE)	Block 3 b (SE)	Final Model OR (SE)
Duration since combat	-0.25 (0.20)	-0.26 (0.20)	-0.27 (0.21)	0.77 (.16)
Age	0.28 (0.20)	0.29 (0.21)	0.29 (0.21)	1.34 (0.28)
Married	-0.49 (0.53)	-0.47 (0.53)	- 0.45 (0.54)	0.64 (0.34)
Additional Exposure	0.10 (0.28)	0.08 (0.28)	0.07 (0.29)	1.07 (0.31)
Forward Focused Coping	-	-0.03 (0.04)	-0.03 (0.04)	0.97 (0.04)
Trauma Focused Coping	-	0.04 (0.06)	0.04(0.06)	1.04 (0.06)
Improvement in Social Support	-	-	0.22 (0.45)	1.24 (0.57)
F (7, 2974.8)	-	-	0.44	0.44
N	138	138	138	138
Number of Imputations	20	20	20	20

*p < 0.05 ** p <0.01 *** p < 0.001

Chapter 5: Discussion and Implications

Overall this study highlights the heterogeneity in post-combat adaptation by distinguishing four profiles: (1) *distressed*; (2) *resistant*; (3) *resilient*; and (4) *struggling*. Both the *resilient* and *struggling* latent class were characterized by reports of PTG. Those in the *resilient* latent class were no more likely to reach constructive growth than those in the *struggling* latent class. However, for those allocated to the *struggling* latent class, a reported improvement in the perceived degree of social support available from baseline to follow-up significantly increased the odds of reaching constructive growth; whereas an improvement in social support was not a significant predictors of constructive growth for the *resilient* latent class. In both groups, demographic characteristics, the use of forward focused coping strategies, and the use of trauma focused coping strategies were not significant predictors of constructive growth.

The identification of multiple post-combat adaptation profiles is consistent with previous research, recognizing the variability of posttrauma reactions (Bonanno et al., 2012; Danhauer et al., 2015; Wang et al., 2014). The profiles of adaptation identified in the current study are similar to those presented by Pat-Horenczyk and colleagues (in press). In particular, we confirm a comparable *struggling* latent class that is characterized by both a high probability of endorsing PTSD diagnostic criteria and slightly above average levels of PTG. This profile adds evidence to the body of literature indicating that growth and distress can co-exist (Pietrzak et al., 2010a; Shakespeare-Finch et al., 2014; Tsai et al., 2015a).

As in Pat-Horenczyk and colleagues' (in press) study our findings also confirmed both a *resistant* and *distressed* latent class. The *resistant* latent class differed from the

struggling group, in that membership was characterized by *low* endorsement of PTG items, positive coping strategies, and PTSD symptomology. This profile suggests an ability to withstand the potential for both distress and growth following trauma, in line with Layne and colleagues' (2007; 2009) classic conceptualization of resistance.

The *distressed* latent class is the smallest of the four classes (6%) and is therefore, proportionally, consistent with rates of PTSD in the general population (Kessler et al., 2005). The *distressed* latent class is characterized by low reports of PTG and positive coping, but with a high probability of endorsing PTSD symptomology. These findings suggest, in keeping with Bonanno (2004) and Layne (2007; 2009), that although PTSD is one potential outcome of trauma exposure, it is not the only, nor the most common profile of adaptation.

Different from Pat-Horenczyk and colleagues' (in press) findings, but in line with the component of resilience that Leopre and Revenson (2014) refer to as *reconfiguration,* the current study identified a *resilient* latent class, characterized by higher than average endorsement of both positive coping strategies and PTG items coupled with a low probability of endorsing PTSD symptomology. This conceptualization of resilience differs from Bonanno's (2004) proposed resilient trajectory in that it does not imply maintenance of pre-trauma functioning, but rather a reported gain as a result of combat exposure in combination with a lack of distress.

The nuance in the measurement of social support, that is the differences between baseline perceptions versus reported improvements, offers an interesting perspective on a commonly researched protective factor in trauma recovery. In the current study, baseline social support was not predictive of reaching constructive growth. Rather, only reported

improvement in social support significantly increased the odds of reaching constructive growth. Further, there were no significant differences between the *resilient* and *struggling* latent class in regarding the amount of improvement perceived in social support; but the role of improvements in social support in facilitating constructive growth was only evident for those in the *struggling* latent class. These findings therefore suggest a unique interaction between social support over time, profile of initial adaptation, and the quality of growth.

A significant body of research on various aspects of social support including: (1) perceived verses received (e.g. Barerra & Ainlay, 1983; Maisel & Gable, 2009); (2) the source of social support (e.g. Rafaeli & Gleason, 2009; Romero et al., 2015; Nyaronga & Toma, 2015; Wilcox, 2010); (3), the quality or satisfaction with social support (e.g. Maisel & Gable, 2009), and (4) the type of support given (e.g. formal and informal supports) (e.g. Weinberg, 2015) has demonstrated that social support is a complex construct and that various aspect may relate differently to positive posttrauma adaptation (Dolan and Ender, 2008; Gleason & Iida, 2015). Perceived social support in particular, has a potent protective influence on reducing distress and negative symptomology post trauma (Jakupcak et al., 2010; Romero et al., 2015), and also in promoting resilience, and posttraumatic growth (Cadell et al., 2003; Currier et al., 2013; Grills-Taquechel et al., 2011; Hall, et al., 2010; Rajandram et al., 2011; Pietrzak & Cook, 2013; Pruitt & Zoellner, 2007; Tedeschi & Calhoun 2004).

Further, recent research regarding the trajectory of social support over time, suggests that in general, the intensity and availability of social support naturally decreases over time as the traumatic event becomes more distant (Holden et al., 2015;

Lowe & Willis, 2015). Yet, despite this nature decline, Schroevers and colleagues (2010)

found that a strong association between reports of social support in the initial aftermath of

a cancer diagnosis and levels of PTG eight years later. Suggesting that even though social

support may decrease over time the initial benefits may be long lasting.

The intensive nature, and particular focus of the *Peace of Mind* intervention on

building social support may trigger a resurgence or renewal of support, both within the

military unit, and externally - that is that veterans may be better able to seek out, or ask

for support following the intervention. Increasing social support within the military unit

has the potential to play a unique role in reaching constructive growth, as within unit

support and cohesion is particularly beneficial for veteran samples (Pietrzak et al., 2010b;

Sharp et al., 2015). Regardless of its source, the perception of an increase in social

support may trigger of a new wave of adaptation.

It is also possible that the limited predictive utility of social support on reaching

constructive growth for those allocated to the *resilient* latent class in our study, reflects a

disconnect between the *resilient* profile and constructive growth. More specifically, those

who are resilient may not *need* to grow, supporting the argument that growth is not a

superior outcome to resilience but rather a laterally equivalent one (Westphal and

Bonanno, 2007). In this case, social support and coping may play a role in other factors

of adaptation such as maintenance of resilience, or other indicators of wellbeing (Cadell

et al., 2003; Currier et al., 2013; Grills-Taquechel et al., 2011; Hall, et al., 2010;

Rajandram et al., 2011; Pietrzak & Cook, 2013; Pruitt & Zoellner, 2007; Tedeschi &

Calhoun 2004); but may not influence the achievement of constructive growth.

To that end, Pat-Horenczyk et al (in press) suggest that the *struggling* profile

reflects a transitory state, one that offers a high degree of malleability and as such can result in shifts towards a more positive adaptation profile. As such, improvements in social support may be particularly beneficial for those in the *struggling* group, as this profile is more malleable to change. In this framework we may view the *resilient* latent class as a profile in which survivors have reached a plateau of adaptation (i.e. stabilized), and as a result, protective factors may play a lessor role, or may more appropriately predict *maintenance* rather than *changes* in adaptation.

In addition, the operationalization of constructive growth used in the current study is broad, in that it differentiates generally between constructive and non-constructive growth. It is possible that within the constructive and non-constructive designation there are a variety of PTG profiles that reflect different qualities of growth (e.g. illusory growth). As such, it is possible that the *resilient* latent class may relate to a particular quality of growth that is not well captured in the current operationalization of constructive growth.

Although we know from the findings of the current study that there are benefits to participating in the group intervention for those in the *struggling* latent class, there may have been benefits for individuals in the *resilient* class that were not captured here. For example, the ability to act as a role model, or support peers in the intervention group who are struggling or experiencing distress, may be related to measures of wellbeing - other than constructive growth. There are many interventions that rely on peer support models (e.g. big brothers/sisters, alcoholics anonymous), indeed, the literature has shown that there are psychological benefits to helping others (Staub & Vollhardt, 2008). There is some evidence suggesting that providing help to others, or engagement in altruistic

actions promotes meaning making and leadership in communities (Staub & Vollhardt, 2008). Therefore it is possible that participating in the group is beneficial not only to those who are struggling, as seen in the current findings, but may hold some added benefit to those who already doing well.

Although coping flexibility (i.e. trauma focused and forward focused coping) has been shown to be influential in predicting positive adaptations (Galatzer-Levy et al., 2012; Park et al., 2015) and to constructive PTG outcomes (Pat-Horenczyk et al., in press), the findings in the current study failed to conform to this trend. Rather the subscales of coping flexibility, trauma focused and forward focused coping, did not significantly predict constructive PTG in either the *resilient* or *struggling* latent classes.

This counter-intuitive finding may reflect inconsistencies in the utility of forward focused coping strategies and trauma focused coping strategies in predicting constructive growth in various trauma-affected populations. More specifically, these findings may illuminate a unique relationship between the two dimensions of coping flexibility and constructive growth in male veterans in a longitudinal context. Although, in a recent study conducted by Pat-Horenczyk and colleagues (in press), coping flexibility was found to predict membership in a constructive PTG latent class at baseline in a sample of women with breast cancer, the study did not account for the role of coping flexibility in constructive growth at later time points, and cannot speak to the influence of coping flexibility on constructive growth in a male sample or in a longitudinal context.

Perhaps the salience of coping flexibility varies among men and women. Existing literature supports the notion that men and women vary in their styles of coping (Hussain & Bhushan, 2011; Prati & Pietrantoni, 2009). More specifically, men were more likely to

blame others and focus heavily on planning strategies as compared to women, and these strategies related differently to decreasing PTSD symptomology and enhancing PTG (Hussain & Bhushan, 2011). These results highlight some of the gender differences in coping. It is therefore possible that the gender differences extend to include the functional utility of coping flexibility. That is, that the importance of coping flexibility may also vary among men and women (Tamres, Janoicki, & Helgeson, 2002).

Alternatively, the impact of coping flexibility on reaching constructive growth may weaken over time, suggesting that although it is a highly influential factor in the initial aftermath of trauma, it weakens in its ability to predict growth as adaptation unfolds. As in Pat-Horenczyk et al., (in press) study, coping flexibility was predictive of constructive growth at baseline, but to our knowledge, no studies have examined the long-term impact of coping flexibility on constructive growth, a critical component in the current study. This scenario assumes that different protective factors may be more influential at various stages of adaptation, and as such social support may offer a more salient protective influence long after trauma exposure, whereas coping flexibility may be more important in the initial stages of adaptation.

Lastly, coping may be more influential in the reduction of negative symptomology rather than the promotion of constructive growth, particularly in the longitudinal context as coping fluctuates over time (Palus et al., 2013). For example, positive reframing or appraisals (Helgeson et al., 2006; Zoellner and Maercker, 2006), and problem focused coping (i.e. strategies that focus on changing or managing problems) (Chettler and Boals 2011; Sattler et al., 2014) are positively associated with PTG. While, reliance on negative coping strategies such as: avoidant coping (Chettler &

Boals, 2011; Galor & Hentschel, 2012; Romero et al., 2015), emotion focused coping (i.e. strategies that aim to reduce emotional distress) (Sattler et al., 2014), and strategies that rely heavily on blame (either self or others) tend to be predictive of greater PTSD symptom severity (Hussain & Bhushan 2011). The findings of the current study do not provide information regarding the role of coping flexibility in reducing negative symptoms of traumatic exposure, such as PTSD, and as such cannot address the potential of a differential relationship among the coping flexibility, PTSD, and PTG constructs, particularly in regards to the quality of PTG.

Implications

A number of implications can be drawn from the findings of this study. We focus on a few that pertain to scholarship in the area of posttrauma adaptation, clinical practice with veterans and their families, and policies that govern intervention programs for veterans and their families.

Scholarship. The findings of the current study support the notion that posttrauma adaptation is heterogeneous in nature; describing profiles of adaptation as complex interactions between distress, growth, resilience, and coping. Therefore, theories of trauma adaptation should continue to recognize adaptation as a multi-dimensional, complex, and dynamic process. By more clearly differentiating among posttrauma adaption profiles, the field can move forward in developing process-oriented models that identify the mechanisms underlying various trajectories of posttrauma adaptation.

The findings of this study suggest that protective factors function differently within adaptation profiles, particularly in regards to their utility in predicting constructive PTG. These findings further contribute to existing knowledge on risk and protective

factors, and suggest that protective factors may not universally promote positive adaptation. Therefore, additional refinement is called for to better understand the context in which protective factors influenced the long-term process of adaptation.

Finally, the allocation of the majority of the sample to the *struggling* latent class (55%), suggests that even after a long gap between combat engagement and participation in the *Peace of Mind* intervention, there remains a groups of respondents with room to grow (i.e. less stabilized) (Pat-Horenczyk et al., in press). Therefore, the process of adaptation may extend further in time that originally thought. Although it is likely that the opportunities for shifts in adaptation decrease as time passes, it may be that an intensive intervention, like *Peace of Mind*, may create a new window of opportunity for adaptation to evolve, carrying implication for longitudinal research on posttrauma adaptation, and clinical practice with trauma affected population.

Clinical Practice. With respect to practice, results of this study speak to the timing of interventions, and suggest that the efficacy of interventions may be closely tied to the stage of adaptation when the intervention is offered. Furthermore, various profiles of adaptation may benefit from interventions offered at different stages of adaptation-with some continuing to benefit from delayed or long-term interventions. Delayed interventions may offer a unique opportunity to re-trigger the availability of psychosocial resources that have decreased naturally over time. The timing of interventions may extend beyond simple chronological time, and may be closely related to the *pace* of adaptation, implying that different profiles of adaptation may unfold at different rates.

The context of timing is not only applicable to the issue of intervention, but also carries implications regarding the need for smart assessment and screening. Assessment

and screening of trauma-affected population could approach the process with recognition of greater heterogeneity in trauma reactions (i.e. that is screening for PTSD alone is not sufficient), and the recognition that the picture of adaptation may change over time. To that end, screening processes should rely on a combination of distress, growth, coping, and timing indicators. Furthermore, clinicians working with trauma-affected populations could recognize that adaptation is a process that may continue for years following traumatic exposure; as such, protocols may also screen for historical traumatic events.

Taken together these findings offer preliminary support for the development of interventions that can be tailored to the characteristics of the adaptation profiles, as well as the stage and pace of adaptation over time. Trauma, interventions should not be universally applied to all trauma-affected individuals. Rather, knowing of the complex interaction between profiles, protective factors, the pace, and stage of adaptation may results in more targeted and effective interventions.

Lastly, the findings of this study have implications regarding treatment modality (i.e. group versus individual). Although the current study was not able to compare group and individual intervention, there may be some added benefit for long-term group intervention models, particularly for military populations. Group intervention may offer an opportunity for natural support from similarly affected individuals to be accessible. In the context of military intervention, there may be a similar advantage to using organic units to build intervention groups (as in the *Peace of Mind* protocol) as previous research has found that unit cohesion is important in buffering the negative impact of traumatic exposure in combat (Pietrzak et al., 2010b; Sharp et al., 2015).

Policy. The study has implications for policies that influence the treatment of

trauma-affected individuals generally, and military samples more specifically. The changing understanding of trauma adaptation could be reflected in the tenants of trauma-informed policies that govern social work practice with trauma-affected populations. For example, practitioners and centers working with trauma-affected population should consider using a more broad and flexible definition of trauma adaptation to broaden eligibility for trauma treatment. Similarly, policies that govern intervention practices could highlight a *combination* of distress symptom reduction, building resilience, and enhancing growth, to reflect the complex combinations of posttrauma adaptation profiles.

As previously stated, trauma adaptation is a process that unfolds over time, and may continue over a period of years. As such, resources could be allocated to promote long-term intervention programs, particularly in military populations. In part, this is a recognition that services should continue to be available to military personnel long after the end of combat exposure. Similarly, resources could support intervention programs that strengthen the support network of military veterans (e.g. families and communities), recognizing the importance of social support in long-term adaptation.

Moreover, policies governing the accessibility of interventions for military samples could continue to work towards reducing stigma of help seeking behavior, and ensure that social support occurs in a pro-social environment that do not center around maladaptive coping behaviors (e.g. substance use). Increasingly, online intervention programs have been tested in military samples, as online forums may be less stigmatizing. For example, Hobfoll and colleagues (2015) proposed an online cognitive behavioral therapy intervention that targets PTSD symptomology in U.S veterans. Online intervention protocols may be effective in reducing stigma, and thereby increasing access

to treatment, particularly in military samples. As such, additional funding for online intervention programs, and the evaluation of these programs, may increasingly become a priority for policy makers and funding sources.

Limitations

Despite its strengths, the current study has some limitations that should be highlighted. The operationalization of the *quality* of growth is in its early stages. For comparability, the current study follows the general operationalization of constructive growth as outlined by Pat-Horenczyk and colleagues (2015). However, we divide the quality of growth into two broad components: (1) constructive; and (2) non-constructive growth; suggesting that there may be variability in the specific kinds of constructive and non-constructive growth (e.g. illusory growth may represent only one kind of non-constructive growth).

This method of operationalization has several limitations. First, the current operationalization does not incorporate an objective and explicit behavioral measure of growth as suggested by Hobfoll and colleagues (2007). Second, the variable is dichotomous and does not capture gradations in the quality of growth. Further, the dichotomous measure is comprised of two difference scores, one for PTG and a second for engagement in negative coping strategies. The use of difference scores remains somewhat controversial, as there is no weight attributed to the amount of improvement demonstrated. Rather, all improvements are treated equally despite the recognition, at a theoretical level, that this may not be the case (e.g. larger differences versus smaller differences etc.).

Given the overall outcome of interest is constructive growth, and the

measurement of growth does not include PTSD symptomology, the results of the current

study fail to provide insight into the trajectory or change in PTSD symptomology

between baseline and follow-up. In part, this reflects the priority of the *Peace of Mind*

intervention, which was to develop social support and resilience. Although these findings

shed light on the ability of those allocated to the *struggling* latent class to reach

constructive growth, it does not provide any information regarding the evolution of PTSD

symptomology within this profile. As such, it is not possible from these results to

determine if reaching constructive growth is also associated with a decrease in PTSD

symptomology for respondents.

As previously mentioned, the profiles provide insight into a snapshot of

adaptation at a particular moment in time. However, theoretical constructs such as

resilience, resistance, and growth should be examined as a pattern of characteristics that

unfold over time (i.e. those who are asymptomatic at baseline and remain asymptomatic

may be considered resistant). In addition, Bonanno (2015) advocates for the use of pre-

trauma data as a point of comparison for posttrauma functioning; indeed, posttrauma

adaptation can be thought of in terms of the amount of deviation from levels of pre-

trauma functioning. Given the data available for this study, this kind of analysis was not

possible, limiting our ability to identify patterns of characteristics over time.

Although the analysis attempts to account for the duration of time since combat,

re-exposure through reserve unit service is not accounted for. This is problematic as

reserve duty is, for the most part, a mandatory component of military service in Israel.

As such, some of the respondents may have engaged in military combat at some point

between the target exposure and participating in the study, complicating the picture of

adaptation.

In addition to participation in combat during reserve duty, there may be other pre and posttrauma characteristic that influence membership in the latent classes as well as the ability to reach constructive growth that were not included in this study. For example, attachment style (Schmidt et al., 2012), dispositional optimism (Zoellner & Maercker, 2006), behavioral coping (Hobfoll et al., 2007), substance use (Seal et al., 2011), perceived cohesion within the military unit, and perceived social support within the military unit (Pietrzak et al., 2009). Further, the current analysis was not able to cluster respondents based on their military unit (i.e. group in the program) due to sample size limitations. Therefore, these findings are not able to speak to the role of unit characteristics in individual adaptation; a potential important influential factor in the adaptation process.

Lastly, the study findings are not generalizable to women. Some aspects of adaptation that may be similar across gender; for example, Pat-Horenczyk and colleagues (in press) found a similar pattern of adaptation profiles in a sample of women with breast cancer. The similarity across these two studies offers preliminary evidence that that profile of adaptation may be robust and potentially generalizable across genders. However, there is evidence that women and men differ in their tendency to seek out social support, the type of social support they engage in (Ashton & Fuehrer, 1993), and the coping strategies they select to cope with distress and trauma (Palus et al., 2013). As such we cannot expect that the pattern of variables shown to predict constructive growth in this sample will hold in a sample of women. Finally, and perhaps most importantly, the current study did not utilize intervention control group data in the current analysis. As

such, there is a limited ability to tease apart the effect of the intervention on these results.

Future Research

Based on the findings and implications of the current study, we identify two important next steps in trauma research relating to the PTG. The first is to continue to develop measurement tools that assess the *quality* of PTG in a complex and dynamic way. The second is to expand existing longitudinal investigation to examine the temporal components of PTG in particular, and take a more complex perspective on the role of time in the process of adaptation more generally.

Although there has been progress at the theoretical level regarding the reconceptualization of growth, there are only a handful of studies that systematically measure the quality of growth. There is a need to develop more robust measures of PTG that capture the quality of reported growth to include objective behavioral measures, and further expand the domains in which growth is expected to occur. New measures of PTG should be sensitive to chronological time, developmental phase, pace of adaptation, and should explore the potential for pro-social behaviors (e.g. empathy and altruism) to reflect a new domain in which growth emerges. A measure of this kind would capture the evolution of growth over time, and would address the complex debate regarding the illusory nature of growth.

With greater clarity in measures, researchers can expand the understanding of protective and risk factors. For example, factors such as coping self-efficacy (Mystakidou et al., 2015), mindfulness (Labelle, Lawlor-Savage, Campbell, Faris, & Carlson, 2015), optimism (Zoellner & Maercker, 2006), locus of control (Baglama & Erdem Atak, 2015), and active search for meaning (Hobfoll et al., 2007) have previously been studied, but

found to be inconsistent predictors of PTG, perhaps reflecting that these factors are differentially related to the illusory and constructive components of PTG. Similarly, future research could examine positive outcomes associated with wellbeing that are predicted by reported growth; thereby clarifying the *clinical* utility of growth as a concept.

Despite emerging literature focusing on the quality of PTG, the exploration into the *Role of Time* in the development of PTG is in its early phases with preliminary theoretical and empirical evidence that PTG is a *process* that emerges over time (Zoellner & Maercker, 2006). As a result there remain unanswered questions regarding aspects of time, above and beyond the chronological measures of time traditionally used in longitudinal investigations.

Current studies that examine trajectories of adaptation over time assume that time, as a variable, is homogenous in nature. However, this is inconsistent with the clinical picture of adaptation, and the variability in adaptation profiles in the cross-sectional literature. Rather we expect that time is a more complex structure, that should be further examined in future research relating to trajectories of adaptation, including: (1) developmental stage; (2) the pace of adaptation; (3) significance attributed to the passage of time; (4) perception of coping in the context of time; and (5) availability of supportive resources over time. It is possible that these temporal aspects may influences psychological and emotional adaption, and could potentially provide insight into the variability of posttrauma adaptation trajectories. As such, future research should broaden prior research on trauma-affected individuals by examining the posttraumatic growth trajectories using a more complex construct of time.

Conclusion

There are aspects of these findings that are generalizable to military samples outside of Israel; and more generally to other trauma affected populations. More specifically the latent profiles of adaptation are expected to be fairly robust and hold across demographic groups and other trauma affected samples. In fact, there is some preliminary evidence suggesting that similar profiles of adaptation are applicable in a sample of women with breast cancer (Pat-Horenczyk et al., in press). Similarly, the general role of social support as a protective factor seems to hold across cultures and trauma types (Gleason & Iida, 2015). However, there may be nuances both in terms of adaptation profiles, but also in the type, source, and timing of social support that may differ across populations (e.g. Chen, Kim, Mojaverian, & Morling, 2012). The role of various coping strategies, including coping flexibility, may also vary across culture (Cheng, Bobo Lau, Pui, & Chan, 2014), trauma type (Littleton, Horsley, John, Nelson, 2007), and gender (Tamres et al., 2002).

Overall the current study provides some insight into the heterogeneity of post-combat reactions, suggesting four potential profiles of adaptation that are characterized by unique combinations of endorsement to coping, growth, and distress indicators. Further, these results highlight the nuanced role and efficacy of protective factors, such as social support and coping, in reaching constructive growth for veterans who embody resilience, as well as the struggle to grow.

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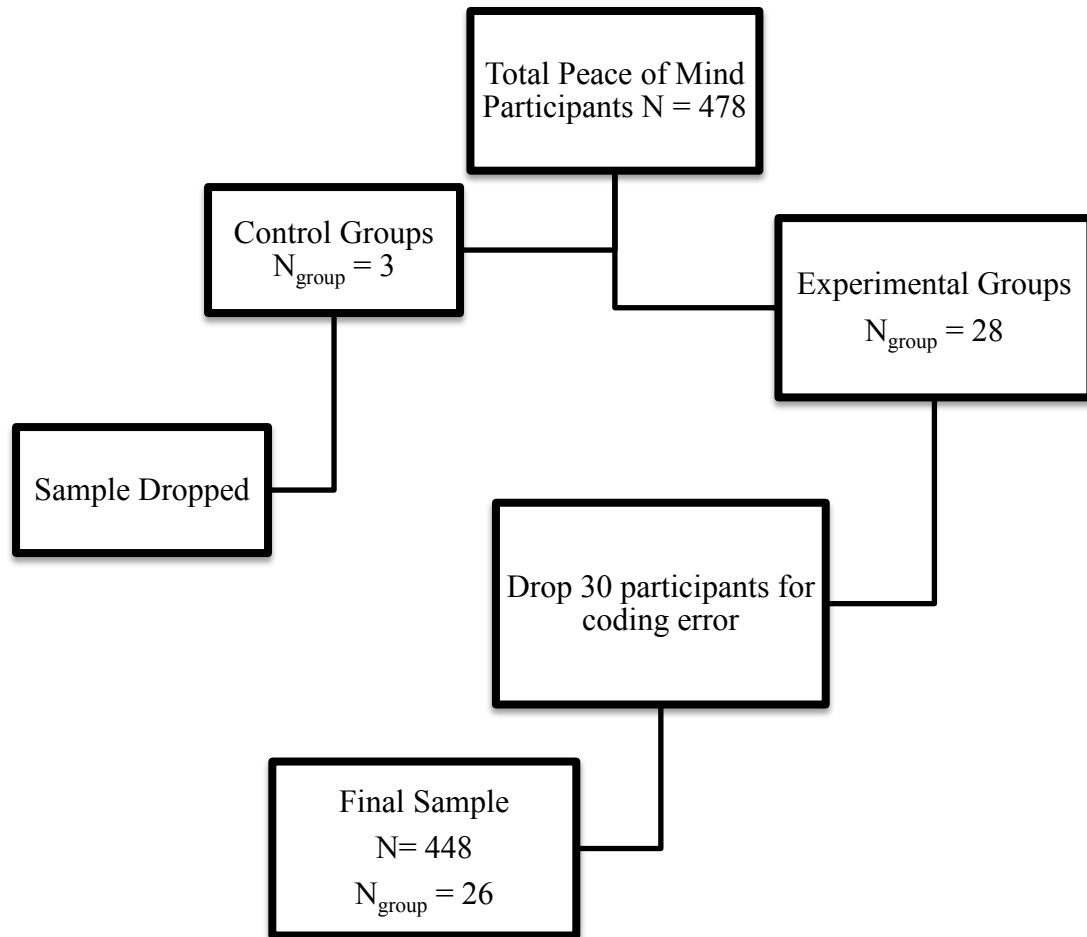
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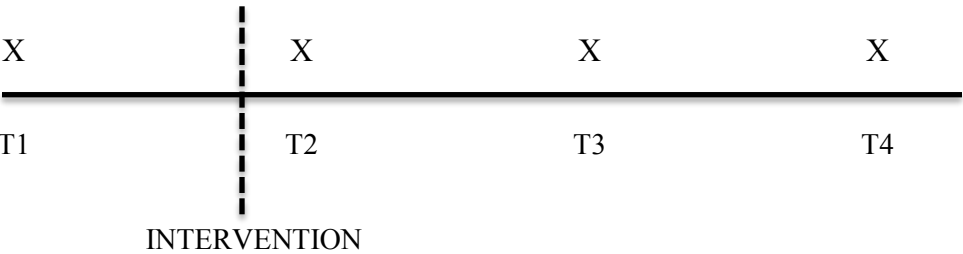Turner, R. J., & Llyod, D. A. (1995). Lifetime traumas and mental health: The

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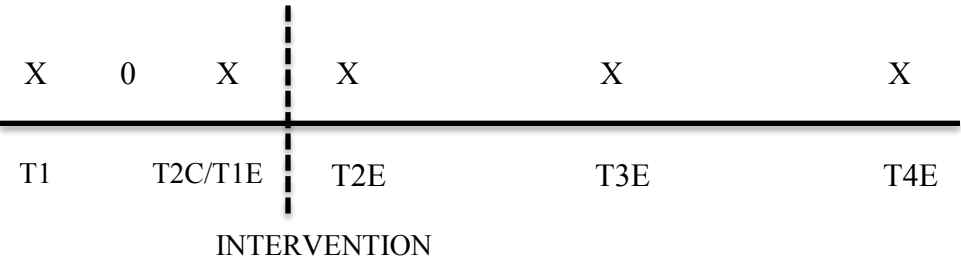**Appendix A: Diagram of Sample Selection Procedures for the Current Study**

Total Peace of Mind Participants N = 478

Control Groups N_{group} = 3

Experimental Groups N_{group} = 28

Sample Dropped

Drop 30 participants for coding error

Final Sample N= 448 N_{group} = 26

Appendix B: Diagram of Data Collection Pattern

EXPERIMENTAL MODEL

X		X	X	X
T1		T2	T3	T4

INTERVENTION

CONTROL MODEL A

X	0	X	X	X	X
T1		T2C/T1E	T2E	T3E	T4E

INTERVENTION

CONTROL MODEL B

X	0	X	X	X	X	X
T1C		T2C	T1E	T2E	T3E	T4E

INTERVENTION