AN EMPIRICAL EXAMINATION OF THE RELATIONSHIP BETWEEN
POSTTRAUMATIC GROWTH AND THE PERSONALITY TRAITS OF
HARDINESS, SENSE OF COHERENCE, LOCUS OF CONTROL, SELF-EFFICACY,
RESILIENCE, AND OPTIMISM

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Dissertation

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ABSTRACT

This study examined the construct validity of Tedeschi and Calhoun’s (2004) theory of posttraumatic growth, as measured by the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996), by empirically examining the nature of its relationship with hardness, sense of coherence, resilience, self-efficacy, locus of control, and optimism. Data from 276 students and community members were collected through a web-based survey. Findings from a correlational and exploratory factor analysis did not support the theoretical link that Tedeschi and Calhoun purported would exist between posttraumatic growth and the six personality variables. Tedeschi and Calhoun’s proposed 5 domain model of growth was also examined through a confirmatory factor analysis. Results and suggested modifications did not indicate an adequate level of fit for the model to this sample ($\chi^2$=457.33($p < .0001$), $RMSEA = .09$, $CFI = .87$, $NFI = .81$, $GFI = .80$). Exploratory analysis also failed to reveal a significant difference in total PTGI scores between individuals who did and did not report experiencing a traumatic event. Clinical implications for utilizing posttraumatic growth, as measured by the PTGI, could not be explored due to a lack of construct validity found in the study. In order to further explore the construct validity of posttraumatic growth, as measured by the PTGI, possible future areas of research are examined, including the underlying factor structure of the PTGI and further exploration of the nature of the relationship between posttraumatic growth and theoretically related personality variables.
I would like to deeply thank my dissertation chair, Dr. James Rogers, for his continual support, guidance, challenge, and motivation during this dissertation process. His continual belief in me and investment in this process was invaluable and critical toward helping me to reach this goal. I also would like to extend a heartfelt thanks to my committee members, Drs. James Werth, Linda Subich, David Tokar, and Ron Otterstetter for their investment, time, suggestions, and inspiration. In addition, I would like to thank the counseling center staff members from Grand Valley State University and Purdue University for their encouragement, guidance, and friendship during the dissertation process. I would also like to sincerely thank my friends Curt, John, Ryan, Amber, and Eric for their patience, motivational interventions, inspiring humor, and support. Finally, I would like to thank my parents, Bud and Shirley, my brother, Mike, and my girlfriend, Kelli, for their love, faith, unyielding patience, friendship, hope, and continual motivation.
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CHAPTER I

STATEMENT OF THE PROBLEM

The idea that one’s struggle with a traumatic event and the resulting loss may lead to positive change and growth is a concept that has existed for thousands of years. Evidence for its existence can be traced to early religious writings such as in the biblical representation of Christ and also in the foundational tenants of Buddhism and Hinduism. As time progressed, the concept of experiencing positive changes after struggling with a traumatic event also began to appear in both philosophical (Kierkegaard, 1983; Nietzsche, 1955) and psychological works (Caplan, 1964; Frankl, 1961). Utilizing the different representations and pieces of this concept that had been presented, Tedeschi and Calhoun (1995) introduced a construct into the psychological literature that attempted to fully capture the process of growth one may experience after encountering a traumatic event. They referred to this as post traumatic growth and defined it as, “positive psychological change experienced as a result of the struggle with highly challenging life circumstances” (Calhoun & Tedeschi, 2001, p. 1).

In order to fully examine this process of growth, Tedeschi and Calhoun utilized the aforementioned existing literature, as well as their own clinical experience working
with survivors of trauma, to create a model of posttraumatic growth. This model explores
the continuous interaction between a person and his or her environment that takes
place when an individual is struggling to cope with and grow from the impact of
experiencing a traumatic event (See Figure 1). Tedeschi and Calhoun (2004) suggested
that evidence of posttraumatic growth for an individual is found in five primary domains:
(a) Appreciation for Life, (b) Connection with Others, (c) Personal Strength, (d) New
Possibilities, and (e) Spiritual Growth. They further indicated that although five domains
have been identified, growth for a person could be seen in as many as all five domains to
as few as just one. It is important to note, however, that the experience of post traumatic
growth is not hypothesized as being universal and that growth is often experienced
concurrently with negative psychological reactions.

Since the concept of posttraumatic growth was introduced into the psychological
literature in 1995 by Tedeschi and Calhoun, its applicability and generalizability has been
tested with a variety of different populations. Specifically, research has focused on
individuals diagnosed with HIV disease and those caring for them (Bower, Kemeny,
Taylor, & Fahey, 1998; Cadell, 2003; Cadell, Regeher, & Hemsworth, 2003); survivors
of abuse (Woodward & Joseph, 2003); individuals diagnosed with cancer and their
caregivers (Cordova, Cunningham, Carlson, & Andrykowski, 2001; Sears, Stanton, &
Danoff-Burg, 2003; Weiss, 2004; Widows, Jacobsen, Booth-Jones, & Fields, 2005);
college students who have experienced a traumatic event (Tedeschi & Calhoun, 1996);
bereaved parents (Polatinsky & Esprey, 2000); and survivors of an assault, violent acts,
or an accident (Powell, Rosner, Butollo, Tedeschi, & Calhoun, 2003; Snape, 1997;
Tedeschi, 1999). Collectively, researchers have found mixed and conflicting support for
the structure of Tedeschi and Calhoun’s (2004) five domain model of post traumatic growth (Cadell et al., 2003; Powell et al., 2003); however, evidence for growth in all five of Tedeschi and Calhoun’s domains has been reported (Woodward & Joseph).

Furthermore, results from research indicate the presence of a positive relation between posttraumatic growth and social support (Cadell et al.), spirituality (Cadell et al.), physical health (Bower et al., 1998), partners’ levels of posttraumatic growth (Weiss), and a negative relation between posttraumatic growth and age and education level (Widows et al., 2005). Findings also indicate that individuals who endured some type of traumatic event display higher levels of posttraumatic growth than those who do not (Cordova et al., 2001). Results from empirical research have produced conflicting results surrounding the relation between one’s level of posttraumatic growth and psychological distress (Cadell et al.; Weiss).
CHALLENGES

Management Of Emotional Distress  
Fundamental Schemas Beliefs & Goals  
Life Narrative

RUMINATION  
Mostly Automatic and Intrusive

Reduction of Emotional Distress  
Management of Automatic Ruminations  
Disengagement from Goals

SELF DISCLOSURE  
Writing, Talking, Praying

SOCIAL SUPPORT  
Models for Schemas, Coping, Posttraumatic Growth

Rumination-More Deliberate  
Schema Change  
Narrative Development

ENDURING DISTRESS  
POSTTRAUMATIC GROWTH  
WISDOM

5 Domains

Figure 1. The Process of Posttraumatic Growth
As shown in the previous paragraph, the applicability of the construct of posttraumatic growth is beginning to be explored in a host of different populations and contexts. However, Tedeschi and Calhoun (2004) noted there are still gaps in the research literature surrounding posttraumatic growth that should be explored. In addition to the conflicting findings regarding the structure of the posttraumatic growth model, one of the other potential areas identified by the authors focuses on examining the relation between posttraumatic growth and the personality variables that help an individual successfully cope with the trials and tribulations of a trauma and ultimately provide one with a greater chance of experiencing growth. Tedeschi and Calhoun identified hardiness (Kobasa & Pucetti, 1983), sense of coherence (Antonovsky, 1987), resilience (Major, Zubek, Cooper, Cozzarelli, & Richards, 1997), optimism (Scheir & Carver, 1985), locus of control (Rotter, 1966), and self-efficacy (Bandura, 1982) as the six personality variables that can assume this important function.

Tedeschi and Calhoun (2004) noted that there are clear theoretical similarities between posttraumatic growth and the aforementioned six personality variables. Specifically, posttraumatic growth and the six variables all examine the process surrounding how one copes with a traumatic event. However, the authors also noted that conceptual differences between hardiness, sense of coherence, resilience, optimism, locus of control, self-efficacy, and posttraumatic growth are evident when one explores the final goal for each of these constructs. For example, Calhoun and Tedeschi (2000) stated that the final goal for the six personality variables centers on how individuals endure highly stressful and demanding situations without developing permanent “deficiencies or psychological problems” (p. 136) and ultimately return to their baseline level of
functioning. However the concept of posttraumatic growth focuses on how an individual can take his or her experience with a traumatic event and use the struggle to reach a higher level of functioning than he or she was at before the trauma occurred. Conceptually and theoretically these differences are evident, but empirically their relationship has yet to be examined.

Summary

To summarize, the construct of posttraumatic growth has historical roots that trace back thousands of years; however, its introduction in the psychological literature is much more recent. Since 1995, the generalizability, applicability, and construct validity of posttraumatic growth has been empirically examined with numerous populations ranging from college students (Tedeschi & Calhoun, 1996) to survivors of abuse (Woodward & Joseph, 2003). In order to further explore the construct validity of posttraumatic growth, Tedeschi and Calhoun (2004) have called for an empirical exploration of the nature of the relationship between posttraumatic growth and the six personality variables of hardiness, sense of coherence, resilience, optimism, locus of control, and self-efficacy. Theoretically the difference between the final goal for posttraumatic growth and these six personality variables are clear, but the distinction has not been tested empirically.

Purpose for the Study

This dissertation extended previous research by following the recommendations of Tedeschi and Calhoun (2004) and conducted exploratory and confirmatory research to empirically examine the 5 domain structure of the posttraumatic growth inventory and to
explore the relationship between posttraumatic growth and the six personality variables of hardiness, sense of coherence, resilience, optimism, locus of control, and self-efficacy. Based on the presence of both conceptual similarities and differences among posttraumatic growth and the six personality variables, it was hypothesized that posttraumatic growth would have a positive relation and share some variance with the personality variables; however, this construct would possess enough unique variance to load significantly onto its own factor and be considered independent and distinct from the six personality variables. Confirmatory research was conducted in order to test the five domain model of PTG that Tedeschi and Calhoun have proposed. It was hypothesized that the data from this sample would adequately fit the proposed model. The following section will further explore the historical roots of posttraumatic growth, review the literature surrounding posttraumatic growth and the six personality variables, and further explore the theoretical similarities and differences between posttraumatic growth and the six personality variables.
CHAPTER II

REVIEW OF THE LITERATURE

Historical Roots of Posttraumatic Growth

Tedeschi and Calhoun (1995) noted that the concept of experiencing growth as a result of one’s struggle with a traumatic event has existed for many centuries but had not been specifically identified and examined in the psychological literature. Evidence for its existence, for example, can be seen in both religious and philosophical writings across the centuries. When examining religious writings, the Biblical representation of Christ is an example of the concept of posttraumatic growth (Tedeschi & Calhoun, 1995). The Bible noted that it was only after Christ suffered and was crucified on the cross, that he could experience salvation and thus create salvation and freedom for others from their sins. The Bible also provided the story of Job, a person who endured numerous painful trials before he found peace and a connection with God.

Examples of posttraumatic growth can also be seen when one examines a few of the central tenets of Buddhism and Hinduism. According to Tedeschi and Calhoun (1995), understanding the universal nature of suffering is seen as critical in the Buddhist religion. The authors noted that Buddhist beliefs suggest that one must confront and
embrace his or her experiences with suffering. Only by doing this can a person move
toward acquiring wisdom and reach a greater level of understanding. Tedeschi and
Calhoun also suggested that suffering plays an important role in the Hindu religion.
According to the authors, Hindu doctrine stresses the importance for individuals to
realize that, at times, happiness can end in suffering, but also that growth and happiness
can arise out of ones experience with suffering.

There are also numerous examples of experiencing growth after enduring
suffering found in philosophical writings (Tedeschi & Calhoun, 1995). For example,
both Nietzsche (1955) and Kierkegaard (1983) discussed the potential benefits
individuals can reap through their experience with suffering and painful events.
Similarly, Rollo May (1960) proposed the idea that individuals must strip away all that is
inauthentic in their lives, thus creating feelings of uncertainty, anxiety, and often times,
loss. However, he noted that once a person completes this action and experiences the
consequent suffering associated with it, that individual will then be able to better
understand who she or he is and what is truly important to her or him.

In the mid-to-late 20th century, writings focusing on positive growth gleaned
from encounters with traumatic events began to appear in the psychological literature.
One of the first and central examples of this comes from the work of Victor Frankl.
Frankl (1961) drew upon his experiences from the concentration camps during World
War II and created his own theoretical approach toward counseling entitled logotherapy.
Logotherapy specifically examines how one can utilize experiences with trauma and
consequent suffering to discover and create meaning in life. Another existential
psychologist, Erich Fromm (1947) also noted that the suffering and struggle that one may
endure while determining what role central existential concerns (freedom, isolation, death, and the creation of meaning in life) play in his or her life could lead to greater self-understanding, existential awareness, and positive growth. Finally, Caplan (1964), during his work as a psychiatrist in community mental health settings, recognized the possible benefits that one may experience after his or her struggle with suffering. Caplan suggested that if mental health workers can help individuals effectively cope with the pain associated with their experience of a traumatic event, then they may have a chance to learn from the experience and to reach a higher level of psychological development than before encountering the trauma.

Evidence for the existence of the construct of growth through one’s struggle with a traumatic event has been present for many centuries. Examples could be found in numerous areas; ranging from early Biblical writings to more modern philosophical and psychological works. Tedeschi and Calhoun’s (2004) current conceptualization of the process of posttraumatic growth offers one of the first complete theoretical explanations of how this process may occur for individuals.

The Process of Growth

Tedeschi and Calhoun (2004) have created a model of posttraumatic growth that explores the continuous interaction between a person and his or her environment that takes place when an individual is struggling to cope with and grow from the impact of experiencing a traumatic event (see Figure 1). According to the authors, their model is based upon their personal experiences as clinicians as well as an integration of theoretical and empirical works focusing on trauma, suffering, coping, meaning, and growth found
in religious, philosophical, and psychological literature. Tedeschi and Calhoun’s model of posttraumatic growth begins by exploring the interaction between one’s personality constellation pretrauma and the specific characteristics associated with a traumatic event, in order to examine how this interplay may affect the individual’s ability to cope with the trauma. Next, the authors examine how a person’s initial reaction to a traumatic event may challenge his or her fundamental schemas, life narrative, and ability to deal with emotional distress. After evaluating one’s immediate response, Tedeschi and Calhoun’s model explores the positive role that self-disclosure, social support, and cognitive processing (specifically ruminative thought) can play in the development of posttraumatic growth. Next, the authors’ model explores the mutually rewarding interaction that occurs between the development of one’s level of general wisdom and posttraumatic growth. Specifically, growth in one’s general wisdom positively influences one’s posttraumatic growth and further development of posttraumatic growth enhances one’s general wisdom. Finally, Tedeschi and Calhoun’s model examines the role that enduring distress, resulting from continual challenges to one’s life narrative, fundamental beliefs, and management of distressing emotions, plays in the maintenance and further development of posttraumatic growth.

Personality Characteristics

The process of the development of posttraumatic growth begins by first examining individuals’ personalities pretrauma and exploring how these personality factors may affect their initial response to the trauma (Tedeschi & Calhoun, 2004) (see Figure 1). The majority of the research surrounding this interplay in Tedeschi and
Calhoun’s model is based on theoretical comparisons; however, one study has empirically examined this relationship. Specifically, Tedeschi and Calhoun (1996) administered the NEO-PI (Costa & McCrae, 1992) and the Posttraumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996) to 325 undergraduate students in an introductory psychology course.

Tedeschi and Calhoun (1995) found that both Extraversion and Openness to experience were statistically significantly related to one’s experience of posttraumatic growth. Specifically, Extraversion exhibited a significant positive correlation with all five potential domains of growth: (a) Appreciation for Life ($r = .16$), (b) Connection with Others ($r = .28$), (c) Personal Strength ($r = .15$), (d) New Possibilities ($r = .16$), and (e) Spiritual Growth ($r = .26$). The authors further reported that participants’ Openness to Experience score revealed a positive significant correlation with two of these domains: Personal Strength ($r = .25$) and New Possibilities ($r = .25$). However, while these correlations are statistically significant, they represent minimal practical shared variance and should be interpreted as small effect sizes (Cohen, 1977).

Due to the fact that this specific study provided inconclusive results and little empirical research has explored the link between posttraumatic growth and personality traits, Tedeschi and Calhoun called for further empirical research to be conducted in this and other areas related to personality factors. For example, in addition to the personality factors measured by the NEO-PI, Tedeschi and Calhoun (1995) suggested that it is important to explore to what degree an individual’s personality contains elements of an internal locus of control, resilience, hardiness, optimism, self-efficacy, or sense of coherence. The authors, in their literature review of these personality variables, noted
that individuals who exhibit these qualities tend to more effectively cope with stresses in numerous situations. Tedeschi and Calhoun reported that the common element that seems to tie these personality characteristics together is the ability for one to be flexible and tenacious in his or her approach to coping with stress. Ultimately the authors noted that it is this sense of flexibility and tenacity in one’s personality that may allow an individual to experience growth, for he or she may be more likely and willing to let go of old shattered assumptions and to construct a worldview that is consistent with his or her beliefs and experiences after enduring the traumatic event.

When examining personality characteristics, Tedeschi and Calhoun (1995) hypothesized a curvilinear relationship between one’s endorsement of the personality characteristics of hardiness, locus of control, sense of coherence, resilience, self-efficacy, and optimism and one’s level of posttraumatic growth. The authors stated that the most likely candidates to experience growth would be individuals who exhibit a constellation of the above-mentioned personality characteristics that allows these individuals to endorse these constructs to the extent that they have sufficient resources to deal with most aspects of a loss, but still have room to grow. Conversely, a person who is very strong, resilient, and adaptive, because he or she fully possesses and endorses numerous aspects of these personality variables, may be so high-functioning that there is less room for that person to struggle and consequently experience growth when encountering a traumatic event. However, the authors also stated that individuals who lack coping skills and have very few resilient qualities may be so overwhelmed by the traumatic experience that they would not have the resources to effectively challenge themselves and the situation and
experience growth. Thus, theoretically, people with moderate levels of the above-mentioned personality characteristics are more likely to experience posttraumatic growth.

Attributions Related to the Traumatic Event

Next in the process of growth, (see Figure 1) the authors suggest that individuals who encounter a traumatic event will begin to construct attributions relating to the origin of the event. Tedeschi and Calhoun (1995) purported that the cause of a traumatic event can be attributed to the actions of oneself, others, or to chance, and that each type of causal attribution may contribute to different types of growth. For example, if a person attributes the cause of a certain traumatic event to his or her own actions, then the direct path for growth will most likely come from self-examination and a transformation of beliefs and self-schemas. If a person believes that a traumatic event was caused by others, that individual may have to challenge his or her schemas centering on how he or she relates to the individual or individuals seen as the central cause of the event. This challenging of schemas focusing on interpersonal relating runs the risk of moving someone toward blaming behavior; however, there is also the possibility that a person can work through negative feelings and conflict toward others and experience a greater sense of connection, self-understanding, more accurate interpersonal judgment, and ultimately growth. Finally, Tedeschi and Calhoun noted that a person may attribute the cause of a traumatic event to chance (such as the occurrence of a natural disaster or unexpected illness). If this is the case, they suggested that individuals may take the time to critically examine their priorities to ensure that they are fully living their lives and taking
advantage of the opportunities that they have because they have been reawakened to the uncertainty that accompanies life.

Initial Reactions to the Traumatic Event

Tedeschi and Calhoun’s (2004) model next explores initial reactions to a traumatic event (See Figure 1). The authors indicated that during this period an individual is faced with three challenges: (a) the management of emotional distress, (b) the challenging of fundamental schemas and beliefs, and (c) the challenge to adjust one’s life narrative to incorporate the traumatic experience.

Managing Emotional Distress

Initially, Tedeschi and Calhoun (1995) conceptualized the relationship between the level of emotional distress associated with a traumatic event and the potential for someone to experience growth as curvilinear, and one that is contingent upon a minimum threshold. In other words, the authors stated that a minimum level of distress and emotional turmoil must be generated from the occurrence of the traumatic event if growth has a chance of occurring. However, they suggested that additional stress beyond this minimum level may not result in significant additional growth and that it may actually hinder a person’s growth because coping resources have been overwhelmed.

However, current research examining the relationship between posttraumatic growth and level of emotional distress has been mixed and has not fully supported this initial conceptualization. For example, some research examining the prevalence of posttraumatic growth when working with breast cancer survivors (Sears et al., 2003),
caregivers of HIV patients (Cadell et al., 2003), and college students who experienced a traumatic event (Calhoun, Cann, Tedeschi, & McMillan, 2000), found a positive association between levels of stress (duration, symptom severity, intrusive thoughts and cognitive rumination, and severity of initial prognosis) and the level of growth experienced. These results suggest that at times traumatic events that produce heightened levels of stress do have the potential to provide greater levels of growth. However, research by Frazier, Conlan, and Glaser (2001) with female sexual assault survivors reported contrasting results. In this study, the authors noted that higher levels of growth were significantly associated with lower levels of distress, specifically one’s level of depression, at both two ($r = -0.50$) and 12 ($r = -0.35$) weeks post-assault. Unlike the aforementioned studies, some work has shown that there is no significant relationship between one’s level of posttraumatic growth and his or her distress level. Specifically, Cordova et al. (2001), in their work with breast cancer survivors, found no relation between women’s level of posttraumatic growth and depressive symptoms.

**Challenging Fundamental Beliefs, Schemas, and Goals**

Tedeschi and Calhoun (2004) noted that a person’s initial response to a traumatic event is often an expression of shock and denial in an attempt to manage the emotional distress and maintain some illusions relating to safety. The authors reported that this response often serves a protective role so that one’s core beliefs, schemas, and values are not immediately challenged or shattered. Following the work of Janoff-Bulman (1992), Tedeschi and Calhoun suggested that these initial reactions enable a person to still see the world as a place that is manageable, comprehensible, and meaningful, for he or she has not been forced to examine how a particular traumatic event fits with previously
established schemas. However, after processing the initial shock from a traumatic event, the authors suggested that in order to open the pathway for growth to occur, an individual must begin to challenge and possibly let go of some of his or her core beliefs, values, and assumptions. For example, in a qualitative study with 52 adults struggling with bereavement, Calhoun and Tedeschi (1989-1990) reported that many of the now-widowed elderly women reported significant changes in their core assumptions and beliefs pertaining to their own ability to be independent. The authors noted that many of the women came from very traditional heterosexual relationships; however, after the death of their spouses, the women reported being able to challenge and let go of some of their core self-perceptions pertaining to their lack of autonomy and they began working, handling financial matters, and effectively dealing with business and service individuals.

Adjusting the Life Narrative

As a result of experiencing shock and denial soon after encountering a traumatic event, individuals may be less likely to initially explore what the occurrence of this particular event means in their life narrative (Tedeschi & Calhoun, 2004). In order to continue to see the world as a comprehensible and meaningful place, individuals may initially view a traumatic event as something that is separate, unusual, and often outside of their personal life story. However, as one is able to move beyond these initial reactions, he or she may come to see the struggle to understand and process the traumatic event as a critical component in the reconstruction of his or her life narrative, for the traumatic event “comes to have meaning as a catalyst for the creation of a new identity, being both the split and the glue between the past and the present” (Calhoun & Tedeschi,
Bower et al. (1998) observed this phenomenon when they interviewed 40 men who were coping with an AIDS related death. When discussing ways in which the loss of a loved one helped to construct his current identity and approach to life, one man indicated that,

“I would say that his death lit up my faith….partially because of what I saw him do and that fact that he didn’t seem to be willing to take the risk that was necessary. I continue to show up and take those risks” (p. 981).

Early Cognitive Processing and Rumination

Tedeschi and Calhoun’s (2004) model (see Figure 1) next indicates that early cognitive processing of the traumatic event plays a critical role in fostering posttraumatic growth. The authors indicated that early cognitive processing is often automatic and frequent and they reported that it is intertwined with the initial reactions of shock and denial. During this time, the individual usually experiences numerous intrusive thoughts and images related to the traumatic event and the authors noted that people have a difficult time controlling when these thoughts and images occur. Tedeschi and Calhoun reported that as trying and potentially emotionally painful as these intrusive cognitive thoughts can be, they also serve a very important purpose. This early processing serves as the vehicle through which individuals begin to start to evaluate how the traumatic event may have challenged their initial core beliefs, schemas, and values. At this point, there is often too much intense emotion attached to the processing for individuals to begin to critically evaluate how their core schemas may need to be adjusted, but this is
the first step in a process that could potentially lead to posttraumatic growth (Tedeschi & Calhoun). Calhoun et al. (2000) explored this assertion with a sample of 54 college students who had experienced a traumatic event within the past three years. The authors found that posttraumatic growth (as measured by the PTGI) was significantly positively associated \( (r = .32) \) with levels of cognitive processing that began soon after the traumatic event occurred.

Self Disclosure and Social Support

As individuals struggle to cope with their intrusive automatic thoughts and emotional distress, Tedeschi and Calhoun (2004) suggested that they may start to reach out and cope through a process of self-disclosure (see Figure 1). The authors noted that this self-disclosure can take many forms (e.g., journaling, prayer, discussion with others) and they shared that if one’s disclosure is received supportively, then that individual can begin to process and cope with the emotional distress associated with the struggle caused by the traumatic event.

An empathic, supportive, and genuine reception of one’s self-disclosure can also lead to the added benefit of discovering social support. Tedeschi and Calhoun (2004) noted that reaching out to others for assistance offers numerous benefits, including gaining emotional support, finding new ways to interpret or understand the situation, and discovering ways to behave to make the situation more manageable. Niemeyer (2001) reported further benefits and noted that by relating a narrative of one’s experience to someone else, a person is given the chance to further understand the meaning of his or her experience and what role it has played in his or her life. This type of meaning-
centered reflection may help individuals begin to explore the relevance of their present schemas and values and make necessary and possibly beneficial adjustments if they are needed (Tedeschi & Calhoun).

Research exploring the relationship between social support, self-disclosure, and posttraumatic growth has found evidence for the positive association between these two variables and posttraumatic growth. For example, Cadell et al. (2003) utilized structural equation modeling when analyzing data from 174 bereaved HIV caregivers. The authors noted that in their model they found a significant positive direct effect between social support and posttraumatic growth ($\gamma = .21$), thus indicating that greater levels of social support were associated with greater levels of posttraumatic growth. In a study with 74 husbands of women who had survived breast cancer, Weiss (2004) stated that the participants’ level of posttraumatic growth was significantly positively associated ($r = .28$) with the number of supportive individuals that they had in their life. Also, research conducted by Powell et al. (2003) with individuals who experienced the war in Sarajevo, found a positive association between social support and posttraumatic growth. The authors noted that the individuals who fled Sarajevo tended to be in more socially stable and supportive environments showed significantly greater evidence of posttraumatic growth ($d = .37$) than those who remained in Sarajevo throughout the war.

**Deliberate Cognitive Processing**

Tedeschi and Calhoun’s model (2004) next describes how deeper and more deliberate cognitive processing develops and aids in the process of posttraumatic growth (See Figure 1). The authors stated that after engaging in self-disclosure and potentially
receiving social support, individuals are better able to cope with the emotional distress associated with their struggle to comprehend and accept the traumatic event. They further suggested that one’s increased ability to manage his or her emotional distress allows that individual to engage in a deeper level of cognitive rumination. The rumination that is carried out during this time is a special type of thinking that is less emotionally laden, less automatic, and more deliberate in nature; revolves around a particular theme, and can be cued by numerous events in the environment, not just those related to the specific traumatic event (Martin & Tesser, 1996). As a result of the more deliberate nature and less emotionally charged qualities of this type of cognitive rumination, individuals are better able to critically explore what fundamental schemas and values they need to disengage from or reconstruct due to their experience with the traumatic event (Tedeschi & Calhoun). It is also during this time, when rumination becomes less emotionally laden, that individuals may be better equipped to begin to explore the role that the traumatic experience will play in their life narrative. It is this initial evaluation, exploration, and construction of new fundamental schemas and narratives that signals the beginning of the development of posttraumatic growth (Tedeschi & Calhoun).

Research exploring the relationship between cognitive rumination and posttraumatic growth has shown the positive effects that deliberate cognitive processing can have on the development of growth. Ullrich and Lutgendorf (2002), in their study with college students who were journaling about their reflections on a traumatic event, reported that only students who deliberately cognitively processed the emotional aspects of their traumatic experience in their journaling showed significant posttraumatic growth
between their initial assessment and their follow up assessment one month later. No significant gains were seen for students who, in their journaling, focused solely on the facts or the emotional aspect of their traumatic experience. Furthermore, Calhoun, Tedeschi, Fulmer, and Harlan (2000), in their work with bereaved parents who were participating in mutual help support groups, explored the relationship between different types of rumination and posttraumatic growth. The authors noted that there was no relationship between intrusive cognitive thoughts and posttraumatic growth. However, they reported that when the parents engaged in deliberate and nonintrusive cognitive processing soon after the death of their child, a significant positive association was found between this style of rumination and posttraumatic growth ($r = .38$).

Potential Growth Domains

After reaching out for support from others, finding sufficient coping resources in the environment, relying on personality characteristics for coping, and beginning to revise schemas (i.e., accepting the unchangeable aspects of a situation, setting more realistic goals, and gaining a more realistic understanding of what happened), a person can begin to view his or her situation as more manageable and comprehensible, and thus can start to experience the initial benefits of growth (Tedeschi & Calhoun, 1995) (see Figure 1). Tedeschi and Calhoun (2004) indicated that posttraumatic growth is found in five main domains: (a) Appreciation for Life, (b) Connection With Others, (c) Personal Strength, (d) New Possibilities, and (e) Spiritual Growth. The authors accordingly noted that a person who does experience growth may encounter posttraumatic growth in as many as all five of these areas to as few as one. It is important to note that not everyone
is able to reach a point where they experience posttraumatic growth, and even for those who can, it may take considerable time (Tedeschi & Calhoun, 2004).

Appreciation for Life

Based on the findings of previous research, such as that completed by Taylor, Lichtman, and Wood (1984) and Klass (1986-1987), Tedeschi and Calhoun (2004) noted that some individuals who encounter a traumatic event may experience a deeper appreciation for life and a reordered sense of priorities, such that relationships with family and friends become increasingly important. The authors also noted that these individuals may start to experience a greater sense of vulnerability and begin to view life as a precious entity that is not to be taken for granted. Specifically, Taylor et al. (1984) conducted an empirical study with 78 women diagnosed with breast cancer. While examining the association between the women’s adjustment to breast cancer and both their attributions of its etiology and their beliefs about their control over the cancer, the authors found that the women began to express a deeper appreciation for life and a newfound focus on friends and family. Current research by Tedeschi and Calhoun was consistent with previous findings of areas of growth noted by Klass. Specifically, Klass examined the reactions of bereaved parents after the death of one or their children. One of the central themes that emerged from the participant observations was a strong sense of reordered priorities for the parents. Klass reported that participants began to express a deeper appreciation for life as well as a renewed investment in relationships with family and friends. Furthermore, in a series of interviews with survivors of a cruise ship disaster, Joseph, Williams, and Yule (1993) reported similar findings. Specifically, the authors
noted that 71% of the survivors reported that they no longer took life for granted and that they try and live each day to the fullest.

Connection with Others

Based upon their own previous research as well as the work of others, Tedeschi and Calhoun (2004) reported that individuals may develop a greater capacity to experience empathy for another person, thus leading to greater connections with other individuals. This increased sense of connection often reveals itself in the form of volunteer and social advocacy work, and more open and honest interactions with others. For example, in a study by Calhoun and Tedeschi (1989-1990) with bereaved elderly women, 83% of the participants discovered strong bonds with family and friends that they could rely on and 60% found themselves being more emotionally open in these relationships then they had been previously. Other examples of deeper connections with others was seen in work with bereaved parents (Calhoun et al., 2000; Calhoun & Tedeschi; Wuthnow, 1991), mothers of newborns needing neonatal intensive care (Affleck, Tennen, & Gershman, 1985), adults who lost a parent (Zemore & Shepel, 1989), and men who became unemployed (Tedeschi, 1989). For example, in research with bereaved parents (Calhoun & Tedeschi; Wuthnow) it was found that the parents who had lost a child were more sensitive to issues pertaining to death and that they were more likely to reach out and offer support to others who were in a similar situation.
Personal Strength

Tedeschi and Calhoun (2004) reported that after struggling through a traumatic event, individuals may acquire a greater sense of personal strength than they had before enduring the trauma. Specifically, the authors suggested that this struggle with a traumatic event awakens in individuals a realization that if they could survive the pain and turmoil associated with this particular traumatic event, then they may be strong enough to endure other difficulties that life presents in the future. The authors noted the paradoxical nature of this discovery, for they reported that even as individuals sense a greater power of survival, they simultaneously become aware of the finite nature of life. This realized greater sense of personal strength has been found in work with patients who endured treatment and had their cancer enter into remission (Collins, Taylor, & Skokan, 1990), successful bone marrow transplantation patients (Curbow, Sommerfield, Baker, Wingard, & Legro, 1993), rescued prisoners of war (Sledge, Boydstun, & Rabe, 1980), and those with combat experience (Aldwin, Levenson, & Spiro, 1994).

New Possibilities

The next domain where growth may be observed is centered on the fact that individuals may begin to recognize new possibilities and opportunities in their life (Tedeschi & Calhoun, 2004). For example, bereaved elderly women, who initially held traditional roles in their families, reported discovering numerous new possibilities in their lives after their husbands died (Calhoun & Tedeschi, 1990; Lund, Caserta, & Diamond, 1993). Many of these women noted that they now could handle an assortment of the activities that their husbands once managed, such as dealing with financial matters,
dealing with business and service people, and working outside of the home. Further
evidence for the existence of growth in this domain can be seen in the research done by
Woodward and Joseph (2003). These authors interviewed 29 adults who had experienced
a form of early childhood emotional, physical, or sexual abuse. After utilizing an
idiographic approach to interpret the participants’ narratives for themes related to growth
from trauma, Woodward and Joseph identified a theme that they entitled Liberation and
Freedom. This theme centered on new opportunities and possibilities that individuals
realized as a result of the growth they experienced from their struggle with a traumatic
event. For example, one individual experienced both a realization that she had a strong
talent and gift for writing and a sense of peace after she decided to write a book
disclosing her early childhood abuse experience.

**Spiritual Growth**

Finally, the fifth domain focuses on the possibility of individuals experiencing a
noted that one’s encounter with a traumatic event may lead to a greater sense of
“existential awareness” (p. 160) and a deeper need for spiritual connection to help create
a sense of meaning and understanding in life. Often one’s encounter with a traumatic
event may initially weaken his or her spiritual beliefs; however, after struggling through
the experience, a person’s sense of spirituality may become increasingly stronger
(Andrykowski, 1993; Calhoun & Tedeschi, 1989-1990). Pargament et al. (1990) noted
that this existential awareness and awakening of spiritual growth can be beneficial in
numerous ways. First, individuals may find a sense of both comfort and control in their
lives once a spiritual connection is established. Second, they may be able to achieve an intimate connection with a higher power and this connection may serve to alleviate some of the loneliness that they could be experiencing. Finally, this spiritual growth may also help them create meaning in their lives as they begin to see how their struggle with the traumatic experience fits into their life and self-concept.

Empirical research has supported the idea that one’s struggle with a traumatic event may lead to spiritual growth. For example, Overcash, Calhoun, Cann, and Tedeschi (1996) utilized naturalistic interviews with 25 college students who noted that they had recently experienced a significant stressful event, in order to assess if spiritual growth was present. The authors reported that 13 of the 25 individuals interviewed described a strengthening of existing spiritual beliefs, the development of new spiritual beliefs, or an increase in the importance of spirituality in their lives. Also, Bower et al. (1998), in their research with surviving partners or friends of individuals who died from disease, found that one of the areas that participants identified experiencing growth from their struggle was a renewed sense of spirituality. As one participant in the study noted, when talking about the death of his partner, “his death lit up my faith” (p. 981). Cadell et al. (2003), in their work with bereaved caregivers of individuals with disease, also explored the link between spiritual growth and one’s struggle with trauma. Through the use of structural equation modeling, the authors reported that the presence of spiritual growth for an individual had a significant, direct, positive effect ($\gamma = .06$) on the development of posttraumatic growth.

It is important to note that not everyone is able to reach a point where they experience posttraumatic growth, and even for those that can, it may take considerable
time (Tedeschi & Calhoun, 2004). However, the authors stated that for those individuals who experience growth in one or more of the five previously described domains, there is also the possibility that they may notice significant developments relating to their general wisdom about life.

The Acquisition of Wisdom

According to Tedeschi and Calhoun’s model (2004) (see Figure 1) the changes that take place as a result of the development of posttraumatic growth have an “ongoing mutual influence” (p. 12) with the development of one’s general wisdom about life. Utilizing Baltes and Smith’s (1990) definition of wisdom, Tedeschi and Calhoun stated that wisdom is the acquisition of knowledge that helps individuals succeed in the fundamental life tasks of life planning, review, and management. According to Baltes and Smith, this type of knowledge allows a person to gather critical information about his or her current life narrative as well as past, present, and future goals. Tedeschi and Calhoun believe there is a strong mutually rewarding relationship between the development of posttraumatic growth and the development of wisdom. For example the appearance of posttraumatic growth can positively enrich one’s overall general wisdom about life; however, one’s general wisdom relating to life can also affect the way in which individuals utilize existing resources to cope with traumatic events, and thus influence the likelihood of posttraumatic growth occurring.

In theoretical work addressing the relationship between the development of both wisdom and posttraumatic growth, Linley (2003) supported Tedeschi and Calhoun’s conceptualization of the relationship between wisdom and posttraumatic growth. He
noted that wisdom is a fluid construct and that it can actually act as both a process and outcome variable in one’s struggle with a traumatic event. For example, Linley reported that growth in wisdom can be a result of one’s struggle with a traumatic event. However, he also stated that one’s present level of wisdom can have an influence on how successfully a person copes with a traumatic event by influencing an individual’s initial reactions and processing of a traumatic event. In order to fully understand the role that wisdom plays in someone’s reaction to a traumatic event, Linley stated that one has to fully explore all 3 dimensions of wisdom identified in the literature including: (a) recognition and management of uncertainty, (b) integration of affect and cognition, and (c) recognition and acceptance of human limitations.

Linley (2003) noted that the first dimension, recognition and management of uncertainty, relates to an individual’s ability to display openness to the uncertainty and change that characterizes one’s world. According to Linley, this openness is primarily exemplified through one’s ability to develop with and show a receptivity to change instead of working against it. The second dimension, integration of affect and cognition, is based on an individual’s ability to achieve a sense of “connected detachment” (Linley p. 605). Individuals achieve a sense of “connected detachment” when they are able to recognize and experience their emotions and somatic concerns without allowing these concerns to overwhelm them. In other words, a person utilizes his or her cognitive abilities to temper the intensity of the emotions and to act in an informed and appropriate manner that still recognizes and accepts the emotions, but does not permit these feelings to fully govern one’s response. The final dimension Linley identified is recognition and acceptance of human limitations. The author noted that this dimension is based on an
individual’s ability to comprehend and accept the finite nature of his or her existence. Ultimately, Linley reported that once individuals accept this reality, they may be able to develop a sense of generativity, moving beyond concerns focused solely on themselves and instead focusing on the well-being of others.

Enduring Distress

The final area of Tedeschi and Calhoun’s model (2004) (see Figure 1) examines the relationship between posttraumatic growth and the level of enduring psychological distress or upset related to one’s struggle with the traumatic event. The authors have identified that in their model the presence of growth does not equal the absence of distress. This assertion has been supported by research surrounding posttraumatic growth, including but not limited to studies done with cancer survivors (Cordova et al., 2001; Widows et al., 2005) caregivers of those with disease (Bower et al., 1998; Cadell, 2003) and survivors of the war in Bosnia (Powell et al., 2003). Tedeschi and Calhoun reported that they believe that this presence of some enduring level of psychological distress can play a valuable role in the continued development and maintenance of posttraumatic growth, for it can serve as a reminder of the growth gained from the struggle or as an impetus for individuals to continue to challenge and revise their schemas, values, and life narrative. As stated early, research surrounding the relationship between posttraumatic growth and level of psychological distress has been mixed, with some studies finding significant positive relations (Cadell et al., 2003; Calhoun et al., 2000; Sears et al., 2003), significant negative relations (Frazier et al., 2001), or no significant relations between the variables (Cordova et al.; Widows et al.). Future
research is needed to clarify the nature of the relation between the development of posttraumatic growth and the presence of some enduring psychological distress for trauma survivors.

Posttraumatic Growth in the Literature

Since Tedeschi and Calhoun first introduced the concept of posttraumatic growth into the psychological literature in 1995, its applicability and generalizability has been tested with a variety of different populations. Specifically, these populations are: individuals diagnosed with HIV disease and those caring for them, survivors of abuse, individuals diagnosed with cancer and their caregivers, bereaved parents, and survivors of an assault, violent acts, or an accident. Research related to each of these areas will be discussed below.

Individuals Diagnosed with HIV Disease and Those Caring for Them

Bower et al. (1998) examined the effect that finding meaning in one’s struggle through the loss of a friend or partner with HIV disease could have on one’s individual health. The authors interviewed 40 men who were part of the Natural History of AIDS Psychosocial Study. The Natural History of AIDS Psychosocial Study was constructed to explore the effects of psychosocial factors on the psychological adjustment, health, and behavior of gay and bisexual men who had AIDS. The participants had to have lost either a close friend or partner to AIDS, had to be HIV seropositive for at least two years prior to the interview, and were not diagnosed as having AIDS. Transcripts from the semi-structured interview were reviewed and responses were coded as “discovery of meaning”
responses if the participant talked about a major shift in values, priorities, or perspectives in response to their struggle to cope with the loss. Through this semi-structured bereavement interview, it was found that 16 individuals (40%) reported some “discovery of meaning” as a result of their struggle with the loss. Participants who reported finding new meaning noted that they now had a greater appreciation for loved ones, an enhanced sense of living in the present, a belief that life is fragile and precious, a renewed commitment to enjoying life, and a stronger sense of spirituality or faith. Findings also indicated that over a two to three year follow-up, individuals who found new meaning from their struggle exhibited a significantly slower rate of CD4 T-Lymphocyte decline than those individuals who did not experience this discovery. Furthermore, during the four to nine year follow up period, individuals who were able to find new meaning from their struggle experienced a significantly lower rate of AIDS-related mortality.

Cadell et al. (2003) worked with 176 caregivers of patients with the disease who had one of the individuals they were taking care of die. The authors examined the relationship between posttraumatic growth and one’s level of spirituality, social support, traumatic stress, and depression. Utilizing structural equation modeling, the authors hypothesized that both spirituality and social support would have a significant direct positive effect on one’s level of posttraumatic growth experienced. They also predicted that level of distress (as measured by utilization of avoidance behaviors and experience of depressive symptoms) would have a significant direct negative effect on posttraumatic growth scores. Results supported the first two hypotheses, such that greater levels of social support ($\gamma = .21$) and spirituality ($\gamma = .06$) led to higher levels of posttraumatic growth.
growth experienced. A significant direct positive effect was also found for the third hypothesis, suggesting that the greater the level of depressive symptoms experienced ($\lambda = 0.33$) and avoidance behaviors that individuals engaged in ($\lambda = 1.05$) the more posttraumatic growth they also experienced.

Survivors of Abuse

Woodward and Joseph (2003) interviewed 29 adults who had experienced a form of early childhood emotional, physical, or sexual abuse. Specifically the authors wanted to explore how themes relating to posttraumatic growth emerged from individuals’ personal narratives. Using an idiographic approach, the authors identified three central themes that emerged from these 29 narratives: (a) Inner Drive Toward Growth, (b) Vehicles of Change, and (c) Psychological Changes. The positive changes that were reported within these 3 themes covered examples of positive growth in all five of the potential growth domains suggested by Tedeschi and Calhoun (2004).

Individuals Diagnosed with Cancer and their Caregivers

Cordova et al. (2001) wanted to determine if there were differences in depression, well-being, and posttraumatic growth between adult women who had survived breast cancer as compared to those who had never had breast cancer. In order to do this the authors matched 70 women who were survivors of breast cancer with 70 women who had never had cancer on age and educational level. Cordova et al. found no difference between the women’s scores on levels of depression and well-being; however, those women who had survived breast cancer displayed significantly higher PTGI scores ($d = .31$) compared to women who never had breast cancer. Specifically, breast cancer
survivors showed significantly higher levels of growth in 3 of the 5 domains of growth purported by Tedeschi and Calhoun (2004), including Relationships with Others, Spiritual Growth, and Appreciation for Life

Sears et al. (2003) interviewed and followed 92 women who had early stages of breast cancer through treatment and at three and 12 months post-treatment. All women completed measures for benefit finding, positive reappraisal coping, and posttraumatic growth. Sears et al. reported that 83% of the women in the study identified at least one benefit from their struggle with breast cancer, with a mean number of 2.62 ($SD = 2.07$) benefits listed. When examined collectively, the benefits shared by the participants covered all five of the potential domains of growth identified by Tedeschi and Calhoun (2004). Utilizing multiple regression analysis, the authors also found that higher levels of growth were predicted by longer duration of time since initial diagnosis and greater levels of stress related to the experience with cancer (as assessed by examining avoidance behaviors, level of intrusive thoughts, and overall perceived level of stress). Although Sears et al. noted that posttraumatic growth, positive reappraisal coping, and benefit finding share some theoretical similarities, they suggested that their findings also supported the idea that these concepts possess some unique, separate, and distinct properties. This assertion is supported by the fact that each of the three variables had unique and distinct predictors. Specifically, level of perceived cancer stress and duration of time since diagnosis predicted posttraumatic growth, education standing and one’s level of optimism predicted benefit finding, and one’s level of hope predicted positive reappraisal coping.
Weiss (2004) examined the prevalence of posttraumatic growth for husbands whose wives were breast cancer survivors. Results indicated that growth for the husbands was significantly and positively correlated with perceived level of social support, the positive qualities found in the marital relationship, greater level of depth and commitment in the relationship, and one’s significant other’s level of posttraumatic growth. Results also suggested a significant interaction between level of posttraumatic growth, as measured by the PTGI, and distress level. Specifically husbands whose experience with their wives’ cancer met DSM-IV (1994) trauma criteria displayed significantly higher means of posttraumatic growth ($d = .71$) than those who’s struggle with their wives’ cancer did not meet DSM-IV trauma criteria.

Widows et al. (2005) searched for predictors of posttraumatic growth by conducting a longitudinal study with cancer patients who had undergone bone marrow transplantation. All 72 participants in the study had to be greater than 18 years old, be at least 6 months post-operation, and have no clinical evidence of the cancer returning. Participants in the study had a mean score on the PTGI of 64.7 ($SD = 21.3$), which the authors noted was similar to a PTGI mean scores found in a study with breast cancer survivors (Cordova et al., 2001; PTGI $M = 64.1$, $SD = 24.8$). Widows et al. (2005) reported that only educational level ($r = -.37$) and age ($r = -.23$) had a significant association with posttraumatic growth. Specifically, the authors noted that individuals who were younger and less well-educated tended to exhibit higher levels of growth. Widows et al. also noted that that there was no significant relation found between level of psychological distress and pre-or post-transplant posttraumatic growth scores.
Bereaved Parents

Polatinsky and Esprey (2000) administered the PTGI to both men and women who were experiencing bereavement after the death of a child. Perceived growth was reported for both men ($M = 79.72$, $SD = 19.50$) and women ($M = 83.47$, $SD = 20.21$), with no significant differences found between their scores. Also, across the full sample, evidence was found to support growth in all five of the potential domains specified by Tedeschi and Calhoun (2004), with the highest level of growth focused on closer, more intimate and meaningful relationships with others.

Survivors of an Assault, War, Violent Act, or an Accident

Snape (1997) explored the relationship between posttraumatic growth and the level of stress associated with a specific traumatic event for a population of individuals who had either experienced an assault or some type of accident. Snape utilized the PTGI and the Impact of Events Scale (IES) (Horowitz, Wilner, & Alvarez, 1979) with 53 individuals who were admitted to a trauma/orthopedic ward of a hospital after experiencing either an assault or an accident. Specifically, 24 individuals in the sample were in a traffic accident, 15 had been assaulted, and 14 encountered another type of accident. Snape reported a significant positive association between PTGI and IES scores at both two ($r = .48$) and four ($r = .46$) months after the traumatic event. Results indicated that higher levels of stress related to a traumatic event are associated with greater levels of posttraumatic growth.

Powell et al. (2003) investigated whether evidence for posttraumatic growth could be found in individuals who were exposed to a chronic stressor, specifically the war in
former Yugoslavia from the years 1991-1995. In order to do this, the authors created a Bosnian translation of Tedeschi and Calhoun’s (1996) PTGI and administered this to two groups of individuals. The first group was comprised of 75 individuals who took refuge in countries outside of former Yugoslavia for at least 7-12 months, during the years of 1991-1995. The second group consisted of 75 individuals who remained in former Yugoslavia during 1991-1995 and were then displaced due to the destruction caused by the war. Powell et al. noted that former refugees evidenced significantly greater levels of posttraumatic growth ($d = .37$) than those who remained in Sarajevo throughout the war. Through the use of exploratory principal component analysis and regression, the authors also found that for this sample a three-component solution for the domains of growth fit better than did the five-factor solution identified by Tedeschi and Calhoun (1996). Powell et al. identified these new domains as “A Changed Sense of Relationship with Others,” “Changed Philosophy of Life,” and “Changes in Self/Positive Life Attitude.”

Tedeschi (1999), in a theoretical article, noted that the concept of posttraumatic growth can also be applied to individuals who have survived an act of violence. He reinforced the positive qualities of referring to individuals who experienced a single or series of violent acts as “survivors” instead of “victims” due to the fact that “survivors” implies that these individuals have the chance to take an active role in their own healing and coping process. Furthermore, Tedeschi indicated that “survivors” of violence may also experience many of the same cognitive and emotional reactions (disengagement, blaming, automatic and effortful ruminations, narrative identity development) that survivors of other types of traumatic events encounter on their path to achieving posttraumatic growth. Tedeschi also suggested that, at times, the consequences of an act
of violence (e.g., war, terrorism) can have such a profound societal impact that positive growth can be seen on a societal level. For example, he noted the profound influence that the group of women in Mothers Against Drunk Driving have had on societal laws related to driving behaviors.

It is important to note that, thus far, the construct of posttraumatic growth has not been examined with a population younger than 18-year-old college students. Tedeschi and Calhoun (2004) addressed this fact and suggested that people are more likely to experience growth after they enter into older adolescence because they have already established schemas by this time. They also suggested that young adults may be the best candidates to experience posttraumatic growth because although they have already created a set of schemas, there is still an element of flexibility associated with these beliefs and perspectives.

As is evident in the above literature review, the applicability of the construct of posttraumatic growth has begun to be examined in a variety of different populations and contexts. In summary, researchers have mixed and conflicting results for the structure of Tedeschi and Calhoun’s (2004) model of posttraumatic growth (Cadell et al., 2003); however, evidence of growth in all five domains has been found (Woodward & Joseph, 2003). Positive associations between posttraumatic growth and social support (Cadell et al.), spirituality (Cadell et al.), physical health (Bower et al., 1998), and partners’ levels of posttraumatic growth (Weiss, 2004) have been reported. Furthermore, research findings have indicated a negative association between posttraumatic growth and age and education level (Widows et al., 2005). The strength of these significant correlations have ranged from $r = .23$ (Widows, et al., 2005) to $r = .48$ (Snape, 1987), indicating weak
medium relations. Research has also shown that in some studies individuals who endured some type of traumatic event display significantly higher levels of posttraumatic than those who did not (Cordova et al., 2001; Weiss, 2004). For the studies where this was found, these differences produced $d$ values ranging from $d = .31$ to $d = .71$, indicating small to medium effect sizes. In addition, conflicting results have been produced from empirical studies examining the relation between one’s level of posttraumatic growth and psychological distress (Cadell et al.; Weiss).

In addition to some of the conflicting research regarding the structure of Tedeschi and Calhoun’s PTG model (2004) and the significant difference between PTGI scores for individuals who did and did not report experiencing a traumatic event, Tedeschi and Cahoun (2004), noted that there are other gaps in the research literature that need to be explored. Most notably, Tedeschi and Calhoun (2003) have suggested that research should focus on clarifying the relations between posttraumatic growth and the personality variables that help an individual successfully cope with the trials and tribulations of a traumatic event.

Related Personality Characteristics

Tedeschi and Calhoun (1995) continued to emphasize that not everyone who experiences a traumatic event encounters growth as a result of the struggle. However, for those individuals who, after their struggle with a traumatic experience, achieve a sense of growth, many questions exist that focus on exactly what factors help them survive the stress associated with a traumatic event. Tedeschi and Calhoun suggested that particular personality characteristics may play a vital role in helping an individual navigate through
a crisis and thus have a better chance of experiencing growth. The authors highlighted six core personality features that may help someone endure a traumatic event and hopefully discover a sense of growth from this struggle. These personality features are hardiness (Kobasa & Pucetti, 1983) sense of coherence (Antonovsky, 1987), resilience (Major, Zubek, Cooper, Cozzarelli, & Richards, 1997), optimism (Scheir & Carver, 1985), locus of control (Rotter, 1966), and self-efficacy (Bandura, 1982). Tedeschi and Calhoun (2004) noted that, conceptually, these six personality factors share an important common theme with posttraumatic growth in that they all focus on the process of how a person experiences and deals with traumatic events. However, they also differ from posttraumatic growth on their final goal for the individual. That is, the final goal for the six personality variables focuses on how an individual “withstands or bounces back” (Calhoun & Tedeschi, 2000, p. 136) from highly stressful and demanding situations and returns to his or her baseline level of functioning. In contrast, the authors noted that the final goal for posttraumatic growth is to reach a higher level of functioning than he or she was at before encountering the trauma. The next section examines the core properties associated with these six personality variables and their conceptual relationship with posttraumatic growth.

Hardiness

The first of these personality variables is the construct of hardiness. According to Kobasa and Pucetti (1983), an individual with a hardy personality has three core traits. The first of these is a sense of control over life’s challenges and the ability to look for a way to establish control in a situation instead of being left feeling helpless. Second, an
individual with a hardy personality exhibits a tendency to see difficulties in one’s life as challenges, rather than threats (Maddi & Hightower, 1999). The person will often strive to learn from his or her life experiences, both positive and negative. Third, a hardy individual will also exhibit a commitment to life tasks. Because the individual tends to be committed to various life tasks, he or she will be more likely to struggle through threats and difficulties (Folkman, 1984). Because these commitments often hold personal meaning, he or she will be more likely to search for meaning from his or her endeavor, even in the face of difficulty (Tedeschi & Calhoun, 1995).

Both Maddi and Khoshaba (1994) and Wiebe (1991) suggested that the three qualities that hardy individuals exhibit help them to engage in a special style of coping and social support exploration that further helps them to effectively manage their reactions to trauma. For example, hardy individuals tend to cope effectively by viewing difficulties in a broader perspective, thus helping isolated events to not seem as devastating as they could be (Maddi & Khoshaba). This ultimately enables them to gain a deeper understanding of the problem and, consequently, leads them to a better realization of what needs to be done in order to return to or maintain their baseline level of functioning. Also, hardy individuals tend to engage in a special pattern of receiving and giving social support that is characterized by assistance and encouragement instead of overprotection and competition, thus helping them find supportive resources when dealing with a trauma. Ultimately, all of the characteristics that underlie a hardy personality help to act as a buffer against stressful situations and work to minimize overwhelming emotional reactions so that individuals can engage in a more active style
of coping and return to their original level of functioning after enduring a traumatic event (Tedeschi & Calhoun, 1995).

Sense of Coherence

The second personality characteristic that is hypothesized to be linked to helping individuals cope with traumatic events is sense of coherence (Tedeschi & Calhoun, 1995). Antonovsky (1987) and Hobfoll (2002) suggested that a person who exhibits a sense of coherence recognizes that stress is omnipresent and that if one responds to it in a favorable manner, then the experience of dealing with the stress can be seen as beneficial. Hobfoll indicated that one’s sense of coherence often holds an existential feel, for people tend to believe that there are forces that influence their life (God, the government, or fate) but that these forces are benevolent and still leave some margin of control at the individual level.

Both Antonovsky (1987) and Hobfoll (2002) identified three qualities that a person with a sense of coherence possesses in order to perceive stressful events in a positive and productive manner and to maintain or return to the pre-event level of functioning. The first is that the person believes in comprehensibility. This denotes that a person ultimately sees events in life, whether positive or negative, as orderly and able to be explained. Second, individuals have a sense of manageability. According to Antonovsky, these individuals believe that they will have the resources to handle most stressful events, not just through their own power, but they will also have resources available from other people and organizations. Finally, a person who has a sense of coherence also possesses a feeling of meaning. That is, he or she holds a belief that
demands and challenges are worthy of investment and engagement and that meaning can be found even in undesirable events. Antonovksy noted that the last trait is the most critical of the three qualities, for without the presence of feelings related to meaning, the other two qualities will have no practical utility.

Antonovsky (1987) also indicated that for any of these three qualities to positively contribute to one’s experience in life, the individual must be first able to derive meaning in four spheres. These four spheres include inner feelings, interpersonal relationships, one’s principal activity, and existential concerns. Accordingly, one’s inability to derive meaning in these four spheres will negate the ability to establish a sense of coherence and to maintain or reestablish the current level of functioning in the face of a traumatic event.

Resilience

A resilient personality is the third characteristic that is believed to help individuals cope with stressful and traumatic events (Tedeschi & Calhoun, 1995). Green (1986) defined a resilient person as someone who is able to accept his or her own weaknesses while embarking on “achievable ventures” (p. 278). Rutter (1987) and Garmezy (1985) both stressed that a resilient individual has both internal factors and environmental influences that help him or her maintain this approach. Specifically, Rutter noted that a resilient individual possesses both a developed sense of self-esteem and self-efficacy. Major et al. (1997) further defined the personality of a resilient individual as possessing three central characteristics. The authors noted that these individuals have positive views of themselves, a perceived sense of control over their lives, and a positive outlook on the future. Werner (1984) noted that this positive attitude may be attributed to role models
that play a part in a resilient individual’s life. He reported that these role models show how to help and nurture others, believe that life makes sense, and hold a belief that life ultimately works out. Garmezy, also when examining the role of positive environmental influences, suggested that it is not necessarily the pleasant environmental interactions that foster a resilient attitude, but rather situations where someone is forced to engage a particular stressor and successfully resolve this encounter. Ultimately, Major and colleagues (1997) summarized the benefit of a resilient personality by stating that resilient individuals are more likely to preserve or return to their current healthy level of functioning because they have a more positive appraisal of stressful situations and thus can better adjust to the particular struggles associated with each situation.

Optimism

The fourth trait that the authors identified was a person’s level of optimism (Tedeschi & Calhoun, 1995). Optimism is defined as maintenance of hope across many life situations or the generalized expectancy that good things will happen (Scheir & Carver, 1985; Tiger, 1979). Optimism, unlike the previously mentioned three personality styles, focuses primarily on the outcome of an event and not necessarily on how one navigates through a traumatic event or crisis. Both Tedeschi and Calhoun (1995) and Scheier, Weintraub, and Carver (1986) indicated that optimists tend to use an active coping style, are usually able to focus on the positive aspects of their situation, and thus can redirect their energy toward finding ways to deal with or solve the presenting problem. This approach to stress is utilized in order to help individuals maintain or reestablish their current level of functioning and psychological health. However, it is
important for them to have a sense of optimism that is grounded in reality, for a person must be able to detect when defeat is inevitable and if it is a time when he or she should conserve his or her resources (Scheier et al., 1986). According to Scheier and colleagues, the ability to do this allows optimists to better accept an isolated defeat, since they tend to see most things in a positive light. Maddi and Hightower (1999) noted that if a person does not possess a realistic sense of optimism, he or she runs the risk of exhibiting a ‘knee jerk’ optimistic reaction to a situation without really understanding or actively coping with the current situation. Tedeschi and Calhoun (1995) in their work with undergraduate college students in an introductory psychology class, suggested that there is some evidence that individuals who are optimistic perceive a greater sense of growth after a trauma and that this growth can further breed more optimism. However, they note that this relation is weak enough \( r = .23 \) to indicate that other variables are also involved in this process and that further research needs to be completed in this area.

**Locus of Control**

Tedeschi and Calhoun (1995) also identified locus of control as a personality variable that may help one positively cope with traumatic situations and maintain his or her current level of functioning. Rotter (1966) noted that locus of control is defined as the process through which one examines his or her beliefs about the nature of the world and, based on this assessment, to what degree the individual perceives reinforcement to be controlled either internally or externally. Specifically, Rotter stated that a person’s locus of control is a function of whether he or she attributes the cause or control of an event to either him or herself or the external environment. Rotter subjugated locus of
control into two different types: internal locus of control and external locus of control. Individual’s with an internal locus of control tend to see themselves affecting the outcome of various events; whereas, those with an external locus of control tend to attribute the outcomes that take place to the actions of other people, chance, or fate. According to Rotter, one’s locus of control becomes particularly important when an event possesses ambiguous qualities, for this leaves a great deal of room for individual interpretation. Ideally a person’s locus of control should fall somewhere in the middle of the continuum between the extreme ends of external and internal levels of control (Rotter). If a person has an extreme level of external locus of control, that individual is more likely to perceive no relation between his/her actions and an event’s outcome (Strickland, 1989). However, if a person has an extremely high level of internal locus of control, he or she may not be able to handle the unexpected and variable nature of a traumatic event or crisis situation. Therefore, a person who can understand both his or her personal impact and the variable nature of a situation, will ultimately cope the most effectively and have the best chance to maintain or return to his or her previous level of functioning (Strickland).

Self-Efficacy

Finally, the last personality variable that Tedeschi and Calhoun (1995) discussed in relation to leading to successful and adequate coping was one’s sense of self-efficacy. Self-efficacy is defined as one’s perception that he or she can successfully perform certain behaviors required to deal with prospective situations (Bandura, 1982). Bandura purported that there is a cyclical nature often associated with self-efficacy, such that the
more effort one employs the greater the likelihood of success, and that this success may lead to an increase in one’s sense of self-efficacy. As with resiliency, role models also play a vital role in helping to impart and influence one’s level of self-efficacy. Bandura stated that individuals high in self-efficacy tend to believe that their efforts aimed toward a problem will be rewarded and this is reinforced by the fact that they engage in a specific type of behavior called “assured opportune action” (p. 140). Conversely, he stated that those with low levels of self-efficacy tend to focus on perceived ineffectiveness, magnification of threats, and often worry about things that may not happen. He noted that, often, these individuals are left feeling despondent, apathetic, and devalued.

Bandura (1982) also suggested that one’s level of self-efficacy plays a pivotal role in coping with stressful events. That is, the anxiety associated with an outcome from a trauma is not a product of the situation itself, but develops from one’s perceived inability to adequately handle the event. Bandura suggested that, ideally, individuals will have a balanced sense of self-efficacy. He stated that this balanced sense of self-efficacy allows individuals to actively engage a threatening situation when they have enough efficacy to deal with it, and enough awareness to realize that they can withdraw when an event produces a higher level of arousal than they are prepared to deal with. Ideally individuals will be able to return to the situation when their anxiety level decreases.

As noted above, the six personality variables of hardiness, sense of coherence, resilience, optimism, locus of control, and self-efficacy, play an invaluable role in helping individuals cope with a traumatic event and to reestablish their baseline level of functioning. As the literature review illustrates, there is a clear theoretical similarity among these six variables and the construct of posttraumatic growth around the fact that
all of these constructs relate to how a person copes with a traumatic event. However, there also appears to be some theoretical differences among the final goals for the six personality variables and posttraumatic growth. Besides a study completed by Tedeschi and Calhoun (1996) examining the relation among posttraumatic growth and optimism, there is no research examining the empirical relations between the six personality variables and posttraumatic growth. The goal of this study to address this gap in the literature surrounding the construct of posttraumatic growth and to explore empirically the relation between posttraumatic growth and the six personality variables of hardiness, sense of coherence, resilience, optimism, locus of control, and self-efficacy.

Purpose of the Study

As Tedeschi and Calhoun (1995, 2003, 2004) and Calhoun and Tedeschi (2000) noted, these six personality variables of hardiness, sense of coherence, resilience, optimism, locus of control, and self-efficacy play a pivotal role in helping an individual navigate through the emotional turmoil associated with traumatic events. After examining each of these constructs, it is clear that, conceptually, these six personality factors do share a common theme with posttraumatic growth, they all focus on the process of how a person experiences and deals with traumatic events. However, they also differ theoretically from posttraumatic growth on their final goal for the individual. Calhoun and Tedeschi stated that the final goal for the six personality variables focuses on how an individual bounces back from highly stressful and demanding situations without developing permanent “deficiencies or psychological problems” (p. 136); in essence returning to their baseline level of functioning. However, the concept of
posttraumatic growth relates to how an individual can take his or her experience with a traumatic event and use the struggle to reach a higher level of functioning than he or she was at before the trauma occurred. As Calhoun and Tedeschi (2000) noted, these differences are clear conceptually, but beyond Tedeschi and Calhoun’s (1996) study examining the relationship between posttraumatic growth and optimism, little work has been done to determine whether these same differences exist empirically. The purpose of this research was to follow the recommendations of Tedeschi and Calhoun (1995, 2003, 2004) and Calhoun and Tedeschi and explore this opening in the empirical literature surrounding posttraumatic growth. In addition, due to some of the conflicting findings regarding the internal domain structure of posttraumatic growth, this research also aimed to explore the underlying structure of the PTGI. These two goals were accomplished by examining the construct validity of posttraumatic growth through the following research hypotheses:

Research Hypotheses

Hypothesis 1: Confirmatory factor analysis will indicate that the Posttraumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996) will satisfactorily fit Tedeschi and Calhoun’s (2004) hypothesized five domain structure for posttraumatic growth.

Hypothesis 2: As a result of the conceptual similarities among posttraumatic growth and the six personality variables, it was hypothesized that there will be a positive relation found between these constructs. Specifically:

H2a: Participants’ total hardiness score will be positively associated with their total posttraumatic growth score.
H2b: Participants’ sense of coherence score will be positively associated with their total posttraumatic growth score.

H2c: Participants’ total optimism score will be positively associated with their total posttraumatic growth score.

H2d: Participants’ total resilience score will be positively associated with their total posttraumatic growth score.

H2e: Participants’ self-efficacy score will be positively associated with their posttraumatic growth score.

H2f: Participants’ locus of control score will be positively correlated with their posttraumatic growth score.

Hypothesis 3: Even though there are conceptual similarities between posttraumatic growth and the six personality variables, it was hypothesized that one’s total PTGI score will be measuring a construct that is unique and distinct from the constructs that the other six personality variables will examining. This hypothesis was examined through the use of exploratory factor analysis of the total scale scores for the primary research variables. It was hypothesized that one’s total PTGI score will load onto its own unique factor. Specifically this means that this factor will not contain significant cross-loadings ($r \geq .40$) from the other six personality variables.

Additional Variable: Religious and Existential Questioning

As Tedeschi and Calhoun (2004) indicated, spiritual growth is one of the five potential domains of growth that an individual may experience after his or her struggle with a traumatic event. As noted previously, they defined this domain as the development
of a greater sense of “existential awareness” (p. 160) and a deeper need for spiritual connection to help an individual create a sense of meaning and understanding in life. In 1991 Batson introduced the Quest Scale. Specifically, Batson, Schoenrade, and Ventis (1993) noted that the Quest scale measures, “the degree to which an individual’s religion involves an open-ended, responsive dialogue with existential questions raised by the contradictions and tragedies of life” (p. 169). Due to the conceptual similarities, relating to an existential search surrounding one’s religion and spirituality, between the Quest Scale and the spiritual growth domain, additional exploratory analysis will be conducted to examine the nature of their relation. Also, since the theory of posttraumatic growth and the Quest Scale share a theoretical emphasis on one’s search for existential meaning as a result of his or her struggle with a traumatic event, their relation will also be examined.
CHAPTER III
METHODOLOGY

This chapter describes the method that was utilized to explore the research questions surrounding posttraumatic growth and its relation to the six previously mentioned personality variables. Specifically, the research design, participants, data collection methods, and measurement instruments are reviewed. The chapter concludes with a description of the research hypothesis and the statistical procedures used to test them.

Research Design
The research design used in this study was a non-experimental survey with convenience sampling. The number of participants for the exploratory factor analysis was based on Hatcher’s (1994) recommendation of the larger of 100 participants or five times the number of variables being analyzed. One hundred and eighty-nine participants completed the surveys and this number satisfies the criteria established for the seven variables analyzed in the exploratory factor analysis. This number of participants also satisfies Hatcher’s (1994) recommendations for confirmatory factor analysis. Each participant completed a demographic data form, the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996), the Life-Orientation Test Revised (LOT-R; Scheier,
Carver, & Bridges, 1994), the Sense of Coherence Scale (SOC-29; Antonovsky, 1993), the Personal Views Survey 3rd Edition Revised (PVS-III-R; Maddi & Koshaba, 2001), the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003), the Adult Nowicki-Strickland Internal-External Control Scale (ANS-IE; Nowicki & Strickland, 1972; Nowicki & Duke, 1973), the General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995), and the Quest Scale (Batson & Schoenrade, 1991). As a result of the fact that specific questions on the PTGI, that fall under the Appreciation for Life domain, are significantly associated with social desirability ($r = -.15$, Tedeschi & Calhoun, 1996), participants were also asked to complete a measure of socially desirable responding (Balanced Inventory of Desirable Responding; BIDR; Paulhus, 1984, 1990). For participants who reported experiencing a traumatic event, they also completed the Impact of Events Scale Revised (IES-R; Weiss & Marmar, 1997). Inclusion into the final sample required that participants have completed all of the measures.

Participants

Participants in this study were undergraduate and graduate college students and community members. All individuals were recruited through a convenience sampling procedure. The total sample included 276 participants with a mean age of 35.6 ($SD = 13.8$). Of the 276 participants, 131 were undergraduate and graduate college students, 128 were community members, and 17 did not report this information.

Participants were undergraduate psychology students, graduate students at various levels of doctoral training as well as community members and professionals. Undergraduate psychology students were recruited through fliers disseminated in their
classes, emails, and as well as by word of mouth by the professors in these classes. The undergraduate students at one particular university were able to earn one research credit point for their classes if they proceeded to the website to complete the survey. Participants were also recruited via departmental program listserv. A significant amount of community member involvement came from participants being encouraged to forward the email link to other graduate students and professionals whom they believed would be interested in the study. Examples of departments that received the email link through their listserv are Purdue University’s psychology department, the University of Akron’s psychology department, and the University of Akron’s counseling psychology program. In addition, participants emailed me and informed me that they had sent the link over their respective department listserv at the University of Kentucky, the University of Cincinnati, and Shippensburg University to name a few. Finally, individual participants informed me that they sent the link to other students and professionals that they knew personally. A complete description of the participants is included in Chapter IV.

Data collection for this study was completed through the use of an online survey, hosted by Survey Monkey. The email or flier to the potential participants included a brief description of the study as well as a link to the website that they could either click-on or type in their internet browser if they wanted to participate in the study. The first page of the web site contained a brief introduction to the study, an explanation of the steps to follow if an individual was completing the survey for extra credit, and details regarding what steps one would follow if he or she wanted to be entered into a drawing for a free i-Pod. At the end of the first page, participants were instructed to “Please click here to begin the survey” (see Appendix K). If individuals clicked on this link they were taken
to an Informed Consent Form that described the procedures surrounding participation as well as help-seeking resources individuals could utilize if participating in the survey caused them to experience emotional distress (see Appendix L). Should the participants agree to participate, they were instructed to click on the icon that stated “Yes, I wish to participate in the study.” After participants completed a brief demographic form and the measurement instruments, they were taken to a Debriefing Form that included a further description of the study as well as help-seeking resources that they could utilize (see Appendix M). Only participants who reported that they experienced a traumatic event completed the IES-R (Weiss & Marmar, 1997). Participants completed a slightly different version of the PTGI (Tedeschi & Calhoun, 1996) depending upon if they reported experiencing a traumatic event. For those participants who did experience a traumatic event, they were given the prompt “Indicate for each of the statements below the degree to which this change occurred in your life as a result of the crisis or life-altering event you identified above, using the following scale.” Those individuals who indicated that they did not experience a traumatic event, received the prompt “Indicate for each of the statements below the degree to which the specified changes occurred in your life over the past year, using the following scale.” At any point in the survey, participants had the option to quit the survey and they would immediately be taken to the Debriefing Form.

Prior to data collection, approval from the University of Akron Institutional Review Board (IRB) was obtained for the proposed research. The Informed Consent Form detailed the purpose of the study, any possible associated risks, the confidential and anonymous nature of the data collection, the right to withdraw from participation at any
time without penalty, and the right to contact the primary researcher and the University of Akron IRB with any questions regarding the study.

The Informed Consent Form stated that the estimated completion time would be approximately 20-30 minutes.

Measures

Participants were given a brief demographic information form to complete. They were asked to report their age, sex, self-identified race/ethnicity, year in school, major, and religious affiliation,

Posttraumatic Growth Inventory

Participants’ level of posttraumatic growth was measured by the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). The PTGI is a 21-item scale that assesses the level of positive outcomes that individuals have experienced after encountering a traumatic event. The items of the scale are a series of positively worded statements and participants are asked to use the statements to indicate the degree to which change occurred in their life as a result of their crisis. Participants respond on a 6-point Likert-type scale with anchors of 1 (“I did not experience this change as a result of my crisis”) and 6 (“I experienced this change to a very great degree as a result of my crisis”). Individuals’ scores are summed with higher scores indicating greater amounts of posttraumatic growth. The extent of the growth is assessed in five domains: (a) Relating to Others (7 items), (b) New Possibilities (5 items), (c) Personal Strength (4 items), (d) Spiritual Change (2 items), and (e) Appreciation of Life (3 items). Total scores from
each domain are added together to create a total PTGI score. In their validation study, Tedeschi and Calhoun (1996) administered the PTGI to 604 undergraduate psychology students. Through the use of varimax rotation and principal components analysis, the authors indicated that overall the 21 questions of the PTGI accounted for 62% of the common variance being measured. Each of the five domains contributed unique amounts of variance to the overall total score: (a) Relating to Others (17%), (b) New Possibilities (16%), (c) Personal Strength (11%), (d) Spiritual Change (9%), and (e) Appreciation of Life (9%).

Research supporting the five factor structure of the PTGI has been mixed. For example, Cadell, Regehr, and Hemsworth (2003) reported support for the factor structure of the posttraumatic growth model with their sample of 174 bereaved HIV caregivers. Through the use of confirmatory factor analysis, the authors indicated that overall the model and its five domains achieved satisfactory fit ($\chi^2(69) = 144.86$, $RMSEA = .08$, $CFI = .91$, $GFI = .88$, $AGFI = .82$, $NFI = .86$). However, a study by Powell, Rosner, Butollo, Tedeschi, and Calhoun (2003), with a study of 150 Bosnian war refugees, utilized a principal components analysis and revealed a three factor structure for the PTGI. These mixed findings regarding the factor structure of the PTGI will be further explored in this study.

In the empirical literature, mean total PTGI scores ranged from $M = 48.54$ ($SD = 23.00$) for war refugees in Bosnia (Powell et al., 2003) to $M = 83.16$ ($SD = 19.27$) for college students who experienced a traumatic event in the past year (Tedeschi & Calhoun, 1996). Tedeschi and Calhoun (1996) also noted that the PTGI exhibits good reliability and adequate construct validity. Specifically individuals’ total PTGI score
were significantly positively correlated with optimism ($r = .23$), religiosity ($r = .25$), Extraversion ($r = .29$), Openness to Experience ($r = .21$), Agreeableness ($r = .18$), and Conscientiousness ($r = .16$) (NEO-PI-R, Costa & McCrae, 1992). Tedeschi and Calhoun also reported that scores from the five domains of growth displayed significant positive correlations with expected variables: (a) Relating to Others and Optimism ($r = .14$), Extraversion ($r = .28$), Agreeableness ($r = .18$); (b) New Possibilities and Optimism ($r = .22$), Extraversion ($r = .16$), Openness ($r = .25$); (c) Personal Strength and Optimism ($r = .22$), Extraversion ($r = .15$), Openness ($r = .25$), and Conscientiousness ($r = .15$); (d) Spiritual Change and Optimism ($r = .17$), religious participation ($r = .50$), and Extraversion ($r = .26$); and (e) Appreciation of Life and Optimism ($r = .15$), and Extraversion ($r = .16$). The authors also noted that there was no association between individuals’ total PTGI scores and social desirability. Four out of five domain scores were not associated with social desirability. Appreciation for Life was significantly negatively associated ($r = -.15$) with social desirability, indicating that individuals with a greater appreciation for life are more likely to respond in a less socially desirable manner. Additionally, construct validity of the PTGI was evidenced by the fact that in a college student sample, individuals who experienced a severe trauma within the past year had significantly higher total PTGI scores ($d = .68$) than those who did not experience a traumatic event. During this study the authors modified the instructions of the PTGI to ask individuals to respond by rating, “the changes that had occurred to them during the past year”, in order to allow individuals who had not experienced a traumatic event to also respond. The Internal consistency reliability coefficients have been good with an $\alpha = .90$ for the total PTGI score and $\alpha$’s of .84, .85, .72, .85, and .67 for the New
Possibilities, Relating to Others, Personal Strength, Spiritual Change, and Appreciation of Life domains, respectively (Tedeschi & Calhoun). Test-retest reliability was also adequate for the total PTGI score with an $r = .71$ over a two month period. Test-retest reliability for three of the domains was adequate, with pearson product moment correlations ranging from $r = .65$ to $r = .74$ for New Possibilities, Relating to Others, and Spiritual Change. Personal Strength ($r = .37$) and Appreciation for Life ($r = .47$) had weak test-retest reliability. Cronbach’s alpha for this scale in the current study was .91. As indicated previously, there is mixed research regarding the internal domain structure of the PTGI. Prior to using the PTGI in subsequent analyses, the internal domain structure of the scale will be investigated in the current sample (see Hypothesis 1.).

Life-Orientation Test Revised

Participants’ level of optimism was measured by the Life-Orientation Test Revised (LOT-R; Scheier et al., 1994). The LOT-R is a 10 item self-report measure that assesses one level of dispositional optimism by asking an individual to endorse his or her level of agreement with a statement on a five point Likert-type scale. The scale is anchored with 0 “strongly agree” and 4 “strongly disagree” and it contains 3 positively and 3 negatively worded items (which are reverse scored) and 4 filler items. Participants’ scores can range from 0-24, with higher scores indicating greater levels of dispositional optimism. When the LOT-R has been used with a college population, specifically 2,055 undergraduate students in an introduction to psychology course, Scheier et al. reported a mean score of 14.33 ($SD = 4.28$).
Scheier et al. (1994) noted that the LOT-R displays adequate convergent and discriminant validity. Evidence for convergent validity was exemplified by significant positive correlations between individuals’ LOT-R scores and their scores for self-mastery \( (r = .48) \) and self-esteem \( (r = .50) \). Evidence for discriminant validity was displayed by significant negative correlations between individuals LOT-R scores and their anxiety \( (r = -.53) \) and Neuroticism \( (r = -.36) \) scores (NEO-PI-R, Costa & McCrae, 1992). Internal consistency reliability coefficients have been adequate and have ranged from \( \alpha = .74 \) to \( \alpha = .78 \) (Carver et al., 2005; Scheier et al., 1994). Test-retest reliability has also been shown to be adequate, ranging from \( r = .60 \) for one year to \( r = .24 \) for two years. Cronbach’s alpha for the scale in the current sample was .57, indicating a marginal level of reliability.

**Personal Views Survey 3rd Edition Revised**

Participants’ level of hardiness was assessed by the Personal Views Survey 3rd Edition Revised (PVS-III-R; Maddi & Koshaba, 2001). The PVS-III-R is an 18 item self-report instrument that measures the three core traits (commitment, control, and challenge) that Maddi (2002) noted contribute to a hardy personality. Maddi noted that one’s degree of commitment measures an individual’s willingness to stay involved with the people and events around him or her instead of retreating to isolation in the face of stress. An individual’s level of control assesses the extent to which one believes that his or her actions can influence the outcome of events. Finally, Maddi reported that one’s level of challenge measures the degree to which someone views life’s difficulties and change as opportunities to learn and grow from the struggle. Each core trait is assessed
by 6 self-report items with an equal number of positively and negatively worded items utilized for each. An example of a positively worded item from the commitment subscale is, “I often wake up eager to take up life wherever it left off.” An example of a negatively worded statement from this subscale is, “Most of what happens in life is just meant to be.” Participants use a 4 point Likert-type rating scale to identify the personal relevance of each statement. The PVS-III-R formulates a total hardness score as well as subscale scores for each of the 3 core traits (commitment, control, and challenge), with higher scores indicating a more hardy personality. Exploratory analysis of the PVS-III-R revealed that utilizing an overall score of hardness is the most reliable estimate and that one can view the 3 subscales as 3 first order factors formulating this concept (Maddi, Harvey, Khoshaba, Lu, Perisco, & Brow, 2006). Based on these results, only total hardness scores will be used in the current study.

Maddi et al. (2006) noted that the PVS-III-R has demonstrated adequate content and construct validity. Specifically, Maddi et al. noted that participants’ scores on the PVS-III-R were significantly positively related to creative and active coping styles ($r = .50$), perceived social support ($r = .38$), and to billable hours ($r = .30$) and global effectiveness in a business setting ($r = .30$). They also noted that significant negative relationships were seen between PVS-III-R scores and the experience of strain ($r = -.44$), endorsement of regressive and denial coping styles ($r = -.50$), experience of general anxiety ($r = -.33$), and endorsement of right-wing authoritarianism ($r = -.21$). Internal consistency reliability coefficients have ranged from $\alpha = .70$ to $\alpha = .85$ for the full scale score and $\alpha = .69$, .57, and .73 for the commitment, control, and challenge subscales,
respectively (Maddi et al., 2006). The Cronbach’s alpha for the PVS-III-R in this study was .78.

Sense of Coherence Scale

Participants’ level of sense of coherence was measured by the Sense of Coherence Scale (SOC-29; Antonovsky, 1993). The SOC-29 is a 29 item self-report instrument that results in a total sense of coherence score by assessing an individual in the three areas of comprehensibility, manageability, and meaningfulness. These subscales are composed of: (a) 11 items for comprehensibility, (b) 10 items for manageability, and (c) 8 items for meaningfulness. All responses are made on a seven point semantic differential scale with two anchoring responses. Examples of questions are: (a) “When you talk to people, do you have the feeling that they don’t understand you?” ( Anchoring responses: “never have this feeling, always have this feeling”) and (b) “When you have a difficult problem, the choice of the solution is?” ( Anchoring responses: “always confusing and hard to find, always completely clear”). Thirteen of the 29 items are formulated negatively and must be reverse scored. Responses to the 29 items are then summed, with higher scores indicating a stronger sense of coherence. Participants’ scores can range from 29-209. Normative mean scores ranged from 117 for 17 Czechoslovakian cancer patients, 129.5 ($SD = 24.5$) for 307 U.S. undergraduates, to 152.6 ($SD = 22.0$) for 148 hi-risk children in Sweden (Antonovsky). Even though the SOC-29 measures sense of coherence in 3 areas, factor analytic research has suggested that a single factor solution best represents the construct of sense of coherence (Antonovsky; Frenz, Carey, & Jorgensen, 1993). Based on these results, the total score will be used in the current study.
Antonovsky (1993) reported that the SOC-29 has adequate content and construct validity. Specifically, content validity was established by having three individuals, who are familiar with the theory, independently judge that each item on the scale only represented one of the 3 sense of coherence subscales. Antonovsky noted that each item was intentionally chosen to represent a distinct profile. Evidence for construct validity was established by examining the relationship between scores on the SOC-29 and other constructs, that according to theory, should be related. In a review of 42 studies, Antonovsky noted that there was a positive correlation between SOC-29 scores and self-esteem ($r = .63$), social skills ($r = .27$), social support ($r = .14$), and health and well-being ($r = .40$). Significant negative correlations were found between SOC-29 scores and one’s level of perceived stressors($r = -.32$) and anxiety ($r = -.61$). Internal consistency reliability coefficients have ranged from $\alpha = .72$ to $\alpha = .95$ (Antonovsky, 1993; Feldman & Snyder, 2005; Lustig, 2005). Test-retest reliability has also been shown to be adequate, ranging from $r = .52$ to $r = .78$ in one year follow-up studies (Antonovsky). The alpha coefficient in the current sample was .67, slightly below the generally accepted cut off of .70.

Connor-Davidson Resilience Scale

Participants’ level of resilience was measured by the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003). Specifically Connor and Davidson’s scale examines the extent to which one “embodies the personal qualities that enable him or her to thrive in the face of adversity” (p. 76). The authors based their definition of resilience on a thorough review of the literature in this area and they noted that resilience is a
multidimensional construct that takes into account one’s level of challenge, commitment, recognition of limits, engagement of others for support, secure attachment, personal or collective goals, self-efficacy, past success, ability to grow from stress, realism, sense of humor, action orientation, patience, tolerance of negative affectivity, adaptability, optimism, and faith. The CD-RISC contains 25 statements and participants are asked to indicate how true each statement has been for them over the past month. Responses are made on a 5-point Likert-type rating scale that has anchor points of 0-“not true at all” and 4-“true nearly all of the time.” Responses are summed and scores can range from 0-100, with higher scores reflecting greater levels of resilience. Initial factor analysis revealed five subscales for the measure: (a) Personal Competence/High Standards/Tenacity, (b) Trust in One’s Instincts/Tolerance of Negative Affect/Strengthening Effects of Stress, (c) Positive Acceptance of Change/Secure Relationships, (d) Control, and (e) Spiritual Influences. The subscales were not be used in this study, only the total score, because of the lack of reliability and validity information related to these scales.

Connor and Davidson (2003) noted that the CD-RISC has good convergent and discriminant validity. The authors reported that the CD-RISC was given to individuals in a variety of settings, including those in the general population, primary care outpatients, psychiatric outpatients in private practice, patients in a study for individuals struggling with generalized anxiety disorder, and patients in a study for those dealing with post traumatic stress disorder. Specifically convergent validity was demonstrated by significant positive correlations between individuals’ scores on the CD-RISC and their scores on measures of Hardiness ($r = .83$; Kobasa Hardiness Scale; Kobasa, 1979) and social support ($r = .36$; Sheehan Social Support Scale; Sheehan, 1990). Significant
negative correlations were seen between individuals’ scores on the CD-RISC and their scores on measures of perceived stress \((r = -.76; \text{Perceived Stress Scale; Cohen, Kamarck, & Mermelstein, 1983})\), stress vulnerability \((r = -.32; \text{Stress Vulnerability Scale; Sheehan et al., 1990})\), and disability \((r = -.62; \text{Sheehan Disability Scale; Sheehan, 1983})\). Discriminant validity was evidenced by the fact that there was no significant relationship found between individuals’ scores on the CD-RISC and their scores on the Arizona Sexual Experience Scale (McGahuey, Gelenberg, Laukes, Moreno, & Delgado, 2000).

Internal consistency reliability coefficients have been reported to be good. When the CD-RISC was administered to 577 individuals in the general population who were not seeking help, Connor and Davidson (2003) reported an internal consistency reliability coefficient of \(\alpha = .89\). The CD-RISC also displayed good test-retest reliability, with an \(r = .87\) for individuals with generalized anxiety disorder and post traumatic stress disorder who showed no significant clinical change between two consecutive visits. The alpha coefficient in the current sample was .91.

Adult Nowicki-Strickland Internal-External Control Scale

Participants’ locus of control was measured by the Adult Nowicki-Strickland Internal-External Control Scale (ANS-IE; Nowicki & Strickland, 1972; Nowicki & Duke, 1973). The ANS-IE is a 40 item measure that assesses individuals’ beliefs about the nature of the world and how reinforcement is controlled. Specifically, the ANS-IE examines whether a person attributes the cause or control of an event to either him or herself or the external environment. Each item is comprised of a question for which the individual is asked to respond with either a “Yes” or “No”. Example questions ask “Do
you believe that wishing can make good things happen?” and “When you get rejected, does it usually seem it’s for no good reason at all?” A total score is computed by assigning an individual points for each statement they selected that endorses an external locus of control perspective, with higher scores indicating a greater preference for an external locus of control and lower scores being indicative of a preference for an internal locus of control. Nowicki and Duke (1973) reported a mean score for college students of 79.60 ($SD = 6.21$) on the ANS-IE. Estrada, Dupoux, and Wolman (2006) indicated similar mean scores for college students with and without learning disabilities ($M = 70.35$, $SD = 4.23$).

Nowicki and Duke (1973) reported that the ANS-IE has demonstrated adequate construct validity. Specifically, Nowicki and Duke noted that they administered the ANS-IE and the Rotter I-E (Rotter, 1966) to two separate groups of college students. The authors noted that in both samples the strength of the positive association between the ANSI-IE and the Rotter I-E ($r = .68; r = .48$) indicates that the two scales are examining the same construct; however, the moderate strength of the association indicates that the ANS-IE assessed a unique portion of variance beyond that of the Rotter I-E. Research has also indicated that scores on the ANS-IE are not significantly related to social desirability (Nowicki & Duke) or intelligence (Nowicki & Duke). Current studies utilizing the ANSI-IE have found that an external locus of control has been associated with social and emotional adjustment in college students with ($r = .42; r = .66$) and without ($r = .56; r = .54$) learning disabilities (Estrada et al., 2006), and expression of physical aggression($r = .26$) (Hall, 2006). Furthermore, an internal locus of control, as measured by ANS-IE scores, has been significantly related to an increase in the ability to engage in self-
assessment and self-reflection \((d = .87)\) for eighth grade students who were assessed through the use of portfolios as compared to traditional classroom assessment methods (Ezell & Klein, 2003) and an increase in achievement orientation for young women completing a school-based social cognitive training program \((d = .25)\) (Manger, Eikelandt, & Asbjornson, 2002). Also, a significant positive association \((r = .44)\) between an internal locus of control and self-esteem has been reported (Furnham & Hughes, 1999). Split half internal consistency reliability coefficients (Cronbach’s alpha) have been reported to be low to adequate, ranging from .60 (Nowicki & Duke) to .86 (Madsen & Goins, 2002) and the ANS-IE also displayed adequate test-retest reliability, ranging from \(r = .81\) for one month to \(r = .56\) for one year (Madsen & Goins). Cronbach’s alpha for this scale in the current sample was .67, again, slightly below the generally recommended cut off value of .70.

General Self-Efficacy Scale

Participants’ degree of self-efficacy was measured by the General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995). The GSE is a 10-item measure that assesses one’s level of general self-efficacy. Schwarzer and Jerusalem noted that general self-efficacy examines global confidence in one’s ability to cope across a wide range of demanding or novel situations. All items on the scale are positively worded and responses are scored on a 4-point Likert-type scale (“1=not at all true, 2=hardly true, 3=moderately true, and 4=exactly true”). Examples of statements on the scale are, “Thanks to my resourcefulness, I know how to handle unforeseen situations” and “When I am confronted with a problem, I can usually find several solutions”. Participants’
scores can range from 10-40, with higher scores indicating greater levels of general self-efficacy. Mean reported GSE scores with a diverse pool of participants has ranged from 28.61(SD = 5.33) to 30.63(SD = 5.42) (Luszczynska, Scholz, & Schwarzer, 2005; Schwarzer, Mueller, & Greenglass, 1999). Results from factor analytic studies have shown that a single global score is the most accurate measure of general self-efficacy (Schwarzer, Born, Iwawaki, & Lee, 1997; Schwarzer et al., 1999).

The GSE has exhibited adequate reliability and validity with a diverse pool of participants (Schwarzer & Jerusalem, 1995). Specifically, participants’ GSE scores have been significantly positively correlated with greater quality of one’s emotional ($r = .32$), social ($r = .19$), and cognitive life ($r = .22$), active coping styles ($r = .27$), positive reframing($r = .32$), the use of humor ($r = .39$), and a fighting spirit ($r = .39$) (Luszczynska et al., 2005; Schwarzer, 1993; Schwarzer et al., 1999). Luszczynska et al. also reported that individuals with higher levels of GSE were more likely to engage in moderate amounts of exercise and eat a healthier diet. Research has also shown a significant negative correlation between participants’ GSE scores and their experience of depression ($r = -.36$), pain ($r = -.26$), fatigue ($r = -.20$), negative affect ($r = -39$), and engaging in blaming behavior ($r = -.12$) and behavioral withdraw ($r = -.22$) (Luszczynska et al., Schwarzer et al.). Internal consistency reliability coefficients have been reported to be adequate, ranging from .86 to .94 and test-retest reliability coefficients have ranged from .55 to .75 for one year and .47 to .63 for two year intervals (Luszczynska et al., Schwarzer & Jerusalem, 1994; Schwarzer & Jerusalem, 1995; Schwarzer et al.; Schwarzer, Boehmer, Luszczynska, Mohamed, & Knoll, 2005). The alpha coefficient for this scale in the current sample was .84.
Balanced Inventory of Desirable Responding

Participants’ tendency to engage in socially desirable responding was measured by the Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1984, 1990). The BIDR will be included due to the significant association ($r = -0.15$, Tedeschi & Calhoun, 1996) between social desirability and questions that create the Appreciation for Life domain on the PTGI. The BIDR examines socially desirable responding through two constructs: (a) self-deceptive positivity (tendency to give self-reports that are honest, but positively biased; measured by questions 1-20) and (b) impression management (deliberate self-presentation to an audience; measured by questions 21-40). The BIDR is composed of 40 statements and participants are asked to indicate how true each statement is for them. Examples of statements on the scale are, “My first impression of people usually turns out to be right” and “I am confident of my judgments”. Responses are made on a 7-point Likert-type rating scale that has anchor points of 1-“not true” and 7-“very true.” Responses are summed, with higher scores indicating greater levels of socially desirable responding.

The BIDR has exhibited adequate reliability and validity. Specifically, Paulhus (1984) noted that participants’ BIDR scores have significantly positively correlated with their scores on other measures of social desirability ($r = .71$ with the Marlowe-Crown scale and $r = .80$ with the Multidimensional Social Desirability Inventory). Internal consistency reliability coefficients for total BIDR scores have been reported to be good at $\alpha = .83$ (Paulhus). Furthermore, internal consistency reliability coefficients for the two subscales of the BIDR have been reported to be adequate, ranging from .60-.80 for the self deception scale and .75-.86 for the impression management subscale (Paulhus).
retest reliability for the self deception and impression management subscales has also
been reported to be adequate, with $r = .69$ and $r = .65$, respectively. Due to the fact that
Paulhus (1990) has found support for a two factor solution for social desirability, both the
self deceptive positivity and impression management subscale scores will be used.
Cronbach’s alpha for the BIDR total, self-deceptive positivity, and impression
management scales scores for the current sample were .78, .69, and .73, respectively.

**Quest Scale**

The extent to which an individual views his or her relationship with religion as a
quest, was measured by the Quest Scale (Batson & Schoenrade, 1991). Specifically,
Batson, Schoenrade, and Ventis (1993) noted that a quest is, “the degree to which an
individual’s religion involves an open-ended, responsive dialogue with existential
questions raised by the contradictions and tragedies of life” (p. 169). The Quest scale
focuses on three primary areas: (a) readiness to face existential complexities without
reducing their complexity (4 items), (b) self-criticism and perceptions of religious doubts
as positive (4 items), and (c) openness to change (4 items). The scale is composed of 12
items and responses are scored on a 7-point Likert-type scale (“1=strongly disagree to
7=strongly agree”). Examples of statements on the scale are, “I find religious doubting
upsetting” and “As I grow and change, I expect my religion also to grow and change”.
Participants’ scores can range from 12-84, with higher scores indicating greater levels of
engaging on a religious “quest.”

The Quest Scale has shown adequate reliability and validity with a diverse group
of participants. Specifically seminary students, those who are immersed in personal
religious exploration, have shown significantly higher levels ($p < .01$) of open religious
dialogue and exploration than a comparison group of college students (Batson & Vends,
1982). Similar findings have been found when comparing religious study groups that
have different emphasis. Ferriani and Batson (1990) noted that groups that place a
stronger emphasis on religious exploration and searching scored significantly higher on
the Quest Scale. In their review of the existing literature, Batson and Schoenrade (1991)
provided evidence for divergent validity of the Quest Scale, indicating that it exhibits no
significant relation with scales that measure other aspects of one’s religious beliefs, such
as the Intrinsic and Extrinsic scales (Allport & Ross, 1967). Batson and Schoenrade also
indicated that when conducting principal components analysis on these scales, research
has consistently shown that each scale loads onto its own unique factor. Internal
consistency reliability coefficients have been reported to be adequate, ranging from .71-
.83 (Batson & Schoenrade, 1991; Burris, 1999; Cottone, Drucker, & Javier, 2007;
for the Quest Scale in the current sample was .80.

Impact of Events Scale Revised

The degree to which a traumatic event physiologically, psychologically, and
emotionally impact an individual was measured with the Impact of Events Scale Revised
(IES-R; Weiss & Marmar, 1997). The IES-R is a 22 item scale that examines how
distressing each item has been for an individual over the past week. All responses are
scored on 5-point Likert-type scale (“0=Not at all, 1=A little bit, 2=Moderately, 3=Quite
a bit, 4=Extremely”). Current level of distress is measured in three main categories: (a)
intrusion (eight items), (b) avoidance (eight items), and (c) hyperarousal (six items). Participants’ total scale scores can range from 0-88, with higher scores indicating greater levels of current distress due to one’s experience with one or more traumatic events.

The IES-R (Weiss & Marmar, 1997) has exhibited adequate reliability and validity with a diverse population (Asukai et al., 2002). Specifically participants IES-R subscale scores have been significantly positively correlated with measures of anxiety (Intrusion, $r = .63$; Avoidance, $r = .58$; Hyperarousal, $r = .70$), depression (Intrusion, $r = .65$; Avoidance, $r = .53$; Hyperarousal, $r = .72$), and PTSD (Intrusion, $r = .81$; Avoidance, $r = .77$; Hyperarousal, $r = .74$) (Beck et al., 2008). Further research by Beck et al. has also shown that the IES-R adequately identifies individual with and without PTSD.

Internal consistency reliability coefficients have been reported to be adequate, ranging from .95-.96 for the total scale score, .87-.94 for Intrusion, .84-.87 for Avoidance, and .79-.91 for Hyperarousal (Creamer, Bell, & Faillia, 2003; Weiss & Marmar, 1997). Test-retest reliability has also been strong, ranging from .89-.94 over a six month period (Weiss & Marmar). Cronbach’s alpha for the IES-R in the current sample was .94.

Research Questions

Hypothesis 1: Confirmatory factor analysis will indicate that the Posttraumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996) will satisfactorily fit Tedeschi and Calhoun’s (2004) hypothesized factor structure for posttraumatic growth. Satisfactory fit was determined by examining fit indices such as $\chi^2$, $GFI$, $AGFI$, $CFI$, $RMSEA$, and $NFI$.

Hypothesis 2: As a result of the conceptual similarities between posttraumatic growth and the six personality variables, it was hypothesized that there would be a
positive relation found between these constructs. This was examined by utilizing correlation matrices to assess the relation between each construct’s total scale scores. The total scale score was used for the PTGI based on the results of hypothesis I.

Specifically:

H2a: Participants’ total PVS-III-R score will be positively associated with their total PTGI score.

H2b: Participants’ SOC-29 score will be positively associated with their total PTGI score.

H2c: Participants’ total LOT-R score will be positively associated with their total PTGI score.

H2d: Participants’ total CD-RISC score will be positively associated with their total PTGI score.

H2e: Participants’ GSE score will be positively associated with their PTGI score.

H2f: Participants’ ANS-IE score will be positively correlated with their PTGI score.

Hypothesis 3: Even though there are some conceptual similarities between posttraumatic growth and six research variables, there are also some conceptual differences. It was hypothesized that PTGI will be measuring a construct that is unique and distinct from the constructs that the other six personality variables will examining. This hypothesis was examined through the use of exploratory factor analysis of the total scale scores for the primary research variables. The total PTGI scale score was used for this analysis, based on the findings from hypothesis I. It was hypothesized that one’s
total PTGI score would load onto its own unique factor. Specifically this means that this factor will not contain significant cross-loadings \((r \geq .40)\) from the other six personality variables.

In addition the relations between social desirability (BIDR) and religious exploration and questioning (Quest) and the primary research variables were examined.
CHAPTER IV
RESULTS

This chapter presents the results of the study. First, descriptive statistics relating to the demographic variables are introduced. Second, the statistical results relating to the first hypothesis are presented and their implications to further analysis are discussed. Third, the statistical results relating to the remaining two hypotheses and the descriptive statistics for the primary research variables are introduced. Fourth, and finally, the chapter ends with additional exploratory analysis examining the relation between social desirability and religious/spiritual beliefs with the primary research variables.

A total of 323 participants proceeded to the online informed consent page of the survey. Of these 323 participants, 321 noted that they wished to participate in the study. A total of 276 participants completed the survey, resulting in a completion rate of 86%. Pre-analysis screening indicated that some of the items had missing values; however, no more than four missing data points for any one scale was found across all 276 participants. Due to this and the fact that missing data occurred in less than 5% of the cases, mean values, based on the current sample, were used to replace the missing data. All data were screened for normality, outliers, missing data, linearity, and homoscedasticity.
Descriptive Statistics

Participants’ demographic characteristics are in Table 1. The sample consisted of 108 men (39.1%) and 168 women (60.9%). The mean age of the current sample was 35.6 ($SD = 13.8$). The median age was 31, ranging from 18 to 94.

Table 1
Demographic Characteristics ($N = 276$)

<table>
<thead>
<tr>
<th>Variable</th>
<th>$n$</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>108</td>
<td>39%</td>
</tr>
<tr>
<td>Women</td>
<td>168</td>
<td>61%</td>
</tr>
<tr>
<td>Racial-Ethnic Background</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African/African American</td>
<td>14</td>
<td>5.1%</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>6</td>
<td>2.2%</td>
</tr>
<tr>
<td>Biracial</td>
<td>2</td>
<td>0.7%</td>
</tr>
<tr>
<td>Caucasian/White</td>
<td>239</td>
<td>86.6%</td>
</tr>
<tr>
<td>Hispanic/Latino(a)/Chicano(a)</td>
<td>3</td>
<td>1.1%</td>
</tr>
<tr>
<td>Multiracial/Multiethnic</td>
<td>4</td>
<td>1.4%</td>
</tr>
<tr>
<td>Native American/American Indian</td>
<td>3</td>
<td>1.1%</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>1.4%</td>
</tr>
<tr>
<td>Not Reported</td>
<td>1</td>
<td>.4%</td>
</tr>
<tr>
<td>Religious/Spiritual Affiliation</td>
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<td></td>
</tr>
<tr>
<td>Buddhism</td>
<td>4</td>
<td>1.4%</td>
</tr>
<tr>
<td>Christianity</td>
<td>177</td>
<td>64.1%</td>
</tr>
<tr>
<td>Islam</td>
<td>3</td>
<td>1.1%</td>
</tr>
<tr>
<td>Judaism</td>
<td>8</td>
<td>2.9%</td>
</tr>
<tr>
<td>Nonreligious/Agnostic/Atheist</td>
<td>35</td>
<td>12.7%</td>
</tr>
<tr>
<td>Nonreligious/Spiritual</td>
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<td>14.5%</td>
</tr>
<tr>
<td>Other</td>
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<td>2.2%</td>
</tr>
<tr>
<td>Not Reported</td>
<td>3</td>
<td>1.1%</td>
</tr>
<tr>
<td>Educational Status</td>
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<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>23</td>
<td>8.3%</td>
</tr>
<tr>
<td>Sophomore</td>
<td>14</td>
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</tr>
<tr>
<td>Junior</td>
<td>12</td>
<td>4.3%</td>
</tr>
<tr>
<td>Senior</td>
<td>23</td>
<td>8.3%</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>59</td>
<td>21.4%</td>
</tr>
<tr>
<td>Other</td>
<td>128</td>
<td>46.4%</td>
</tr>
<tr>
<td>Not Reported</td>
<td>17</td>
<td>6.2%</td>
</tr>
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</table>
Table 1 (Continued)
Demographic Characteristics (N = 276)

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experienced a Traumatic Event</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>189</td>
<td>68.5%</td>
</tr>
<tr>
<td>No</td>
<td>86</td>
<td>31.2%</td>
</tr>
<tr>
<td>Not Reported</td>
<td>1</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

Participants were asked to self-report their racial-ethnic identity. Of the 276 respondents, 275 identified a racial-ethnic identity. Two hundred and thirty nine participants identified as Caucasian/White (86.9%), 14 as African/African American (5.1%), six as Asian/Pacific Islander (2.2%), four as Multiracial/Multiethnic (1.5%), three as Hispanic/Latino(a)/Chicano(a) (1.1%), three as Native American/American Indian (1.1%), two as Biracial/Bi-ethnic (.7%), and four as Other (1.5%). Two hundred and seventy three individuals out of 276 identified their religious or spiritual beliefs (99%). Specifically 177 indicated that they were affiliated with Christianity (64.8%), 40 identified as Nonreligious/Spiritual (14.7%), 35 as Nonreligious/Agnostic/Atheist (12.8%), eight identified with Judaism (2.9%), four with Buddhism (1.5%), three with Islam (1.1%), and six responded to the Other (2.2%) category.

Participants were also asked to report their current educational status. Twenty three respondents identified as Freshman (8.9%), 14 as Sophomore (5.4%), 12 as Junior (4.6%), 23 as Senior (8.9%), 59 as Graduate Student (22.8%), 128 as Other (49.4%), and 17 did not answer this question. Participants who identified as Other reported a wide array of educational status including high school graduate, college graduate, post-PhD., J.D., and retired. Individuals were also asked to indicate whether they had experienced a traumatic event. One hundred and eighty nine respondents indicated Yes (68.7%), 86
indicated No (31.3%), and one participant did not respond to this question. Of those individuals who indicated that they experienced a traumatic event, 65 were male, 124 were female, and one did not indicate sex. For those respondents who indicated that they did not experience a traumatic event, 43 were male and 43 were female.

Test of Statistical Hypothesis I

Prior to descriptively investigating the primary research variables, the internal structure of the PTGI was investigated, as indicated in Hypothesis I, to determine the most appropriate configuration for interpreting the scale in the current sample.

Hypothesis I

The first hypothesis stated that confirmatory factor analysis will indicate that the PTGI will satisfactorily fit Tedeschi and Calhoun’s (2004) hypothesized five domain structure for posttraumatic growth. Tedeschi and Calhoun identified these five domains as Appreciation for Life (AL), Connection with Others (CO), Personal Strength (PS), New Possibilities (NP), and Spiritual Growth (SG). The authors reported that AL is composed of three items (1, 2, 13) SG of two items (5, 18), PS of 4 items (4, 10, 12, 19), NP of 5 items (3, 7, 11, 14, 17), and CO of 7 items (6, 8, 9, 15, 16, 20, 21). One hundred and eighty-nine participant responses were used in this analysis. In order to be included in the confirmatory factor analysis, participants had to indicate that they experienced a traumatic event and also completed all of the surveys related to the primary research variables. Confirmatory factor analysis was conducted on this model using Statistical Analysis Software (SAS V.9). Each of these five domains was considered a latent factor
in the analysis and the items for each domain served as indicator variables for that
domain. Due to the existing significant relations among the five growth domains, each
domain was allowed to freely covary with the other four domains (See Table 2). Six fit
indices were used to assess the fit of this model and the results are presented in Table 3.

Table 2
Correlations Among the Five Domains of Growth for the PTGI for Individuals who
Indicated that they Experienced a Traumatic Event (N = 189).

<table>
<thead>
<tr>
<th>Variables</th>
<th>AL</th>
<th>SG</th>
<th>PS</th>
<th>NP</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SG</td>
<td>.59*</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PS</td>
<td>.72*</td>
<td>.63*</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NP</td>
<td>.78*</td>
<td>.73*</td>
<td>.75*</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>.73*</td>
<td>.77*</td>
<td>.78*</td>
<td>.82*</td>
<td>---</td>
</tr>
</tbody>
</table>


*p < .01

Table 3
Goodness of Fit Indices for the Five Factor Model of PTG

<table>
<thead>
<tr>
<th>Factor Model</th>
<th>(\chi^2)</th>
<th>df</th>
<th>(p)</th>
<th>(\chi^2/df)</th>
<th>RMSEA</th>
<th>CFI</th>
<th>GFI</th>
<th>NFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Five Factor Model</td>
<td>457.33</td>
<td>179</td>
<td>&lt;.0001</td>
<td>2.55</td>
<td>.09</td>
<td>.87</td>
<td>.80</td>
<td>.81</td>
</tr>
</tbody>
</table>

First, the \(\chi^2\) value of the fit was examined. Kline (2005) noted that this value
should not be significant, for this would suggest that the hypothesized model is
significantly different than the “just identified” model. Results from the factor analysis
produced a \(\chi^2(179) = 457.33\). This value was significant at \(p < .0001\). Kline noted
however that often the \(\chi^2\) value is strongly influenced by the sample size and he
suggested that a more accurate measure of model fit can be achieved by examining the
\(\chi^2/df\) ratio. This ratio should be less than 3, and in this analysis the ratio is 2.55. This
particular finding indicates that the proposed model has an adequate level of fit.
Furthermore, for a good fit it is suggested that the model produce a RMSEA value of less than .08, and in this model the RMSEA was .09. This indicator does not support that the five domain model provides an adequate level of fit. Three other fit indices were explored: (a) Bentler’s Comparative Fit Index (CFI), (b) Bentler and Bonnett’s Normed Fit Index (NFI), and (c) the Goodness of Fit Index (GFI). A model is assumed to have adequate fit if these indices have values at .90 and above. In this study the CFI, NFI, and GFI had values of .87, .81, and .80, respectively. These findings are below the cut-off value of .90; and are not indicative of adequate fit. Collectively, the findings from confirmatory factor analysis do not support the proposed five domain structure of the posttraumatic growth model.

Hatcher (1994) recommended exploring the predicted versus actual relation between each variable and the factors in the model in order to determine if new paths should be added or variables deleted in order to improve the overall fit of the model. SAS (V.9) provides both the Wald test and the Lagrange multiplier test in order to help one explore what modifications may be made to a model in order to reduce the chi-square value and ultimately improve the fit of the model. The majority of the suggestions provided by these two tests focused on either adding or eliminating paths between questions 6, 12, and 15 of the PTGI and the five factors. Specifically, the current model underpredicts the relation between these 3 variables and the five factors. Hatcher shared that when a model underpredicts a relationship, in essence it is not accurately accounting for the level of influence that a factor has on a specific variable in the model. For example, the model underpredicts the relationship between Question 12 (Having compassion for others) and Factors 3 (AL), 4 (CO), and 5 (NP). While Question 12 is
initially assigned to Factor 2 (PS), it also appears that Factors 3, 4, and 5 also strongly influence this variable. This fact raises the question that perhaps Question 12 should be assigned to multiple factors and not solely Factor 2. Also, the relation between Question 15 (Putting effort into my relationships.) and Factors 2 (PS) and 3 (AL) is underpredicted by the model. Finally, the current model underpredicts the relation between Question 6 (Knowing that I can count on people in times of trouble.) and Factors 2 (PS) and 3 (AL). Modification indices note that the chi-square value can be reduced by creating a path between these variables and the factors that they are affected by. However, Hatcher indicates that it is not preferable to create complex variables even if they load significantly onto more than one factor. Rather if variables 6, 12, and 15, load significantly onto more than 1 factor, it is suggested to drop these variables from the model instead of creating additional paths in the model. Therefore, in order to improve the fit of the model, three separate confirmatory factor analysis were run, beginning with dropping variable 12. The fit indices associated with these modifications are listed in Table 4.

<table>
<thead>
<tr>
<th>Factor Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>p</th>
<th>$\chi^2$/df</th>
<th>RMSEA</th>
<th>CFI</th>
<th>GFI</th>
<th>NFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removing V12</td>
<td>609.39</td>
<td>160</td>
<td>&lt;.0001</td>
<td>3.81</td>
<td>.12</td>
<td>.77</td>
<td>.74</td>
<td>.72</td>
</tr>
<tr>
<td>Removing V12, V15</td>
<td>432.85</td>
<td>142</td>
<td>&lt;.0001</td>
<td>3.05</td>
<td>.10</td>
<td>.84</td>
<td>.82</td>
<td>.78</td>
</tr>
<tr>
<td>Removing V12, V15, and V6</td>
<td>562.92</td>
<td>125</td>
<td>&lt;.0001</td>
<td>4.05</td>
<td>.14</td>
<td>.75</td>
<td>.74</td>
<td>.70</td>
</tr>
</tbody>
</table>
As can be seen in Table 4, none of the modification indices improve the fit of the model beyond the fit achieved in its original conception. Based on these results, subsequent analyses using the PTGI will use the total score of the scale rather than the five factor model. Internal consistency reliability for the total score in the current sample was .93.

Descriptive Statistics for the Primary Research Variables

The correlations between the primary research variables (PTGI, IES, SOC-29, CD-RISC, GSE, ANS-IE, and LOT-R) are presented in Table 5.

Table 5
Correlations Among the Primary Research Variables for Individuals who Experienced a Traumatic Event (N = 276). Internal consistency reliability estimates for the research variables are on the diagonals.

<table>
<thead>
<tr>
<th>Variables</th>
<th>PTGI</th>
<th>IES</th>
<th>SOC-29</th>
<th>CD-RISC</th>
<th>GSE</th>
<th>ANS-IE</th>
<th>LOT-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTGI</td>
<td>.93</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IES</td>
<td>.20**</td>
<td>.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC-29</td>
<td>.06</td>
<td>-.13</td>
<td>.67</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD-RISC</td>
<td>.16**</td>
<td>-.03</td>
<td>.61**</td>
<td>.91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSE</td>
<td>.08</td>
<td>-.07</td>
<td>.44**</td>
<td>.62**</td>
<td>.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANS-IE</td>
<td>.07</td>
<td>.12</td>
<td>-.40**</td>
<td>-.25**</td>
<td>-.16**</td>
<td>.67</td>
<td></td>
</tr>
<tr>
<td>LOT-R</td>
<td>.20**</td>
<td>.05</td>
<td>.36**</td>
<td>.33**</td>
<td>.14</td>
<td>-.29**</td>
<td>.57</td>
</tr>
<tr>
<td>PVS-III-R</td>
<td>.04</td>
<td>-.09</td>
<td>.58**</td>
<td>.67**</td>
<td>.56</td>
<td>-.37**</td>
<td>.30**</td>
</tr>
</tbody>
</table>


*p < .05
**p < .01

Next, descriptive statistics for the primary research variables are presented in Table 6, Table 7, and Table 8. Table 6 compares the aggregate means of the primary research variables as a function of prior experience with a traumatic event. Overall,
participants who identified that they experienced a traumatic event reported significantly higher PTGI total scores ($M = 78.75, SD = 22.13, d = .37$) than did individuals who did not note that they experienced a traumatic event ($M = 70.55, SD = 22.28$). This was the only significant difference found between the aggregate means scores of the primary research variables for respondents who did and did not experience a traumatic event. This difference, while being statistically significant, produced a Cohen’s $d$ value ($d = .37$), indicating a small effect.

Table 6
**Between Group Differences on the Primary Research Variables: Summary of Univariate Analysis of Variance: ($N = 276$)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>$M$</th>
<th>$SD$</th>
<th>df</th>
<th>$F$</th>
<th>Cohen’s $d$</th>
<th>$\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTGI Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.93</td>
</tr>
<tr>
<td>Traumatic Experience</td>
<td>78.75</td>
<td>22.13</td>
<td>274</td>
<td>8.09*</td>
<td>.37</td>
<td></td>
</tr>
<tr>
<td>No Traumatic Experience</td>
<td>70.55</td>
<td>22.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOT-R Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.57</td>
<td></td>
</tr>
<tr>
<td>Traumatic Experience</td>
<td>14.61</td>
<td>3.22</td>
<td>274</td>
<td>.06</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>No Traumatic Experience</td>
<td>14.51</td>
<td>3.27</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC-29 Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.67</td>
<td></td>
</tr>
<tr>
<td>Traumatic Experience</td>
<td>127.90</td>
<td>10.53</td>
<td>274</td>
<td>.12</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>No Traumatic Experience</td>
<td>128.37</td>
<td>10.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANS-IE Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.67</td>
<td></td>
</tr>
<tr>
<td>Traumatic Experience</td>
<td>11.07</td>
<td>4.47</td>
<td>274</td>
<td>1.05</td>
<td>.13</td>
<td></td>
</tr>
<tr>
<td>No Traumatic Experience</td>
<td>11.67</td>
<td>4.45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSE Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.84</td>
<td></td>
</tr>
<tr>
<td>Traumatic Experience</td>
<td>32.57</td>
<td>3.82</td>
<td>274</td>
<td>.47</td>
<td>.09</td>
<td></td>
</tr>
<tr>
<td>No Traumatic Experience</td>
<td>32.23</td>
<td>3.58</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6 (Continued)
Between Group Differences on the Primary Research Variables: Summary of Univariate Analysis of Variance: (N = 276)

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>df</th>
<th>F</th>
<th>Cohen’s d</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD-RISC Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.91</td>
</tr>
<tr>
<td>Traumatic Experience</td>
<td>72.75</td>
<td>11.42</td>
<td>274</td>
<td>1.98</td>
<td>.18</td>
<td></td>
</tr>
<tr>
<td>No Traumatic Experience</td>
<td>70.60</td>
<td>12.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVS-III-R Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.78</td>
</tr>
<tr>
<td>Traumatic Experience</td>
<td>36.45</td>
<td>5.24</td>
<td>274</td>
<td>.94</td>
<td>.12</td>
<td></td>
</tr>
<tr>
<td>No Traumatic Experience</td>
<td>35.79</td>
<td>5.93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


* p < .01

The next two tables explore further the primary research variables by grouping the aggregate mean scores by sex. Specifically, Table 7 contains responses for individuals who noted that they experienced a traumatic event and Table 8 is composed of data for those respondents who did not indicate that they experienced a traumatic event.

Through the use of ANOVAs, significant differences in aggregate mean scores by sex were found for the PTGI and the IES for those participants who reported experiencing a traumatic event. Specifically, when exploring differences in PTGI scores by sex, females displayed significantly higher mean levels of growth (M = 81.85, SD = 20.11) (d = .41) than did males (M = 72.85, SD = 24.65). This same trend was found when participants who experienced a traumatic event completed the IES. Again, females had significantly higher IES means scores (M = 46.57, SD = 16.03) (d = .37) than did males (M = 40.88, SD = 16.44). The differences for these two variables by sex, while statistically significant, produced effect sizes of d = .37 and d = .42, which indicates that the differences for the scores by sex are small and have minimal practical significance (Henson, 2006).
were no further significant differences found by sex when exploring the aggregate mean scores of participants’ responses to the PVS-III-R, LOT-R, SOC-29, ANS-IE, GSE, and the CD-RISC. For individuals who did not experience a traumatic event, a significant difference was found on PTGI scores. Women had significantly higher mean PTGI scores \((M = 75.95, SD = 21.43)\) \((d = .50)\) than did men \((M = 65.14, SD = 22.03)\).

Specifically, a Cohen’s \(d\) of .50 suggests that a moderate significant difference exists between men and women’s scores on the PTGI, for those individuals who did not experience a traumatic event (Hansen). There were no additional significant differences found by sex when exploring the aggregate means scores on the PVS-III-R, LOT-R, SOC-29, ANS-IE, GSE, and the CD-RISC.

### Table 7

Between Group Differences on the Primary Research Variables for those Participants who Indicated that they Experienced a Traumatic Event \((N = 189)\).

<table>
<thead>
<tr>
<th>Variable</th>
<th>(M)</th>
<th>(SD)</th>
<th>df</th>
<th>(F)</th>
<th>Cohen’s (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTGI Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>72.85</td>
<td>24.65</td>
<td>188</td>
<td>7.22**</td>
<td>.42</td>
</tr>
<tr>
<td>Women</td>
<td>81.85</td>
<td>20.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOT-R Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>14.35</td>
<td>3.65</td>
<td>188</td>
<td>.64</td>
<td>.12</td>
</tr>
<tr>
<td>Women</td>
<td>14.75</td>
<td>2.98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC-29 Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>129.11</td>
<td>10.60</td>
<td>188</td>
<td>1.31</td>
<td>.18</td>
</tr>
<tr>
<td>Women</td>
<td>127.27</td>
<td>10.47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANS-IE Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>11.03</td>
<td>4.85</td>
<td>188</td>
<td>.01</td>
<td>.02</td>
</tr>
<tr>
<td>Women</td>
<td>11.09</td>
<td>4.27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSE Total Score</td>
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</tr>
<tr>
<td>Men</td>
<td>32.74</td>
<td>3.75</td>
<td>188</td>
<td>.20</td>
<td>.07</td>
</tr>
<tr>
<td>Women</td>
<td>32.48</td>
<td>3.86</td>
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</tr>
</tbody>
</table>
Table 7 (Continued)
Between Group Differences on the Primary Research Variables for those Participants who Indicated that they Experienced a Traumatic Event ($N = 189$).

<table>
<thead>
<tr>
<th>Variable</th>
<th>$M$</th>
<th>$SD$</th>
<th>df</th>
<th>$F$</th>
<th>Cohen's $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD-RISC Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>73.66</td>
<td>10.69</td>
<td>188</td>
<td>.63</td>
<td>.12</td>
</tr>
<tr>
<td>Women</td>
<td>72.27</td>
<td>11.81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVS-III-R Total Score</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>35.94</td>
<td>5.54</td>
<td>188</td>
<td>1.06</td>
<td>.16</td>
</tr>
<tr>
<td>Women</td>
<td>36.76</td>
<td>5.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IES Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>40.78</td>
<td>16.44</td>
<td>188</td>
<td>5.76*</td>
<td>.37</td>
</tr>
<tr>
<td>Women</td>
<td>46.73</td>
<td>16.03</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05
**p < .01

Table 8
Between Group Differences on the Primary Research Variables for those Participants who indicated that they did not Experience a Traumatic Event.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$M$</th>
<th>$SD$</th>
<th>df</th>
<th>$F$</th>
<th>Cohen's $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTGI Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>65.14</td>
<td>22.03</td>
<td>85</td>
<td>5.32*</td>
<td>.50</td>
</tr>
<tr>
<td>Women</td>
<td>75.95</td>
<td>21.43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOT-R Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>14.26</td>
<td>3.13</td>
<td>85</td>
<td>.52</td>
<td>.16</td>
</tr>
<tr>
<td>Women</td>
<td>14.77</td>
<td>3.41</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC-29 Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>127.21</td>
<td>11.12</td>
<td>85</td>
<td>.99</td>
<td>.22</td>
</tr>
<tr>
<td>Women</td>
<td>129.53</td>
<td>10.46</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANS-IE Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>11.84</td>
<td>4.75</td>
<td>85</td>
<td>.13</td>
<td>.08</td>
</tr>
<tr>
<td>Women</td>
<td>11.49</td>
<td>4.18</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 8 (Continued)
Between Group Differences on the Primary Research Variables for those Participants who indicated that they did not Experience a Traumatic Event.

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>df</th>
<th>F</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSE Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>32.47</td>
<td>3.73</td>
<td>85</td>
<td>.36</td>
<td>.13</td>
</tr>
<tr>
<td>Women</td>
<td>32.00</td>
<td>3.45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD-RISC Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>70.00</td>
<td>13.68</td>
<td>85</td>
<td>.21</td>
<td>.10</td>
</tr>
<tr>
<td>Women</td>
<td>71.21</td>
<td>10.96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVS-III-R Total Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>35.58</td>
<td>6.67</td>
<td>85</td>
<td>.11</td>
<td>.07</td>
</tr>
<tr>
<td>Women</td>
<td>36.00</td>
<td>5.15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


* \( p < .05 \)

Tests of Statistical Hypothesis II

The second hypothesis (H2a-H2f) stated that due to the conceptual similarities between posttraumatic growth and the six personality variables, there will be a positive relation found between the total scale scores of these constructs. The total scale score for the PTGI was used due to the findings of Hypothesis I. The correlations between these variables and the uncorrected significance of these correlations can be seen in Table 9.
Table 9
Correlations Among the Primary Research Variables for Individuals who Experienced a Traumatic Event ($N = 189$).

<table>
<thead>
<tr>
<th>Variables</th>
<th>PTGI</th>
<th>IES</th>
<th>SOC-29</th>
<th>CD-RISC</th>
<th>GSE</th>
<th>ANS-IE</th>
<th>LOT-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTGI</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IES</td>
<td>.21**</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC-29</td>
<td>.05</td>
<td>-.13*</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD-RISC</td>
<td>.16*</td>
<td>-0.03</td>
<td>.59**</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSE</td>
<td>.05</td>
<td>-0.07</td>
<td>.40**</td>
<td>.60**</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANS-IE</td>
<td>.07</td>
<td>.12*</td>
<td>-.37**</td>
<td>-.18**</td>
<td>-.15*</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>LOT-R</td>
<td>.21**</td>
<td>.05</td>
<td>.39**</td>
<td>.32**</td>
<td>.13*</td>
<td>-.29**</td>
<td>---</td>
</tr>
<tr>
<td>PVS-III-R</td>
<td>.07</td>
<td>-0.08</td>
<td>.53**</td>
<td>.65**</td>
<td>.54**</td>
<td>-.30**</td>
<td>.28**</td>
</tr>
</tbody>
</table>


*p < .05
**p < .01

One hundred and eighty-nine participant responses were analyzed to test this hypothesis. In order to be included in this analysis, participants had to indicate that they had experienced a traumatic event and also completed all of the required surveys. Due to the directional nature of the hypothesis, the relation between these variables was tested using one-tailed significance tests. The findings from this analysis partially support the hypothesis that there will be a positive relation between posttraumatic growth and the six personality variables as only three of the personality variables evidenced a significant positive correlation with posttraumatic growth. Specifically, the aggregate mean PTGI total scale score was significantly positively correlated with CD-RISC ($r = .16$, $p < .05$), IES ($r = .21$, $p < .01$) and LOT-R ($r = .21$, $p < .01$) total scale scores. However, the relation between the aggregate mean PTGI total scale score and the CD-RISC, IES, and
LOTR total scale scores only accounts for 2%, 4% and 4% of the variance respectively. While these correlations are statistically significant, they indicate little or minimal overlap between the constructs (Cohen, 1987). Additionally, correlations between PTGI aggregate mean scores were not significantly different from zero for the SOC-29 ($r = .05, p > .05$), GSE ($r = .05, p > .05$), and the ANS-IE ($r = .07, p > .05$) total scale scores. Therefore, overall findings do not indicate support for hypothesis two.

Test of Statistical Hypothesis III

The third hypothesis stated that the total PTGI score will be measuring a construct that is unique and distinct from the constructs that the other six personality tests examined. It was hypothesized that the total PTGI score will load onto its own unique factor in exploratory factor analysis. Specifically this means that this factor will not contain significant cross-loadings ($r \geq .40$) from the other six personality variables (Hatcher, 1994). In order to examine this hypothesis, the total scale scores of 189 individuals, who had reported experiencing a traumatic event, for the PTGI, the LOT-R, the PVS-III-R, the SOC-29, the CD-RISC, the ANS-IE, and the GSE were subject to exploratory factor analysis.

The total scale scores of the 189 participants were subjected to an exploratory factor analysis using squared multiple correlations as prior communality estimates. The factors were extracted through the use of principal axis factor analysis and this was followed by a direct oblique rotation. The results of the factor analysis supported a three factor solution as the most simple factor structure for this sample. In Table 10, the initial eigenvalues and the percentages of common variance for the six factors and the
eigenvalues for the three-factor solution, percentages of common variance, and the cumulative percentage are listed. Also, the correlations between the 3 factors are presented in Table 11.

Table 10
Eigenvalues and Common Variance Explained by the Factors ($N = 189$).

<table>
<thead>
<tr>
<th>Factor</th>
<th>Initial Eigenvalue</th>
<th>Percentage $^*$ of Variance</th>
<th>Eigenvalue after Rotation</th>
<th>Percentage $^{**}$ of Variance</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.01</td>
<td>43.04</td>
<td>2.43</td>
<td>37.50</td>
<td>37.50</td>
</tr>
<tr>
<td>2</td>
<td>1.10</td>
<td>15.74</td>
<td>1.29</td>
<td>8.96</td>
<td>46.45</td>
</tr>
<tr>
<td>3</td>
<td>1.08</td>
<td>15.44</td>
<td>.74</td>
<td>6.09</td>
<td>52.54</td>
</tr>
<tr>
<td>4</td>
<td>.62</td>
<td>8.79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>.48</td>
<td>6.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>.42</td>
<td>5.97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>.29</td>
<td>4.14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* indicates initial percentage of common variance
** indicates common variance after principal axis factoring

Table 11
Factor Correlation Matrix for the Three Factors ($N = 189$).

<table>
<thead>
<tr>
<th>Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sense of Coherence, Resilience, General</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self Efficacy, and Hardiness</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Locus of Control and Optimism</td>
<td></td>
<td>-.35</td>
<td>---</td>
</tr>
<tr>
<td>3. Posttraumatic Growth and Optimism</td>
<td></td>
<td>.22</td>
<td>-.09</td>
</tr>
</tbody>
</table>

Following the recommendation of Hatcher (1994), Kahn (2006), and Tinsley and Tinsley (1987) multiple criterion were used in order to determine how many factors to retain. Specifically, four criterion were examined: (a) Kaiser’s criterion (i.e., retaining factors that had eigenvalues greater than or equal to 1), (b) Cattell’s scree plot test, (c) the proportion of common variance accounted for by the last factor, and (d) the amount of common variance accounted for by the factor solution (i.e., at least 40% or greater). When exploring the results of the exploratory factor analysis, results from Kaiser’s
criterion and Cattell’s scree test both suggested that three factors should be retained. Specifically, Factor 1 had an eigenvalue of 3.01 and accounted for approximately 43.04% of the common variance. Factor 2 and Factor 3 had eigenvalues of 1.10 and 1.08 and accounted for an additional 15.74% and 15.44% of the common variance, respectively. Kahn (2006) suggested that the last factor retained should explain a large enough percentage to be “deemed to be important” (p. 690) and indicated that 5-10% is a rule of thumb. In the unrotated solution, the third factor retained in this study accounted for approximately 15.44% of the variance and thus satisfies this criterion. Also, Tinsley and Tinsley noted that the final factor solution should account for at least 40% of the common variance. The three factor solution in this study satisfies this criterion, accounting for approximately 77.14% of the common variance.

Due to the fact that the variables in the factor analysis are correlated (See Table 5) and related conceptually, an oblique rotation was run on the three factor solution. After the rotation, Factor 1 accounted for the largest amount of variance in the solution, with an eigenvalue of 2.43 and 37.5% of the common variance. Factor 2 and Factor 3 had eigenvalues of 1.29 and .74 and accounted for 8.96% and 6.09% of the common variance, respectively. The rotated three factor solution accounted for 52.54% of the common variance.

Utilizing a cut-off of .4 (Hatcher, 1994), Factor 1 included significant loadings from the total scale scores of the SOC-29 (.51), the CD-RISC (.86), the GSE (.75), and the PVS-III-R (.72). Factor 2 included two total scale scores with significant loadings; the ANS-IE (.64), and the LOT-R(-.50). The Third Factor is composed of two significant loadings; total PTGI scores (.43) and LOT-R scores (.54). Only one variable, total LOT-
R scores, loaded onto more than one factor and in this case it loaded positively onto Factor 3 and negatively onto Factor 2. Due to the fact that in the unrotated and rotated solution, Factor 2 and Factor 3 account for significantly less variance than Factor 1, a two factor exploratory factor analysis was run to see if simple structure could be achieved. In this analysis, posttraumatic growth failed to load onto a factor and thus, simple structure was not achieved. Based on the 4 criterion noted above and the fact that a two factor solution did not improve simple structure, the results of this exploratory factor analysis support a three factor solution. While support was found for a three factor solution, this solution did not support hypothesis three, for posttraumatic growth did not load onto its own individual factor. Complete results regarding each variable loading onto a given factor are found in Table 12.

Table 12
Variable Loadings on the Rotated 3 Factor Pattern.

<table>
<thead>
<tr>
<th>Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTGI</td>
<td>.04</td>
<td>.09</td>
<td>.43</td>
</tr>
<tr>
<td>SOC-29</td>
<td>.51</td>
<td>-.37</td>
<td>.07</td>
</tr>
<tr>
<td>CD-RISC</td>
<td>.86</td>
<td>.06</td>
<td>.17</td>
</tr>
<tr>
<td>GSE</td>
<td>.75</td>
<td>.09</td>
<td>-.07</td>
</tr>
<tr>
<td>ANS-IE</td>
<td>-.07</td>
<td>.64</td>
<td>.13</td>
</tr>
<tr>
<td>LOT-R</td>
<td>-.01</td>
<td>-.50</td>
<td>.54</td>
</tr>
<tr>
<td>PVS-III-R</td>
<td>.72</td>
<td>-.15</td>
<td>-.02</td>
</tr>
</tbody>
</table>

Exploratory Analysis

Additional analyses were conducted in order to examine two additional variables that could possibly have a significant relation or influence on the primary research variables. First, the relation between socially desirable responding and the primary research variables was examined. Socially desirable responding was measured by using the Balanced Inventory of Responding (BIDR, Paulhus, 1990). The BIDR measures two separate domains of socially desirable responding: (a) self-deceptive positivity and (b) impression management. The relation between both of these domains and the primary research variables was explored. Second, due to the fact that the PTGI indicates that one area of growth that a person may experience is a new sense of spiritual growth and exploration, a measure examining the open-ended and existential dialogue around one’s religious and spiritual beliefs was included to assess to what extent this variable may be related to posttraumatic growth and the other primary research variables. The extent to which one engages in an existential exploration of his or her spiritual and religious beliefs was measured with the Quest Scale (Batson, 1991).

Socially Desirable Responding

The correlations between socially desirable responding and the primary research variables are presented in Tables 13 and 14. The first table explores the relationship between the two subscales of the BIDR (impression management and self-deceptive positivity) and the primary research variables for those individuals who reported that they experienced a traumatic event. When examining these particular participants, numerous significant correlations were found between the two subscales and the primary research
variables. Specifically, a significant relation was found between the self-deceptive positivity subscale of the BIDR and the SOC-29 ($r = .39$), the CD-RISC ($r = .51$), the GSE ($r = .39$), the ANS-IE ($r = -.34$), and the PVS-III-R ($r = .52$). This suggests that there is a relation between the extent to which one reports on his or her level of sense of coherence, resilience, self-efficacy, locus of control, and hardiness and his or her likelihood to give self-reports that are honest, but positively biased. The strength of this relation between the self-deceptive positivity subscale and the SOC-29, GSE, and ANS-IE subscales can be classified as moderate, while the relation between this subscale and the CD-RISC and the PVS-III-R is classified as large (Cohen, 1987). No, significant, relations were found between the impression management subscale of the BIDR and the personality variables. There were no significant associations found between the PTGI and the impression management ($r = .08$) and self-deceptive positivity ($r = .02$) subscales of the BIDR. These findings are consistent with the findings of Tedeschi and Calhoun (1996).

Table 13
Correlations Among the Primary Research Variables, the BIDR, and its 2 Subscales for Participants who Experienced a Traumatic Event, with a Bonferroni Correction ($N = 189$).

<table>
<thead>
<tr>
<th>Variables</th>
<th>PTGI</th>
<th>IES</th>
<th>SOC-29</th>
<th>CD-RISC</th>
<th>GSE</th>
<th>ANS-IE</th>
<th>LOT-R</th>
<th>PVS-3-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIDR</td>
<td>.06</td>
<td>-.06</td>
<td>.28*</td>
<td>.34</td>
<td>.19</td>
<td>-.34*</td>
<td>.16</td>
<td>.37</td>
</tr>
<tr>
<td>BIDR-SD</td>
<td>.02</td>
<td>-.11</td>
<td>.39*</td>
<td>.51*</td>
<td>.39*</td>
<td>-.34*</td>
<td>.15</td>
<td>.52*</td>
</tr>
<tr>
<td>BIDR-IM</td>
<td>.08</td>
<td>-.01</td>
<td>.11</td>
<td>.11</td>
<td>-.02</td>
<td>-.24</td>
<td>.12</td>
<td>.15</td>
</tr>
</tbody>
</table>

Table 14
Correlations Among the Primary Research Variables, the BIDR, and its 2 Subscales for Participants who did not Experience a Traumatic Event (N = 86).

<table>
<thead>
<tr>
<th>Variables</th>
<th>PTGI</th>
<th>SOC-29</th>
<th>CD-RISC</th>
<th>GSE</th>
<th>ANS-IE</th>
<th>LOT-R</th>
<th>PVS-3-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIDR</td>
<td>-.15</td>
<td>.32</td>
<td>.27</td>
<td>.09</td>
<td>-.41*</td>
<td>.20</td>
<td>.36*</td>
</tr>
<tr>
<td>BIDR-SD</td>
<td>-.07</td>
<td>.51*</td>
<td>.50*</td>
<td>.36*</td>
<td>-.50*</td>
<td>.24</td>
<td>.59*</td>
</tr>
<tr>
<td>BIDR-IM</td>
<td>-.16</td>
<td>.05</td>
<td>-.01</td>
<td>-.16</td>
<td>-.19</td>
<td>.10</td>
<td>.05</td>
</tr>
</tbody>
</table>


*p < .002

When examining the results from participants who noted that they did not experience a traumatic event (Table 14), significant relations were found. Specifically, a significant relation was observed between the SOC-29 (r = .51), the CD-RISC (r = .50), the GSE (r = .36), the ANS-IE (r = -.50), and the PVS-III-R (r = .59) and the self-deceptive positivity subscale of the BIDR. The strength of these relations is considered large for the SOC-29, CD-RISC, ANS-IE, and the PVS-III-R, moderate for the GSE (Cohen, 1987). No significant correlations were found between the impression management subscale of the BIDR and the primary research variables. Again, no significant relation was found between the PTGI and the impression management (r = -.16) and self-deceptive positivity (r = -.07) subscales of the BIDR.
Religious and Spiritual Exploration

The correlations between existential religious and spiritual exploration and the primary research variables are presented in Tables 15 and 16. Table 15 explores the nature of these correlations for individuals who shared that they experienced a traumatic event. When exploring these results, a significant relation between one’s Quest scale scores and both components of social desirability was found. This relation was explored in the previous paragraph. There were no significant relations found between the remaining primary research variables and the Quest scale. The PTGI also has a subscale (Spiritual Growth) that examines the extent to which an individual reports that he or she grows spiritually as a result of his or her struggle with a traumatic event. A significant correlation ($r = .69, p < .001$) was found between the Quest Scale and the PTGI domain of Spiritual Growth. Cohen (1987) classifies the strength of this correlation as large and these findings may suggest that both of these measures assess a similar component of existential questioning and growth around religious or spiritual beliefs in a person. For instance both the PTGI and the Quest scale examines the extent to which an individually may grow spiritually as a result of an open and honest questioning of his or her religious beliefs as result of his or her struggle with existential questions raised by contradictory or traumatic experiences. When examining individuals who indicated that they did not experience a traumatic event, no significant relations between the primary research variables and the Quest scale were found (Table 16). However, there was again evidence to suggest a significant and large relation between the Quest Scale and the Spiritual Growth domain of the PTGI ($r = .56, p < .001$).
Table 15
Correlations Among the Primary Research Variables and the Quest Scale for Participants who Experienced a Traumatic Event ($N = 189$).

<table>
<thead>
<tr>
<th>Variables</th>
<th>PTGI</th>
<th>IES</th>
<th>SOC-29</th>
<th>CD-RISC</th>
<th>GSE</th>
<th>ANS-IE</th>
<th>LOT-R</th>
<th>PVS-3-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quest</td>
<td>.09</td>
<td>.12</td>
<td>-.04</td>
<td>-.07</td>
<td>.05</td>
<td>.13</td>
<td>-.01</td>
<td>-.08</td>
</tr>
</tbody>
</table>


Table 16
Correlations Among the Primary Research Variables and the Quest Scale for Participants who did not Experience a Traumatic Event ($N = 86$).

<table>
<thead>
<tr>
<th>Variables</th>
<th>PTGI</th>
<th>SOC-29</th>
<th>CD-RISC</th>
<th>GSE</th>
<th>ANS-IE</th>
<th>LOT-R</th>
<th>PVS-3-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quest</td>
<td>.10</td>
<td>-.01</td>
<td>-.01</td>
<td>-.07</td>
<td>-.08</td>
<td>-.01</td>
<td>.08</td>
</tr>
</tbody>
</table>

CHAPTER V
DISCUSSION

The purpose of this investigation was to further explore the construct validity of posttraumatic growth by empirically examining the nature of the relationship between posttraumatic growth and the six personality variables of hardiness, resilience, sense of coherence, optimism, locus of control and self-efficacy. Tedeschi and Calhoun (2004) noted that there are clear theoretical similarities between posttraumatic growth and these six personality variables, for they all examine the process surrounding how one copes with a traumatic event. However, the authors stated that these constructs also differ in their final goals for an individual. Specifically, posttraumatic growth examines how an individual can take his or her experience with a traumatic event and use the struggle to reach a higher level of functioning than he or she was at before the trauma occurred. In contrast, the six aforementioned personality variables focus on how individuals endure highly stressful and demanding situations without developing permanent “deficiencies or psychological problems” (p. 136) and ultimately return to their baseline level of functioning (Tedeschi & Calhoun). This study aimed to empirically examine these conceptual differences between posttraumatic growth and the six personality variables. Overall, the results of this study did not provide empirical support for both the identified
conceptual similarities and differences between these constructs and the purported five-domain structure of posttraumatic growth.

Confirmatory Factor Analysis

It was hypothesized that the current sample would fit Tedeschi and Calhoun’s (1996) hypothesized five-domain model of posttraumatic growth. The findings in the confirmatory factor analysis did not provide support to Tedeschi and Calhoun’s proposed model (See table 7). Due to the fact that a significant chi-square value is often strongly influenced by sample size, Kahn (2006) recommended examining the chi-square/degrees of freedom ratio. Kahn indicated that a model has “good fit” if the $\chi^2/df$ ration is less than 3 and in the current study this ratio was 2.55; suggesting that the data is a good fit to the proposed model. However, none of the other fit indices ($CFI = .87$, $GFI = .80$, $NFI = .81$, $RMSEA = .09$) met the criteria to indicate a good fit between the data and the proposed model. Only one other study had conducted a confirmatory factor analysis on Tedeschi and Calhoun’s proposed five domain model of posttraumatic growth. Cadell, Regehr, and Hemsworth (2003), in their research with 174 bereaved caregivers of individuals with HIV disease, also found mixed results regarding the goodness of fit of the proposed model. Specifically, Cadell et al. (2003) reported a non-significant chi-square value ($\chi^2(69) = 144.86; p < .05$), a $\chi^2/df$ ration less than 3 ($\chi^2/df = 2.10$) and a $CFI$ greater than .9 ($CFI = .91$). These positive indicators of a good fit were in contrast to the $GFI$, $NFI$, and $RMSEA$ values ($GFI = .88$, $NFI = .86$, $RMSEA = .08$) in that study that did not meet the specified values to indicate an adequate fit. Powell, Rosner, Butollo, Tedeschi, and Calhoun (2003) also explored the factor structure of the PTGI with 150
The authors utilized a principal components analysis of this Bosnian translation of the PTGI and revealed only 3 domains of growth instead of 5: a. Changed Sense of Relationship with Others, b. Changed Philosophy of Life, and c. Changes in Self/Positive Life Attitude. The findings in these studies are similar and ultimately do not provide support for the proposed five factor model.

These mixed results surrounding the confirmatory factor analysis indicates that there are questions surrounding the structure of the PTGI and the construct of posttraumatic growth. There are a few possible reasons why Tedeschi and Calhoun’s (2004) proposed model of posttraumatic growth may have not adequately fit for the sample. The first relates to the significant associations seen between the five domains of growth. As indicated in Table 6, all five domains of growth were significantly correlated at the $p < .01$, with correlations ranging from $r = .59$ (between AL and SG) to $r = .82$ (between CO and NP). The strong conceptual overlap found between all five domains indicates that these domains may be measuring the same or similar aspects of growth and not five separate areas.

Other findings from the confirmatory factor analysis further support the idea that there is strong conceptual overlap between the proposed five domain structure of the PTGI. Specifically, results indicated that the current five factor model underpredicts the effect that factors, other than the one that a variable has been assigned to, have on that variable. For example, Questions 12 (Having compassion for others), 15 (Putting effort into my relationships), and 6 (Knowing that I can count on people in times of trouble) are all influenced to a greater extent by other factors than the model predicted they would be. Specifically, Question 12 (Having compassion for others) is assigned to Factor 2.
(Personal Strength); however, this variable has a stronger relation with Factor 3 (Appreciation for Life), Factor 4 (New Possibilities), and Factor 5 (Connection with Others) than predicted by the model. When exploring the meaning behind question 12 (As a result of the crisis I have developed greater compassion for others) and the names of the other factors it is closely related to (Appreciation for Life, New Possibilities, & Connection with Others), one can see how growth in this area may be significantly related to growth in all of these domains, and not just the factor it was assigned to (Personal Strength). This example, and others suggests that the initial factor structure of the PTGI needs to be further examined, for there does not appear to be five distinct domains of growth.

One possible reason that the PTGI has not adequately fit the proposed five domain structure may be due to the data reduction technique and the sample that Tedeschi and Calhoun (1996) used in their validation study. In their validation study, the authors subjected responses to the PTGI from 604 undergraduate students to a principal components analysis. This technique, while helping to organize the data of the PTGI, does not attempt to explore the contributions of unique and common variance for each variable. By subjecting the PTGI to an exploratory factor analysis, a clearer picture of the underlying latent factor structure of the PTGI may emerge. Also, Tedeschi and Calhoun’s initial study focused solely on college students. It will be important to continue to incorporate an increasingly diverse sample into research surrounding the PTGI, so that a more representative and possibly clearer picture of the underlying domains of growth may emerge.
Correlational Analysis

Due to the fact that posttraumatic growth and the six personality variables (optimism, hardiness, resilience, locus of control, self-efficacy, and sense of coherence) all explore the process surrounding how one copes with a traumatic event, it was hypothesized that a positive relation would be found between these constructs for individuals who reported experiencing a traumatic event. Even though their final goals are different it was believed that enough common variance would be shared that this positive relation would be found. Results did not support this hypothesis (see Table 9). Specifically only optimism ($r = .21$) and resilience ($r = .16$) had a significant positive relation with posttraumatic growth. However, it is important to note that these correlations of $r = .16$ and $r = .21$ only account for 2 and 4% of the variance and according to Cohen (1987) the relation between posttraumatic growth and these two personality variables should be interpreted as minimal and non-significant.

One possible reason for the lack of a significant relation between posttraumatic growth and the six personality variables is that there is less conceptual overlap between these constructs than Tedeschi and Calhoun (2004) proposed. Specifically, the lack of a meaningful positive association between posttraumatic growth and optimism, hardiness, sense of coherence, resilience, self-efficacy, and locus of control may be related to the nature of the meaning that one finds. For example, due to the differences in final outcome between these four personality constructs (Bandura, 1982; Hobfoll, 2002; Maddi & Hightower, 1999; Rotter, 1966) and posttraumatic growth, they may focus on a brief and immediate reflection of meaning and benefits that help an individual return to his or her baseline level of functioning, rather than the long-lasting and schema altering
meaning and growth that posttraumatic growth explores. Future research may explore the difference in the nature of the meaning that is measured by these constructs may by examining to see if the relationship between posttraumatic growth and the six personality variables is structured around a curvilinear relationship.

Another possible reason why a significant relation between posttraumatic growth and the six personality variables was not found may be due to the fact that the PTGI is not adequately measuring the construct of posttraumatic growth. Theoretically, there are numerous areas of overlap and similarity between the definitions of posttraumatic growth and the six personality variables. For example, as noted previously in chapter 2, the constructs of hardiness and sense of coherence have elements that are strongly conceptually related to posttraumatic growth. Specifically, Maddi and Hightower (1999) indicated that hardy individuals tend to see difficulties in their life as challenges rather than threats and that they will be more likely to strive to learn from these challenging experiences. Tedeschi and Calhoun (1995) noted that this orientation toward viewing difficulties as challenges, increases the possibility that one will be committed to his or her tasks and thus will seek to find meaning in these endeavors. A similar search for meaning can also be found in the definition of sense of coherence. Antonovsky (1987) reported that one aspect of this construct is the fact that individuals hold a belief that demands and challenges are worthy of investment and engagement and that meaning can be found even in undesirable events. These examples of areas of strong theoretical overlap cause one to question why significant associations were not found between posttraumatic growth and the six personality variables and also causes the question to
surface regarding the construct validity of the PTGI. Add piece about marginal reliabilities of measures for other constructs.

Further evidence, beyond the lack of significant associations between the PTGI and the six personality variables, questioning the construct validity of the PTGI is found when comparing aggregate means scores on the PTGI for individuals who did and did not experience a traumatic event. As reported in Chapter 4, individuals who noted that they experienced a traumatic event reported significantly higher PTGI scores ($M = 78.75$, $SD = 22.13$, $d = .37$) than did individuals who did not note that they experienced a traumatic event ($M = 70.55$, $SD = 22.28$). However, a Cohen’s $d$ value of .37 indicates that the effect of this statistical difference is small and has minor practical significance (Henson, 2006). Research by Cordova, Cunningham, Carson, and Andrykowski (2001) also noted that the significant difference on PTGI scores for individuals who did and did not have breast cancer was considered to be minimal ($d = .31$). For both examples, if there is only a minimal difference between individuals’ scores on the PTGI for those that did and did not experience a traumatic event, then it raises the question as to what specific construct the PTGI is measuring? The results of the exploratory factor analysis also raise questions surrounding the construct validity of the PTGI.

Exploratory Factor Analysis

The construct validity of posttraumatic growth was further explored by conducting an exploratory factor analysis with posttraumatic growth and the six personality variables of hardiness, sense of coherence, optimism, resilience, locus of control, and self-efficacy. Even though it was believed that there are some conceptual
similarities between posttraumatic growth and the personality variables, it was hypothesized that posttraumatic growth would load onto its own unique factor because the end goal for posttraumatic growth is different from the final goal of the personality variables. The results of the exploratory factor analysis did not support the hypothesis that posttraumatic growth would load significantly \((r \geq .40)\) onto its own factor (see Table 12). Specifically, Factor 1 consisted of sense of coherence, resilience, self-efficacy, and hardiness. Factor 2 was comprised of locus of control and a significant negative loading for optimism. Posttraumatic growth and optimism constituted the two variables that loaded significantly onto Factor 3.

The findings of this exploratory factor analysis are inconsistent with the results found when exploring Hypothesis II and the correlational analysis. Due to the fact that significant associations between posttraumatic growth and the six personality variables were not found, then one may expect to find that posttraumatic growth would conceptually occupy its own factor. However, the results of Hypothesis III do not support this assumption. Specifically, in the exploratory factor analysis, the creation of Factor 3 indicates that there is significant theoretical overlap between posttraumatic growth and optimism. While one may want to utilize shared conceptual similarity as the reason to explain the significant loadings of posttraumatic growth and optimism on the same factor, the results of Hypothesis II contradict this explanation.

The results that established the first two factors are consistent with the findings of the correlational analysis for Hypothesis I. The personality variables that loaded significantly onto Factor 1 (sense of coherence, resilience, self-efficacy, and hardiness) also had a significant positive relation to each other in the correlation analysis (See Table
This positive significant association between these four variables has been found in previous psychological research with a diverse population, ranging from high school students and college athletes to adults over the age of 85 (Law, 2004; Almedom, 2005; Martin & Marsh, 2006). When exploring the definitions of these four constructs it appears that the significant relation between each of these variables may be due to the fact that each one includes a person having a positive view of him or herself, a sense of control in his or her life, and a feeling of manageability and competence in crisis or difficult situations. Ultimately all of these qualities congeal to help an individual utilize both his or her internal and external resources to effectively navigate through a traumatic event and return to his or her baseline level of functioning.

Factor 2 was solely composed of the personality variable locus of control. This finding is consistent with the significant negative relation found between locus of control and the other five personality variables in the correlation analysis (see Table 9). Research with a diverse population, ranging from high school students and college freshman to adults over the age of 85, has also found a significant negative relation between locus of control (when higher scores indicate an external locus of control) and the aforementioned personality variables (Hoover, 2000; Law, 2004; Martin & Marsh, 2006). These findings can be interpreted and explained by exploring the scoring rubric of the measure used to assess locus of control, ANS-IE. The ANS-IE is scored in such a way that higher scores are indicative of greater levels of an external locus of control. Rotter (1966) stated that a person’s locus of control is a function of whether he or she attributes the cause or control of an event to either him or herself or the external environment. He further noted that an individual with a greater level of an external locus
of control tends to attribute the outcomes that take place to the actions of other people, chance, or fate. This definition of an external locus of control, while being connected to helping an individual successfully navigate through a traumatic event, differ with the other five personality variables on how an individual accesses his or her coping resources. Specifically, the personality traits of resilience, sense of coherence, self-efficacy, and hardiness all center on the fact that an individual believes that he or she can utilize internal resources and traits to have some control and direction over his or her process of coping with a traumatic event. This definition is in contrast to the fact that an individual with an external locus of control will seek answers, understanding, and control externally, instead of looking inward.

Ultimately the results of the confirmatory factor analysis, exploratory factor analysis, and the correlational analysis do not provide empirical support for the construct validity of posttraumatic growth. The lack of results that reflect the proposed internal structure and both the theoretical similarities and differences between posttraumatic growth and the six personality variables, leads one to question the construct validity of both posttraumatic growth and the PTGI. The next section will explore the extent to which socially desirable responding influenced individuals’ responses to the PTGI in this study.

Social Desirability and Posttraumatic Growth

In order to account for the role of social desirability the BIDR-R was used in this study. Consistent with the research of Tedeschi and Calhoun (1996), neither indicators of social desirability (Impression Management and Self-Deceptive Enhancement) was
significantly related to posttraumatic growth ($r = .08$ and $r = .02$, respectively). These findings are similar to the non-significant relation between social desirability and posttraumatic growth that Tedeschi and Calhoun found in prior research. Even though posttraumatic growth was not significantly related to social desirability, all of the six personality constructs were. Specifically, hardiness, sense of coherence, general self-efficacy, locus of control, resilience, and optimism all were significantly related to the Self-Deceptive Enhancement subscale of the BIDR. Only hardiness and locus of control were significantly related to the Impression Management subscale of the BIDR. Collectively these findings indicate that when individuals are asked to assess their internal and external strengths and coping factors they are likely to respond in a positively biased manner. Due to this fact, the findings surrounding the six personality constructs need to be interpreted with caution.

This tendency to respond in a positively biased manner may be explained by the fact that it is difficult for a person to truthfully assess his or her areas of perceived strength and to have to admit that these resilience factors may not be as strong as the person hoped they would be. In essence, an honest evaluation of these resilience factors may reveal weaknesses that one does not wish to explore, for these weaknesses may indicate that one would struggle to cope with a traumatic event or to return to a baseline level of functioning.

Limitations and Recommendations

Ultimately the findings of this dissertation did not provide support for the construct of posttraumatic growth as measured by the PTGI. This section will provide
suggestions for future research surrounding the PTGI, including ways to enhance limitations that are present in this study. One limitation of the current study relates to the generalizability of the sample. Although the sample consisted of an almost even distribution of students (54%) to community members (46%) there were other demographic and cultural areas that were not as evenly represented. For instance 86% of the participants were European American, 61% were female, 64% were Christian, and the majority of the sample came from northern Ohio. Each of these areas of one’s identity may carry with them certain values, norms, and traditions that are specific to this aspect of identity. For example, even though individuals from Kentucky and Pennsylvania completed the survey, the majority of the sample came from northern Ohio. This particular regional homogeneity may reflect social and cultural values of this region, thus possibly impacting the generalizability and reliability of the results. Due to this fact, it will be important for future researchers to continue to expand the diversity of the sample that they are utilizing when exploring the construct of PTGI so that findings continue to become increasingly generalizable.

Another possible limitation of this study is related to the sampling process. Those individuals who decided to participate in the online survey were self-selected and chose to begin the study after reading the informed consent and realizing that the study was centered on personality factors and traumatic events. Of the 321 individuals that began the study, 276 completed it. It is possible that those individuals who chose not to participate or did not complete the study chose to withdraw because the nature of the topic of trauma may have been extremely difficult for them to confront or explore. This possible self-selection bias may naturally rule-out numerous individuals who had
experienced a traumatic event and did not experience growth from their struggle or who find it to painful to recall their emotional reaction to this event. Due to this fact, it is possible that the sample is somewhat restricted and only explores how the PTGI measures growth and is related to the personality constructs, for individuals at this specific level reaction to a trauma experience.

A final area in this study in which future researchers may improve upon is related to the marginal internal consistency reliability found in three of the scales used. Specifically, the LOT-R ($r = .57$), SOC-29 ($r = .67$) and the ANS-IE ($r = .67$) all have internal consistency reliability coefficients below the acceptable cut-off of .70. Based on this fact, it is possible that these three scales were not accurately measuring the constructs of optimism, sense of coherence, and locus of control. The marginal reliability found in these three measures may impact the relation between posttraumatic growth and these three constructs, for these three measures may not be providing an accurate representation of these constructs for posttraumatic growth to be compared too. Future research exploring the link between posttraumatic growth and optimism, sense of coherence, and locus of control should consider using alternate measures that may offer greater internal consistency reliability.

Clinical Implications

The findings of this empirical investigation did not provide support for the construct of posttraumatic growth as measured by the PTGI. Specifically, evidence was not found to support Hypothesis II and III that explored the theoretical link between posttraumatic growth and the personality variables of hardiness, resilience, locus of
control, self-efficacy, optimism, and hardiness. The confirmatory factor analysis also revealed that the five domain model of growth, purported by Tedeschi and Calhoun (2004), did not achieve satisfactory fit for the sample. In addition, total PTGI scores failed to significantly differentiate between individuals who reported that they experienced a traumatic event and those who indicated that they did not experience a traumatic event. Collectively, these findings provide little evidence to support the construct validity of posttraumatic growth as measured by the PTGI.

Before posttraumatic growth can be utilized clinically, further research must be conducted to examine if support for the construct validity of this concept can be attained. This research should begin by examining the underlying theoretical components of posttraumatic growth as measured by the PTGI. In order to do this, researchers may employ factor analysis in order to incorporate both shared and total variance to better determine the underlying factor structure of this measure, explore if PTGI scores correlate with theoretically similar concepts, and examine how to differentiate the degree of growth one experiences between individuals who have and have not reported experiencing a traumatic event. Calhoun and Tedeschi (2000) provided numerous examples of how clinicians can promote posttraumatic growth in their clients; however as indicated by the findings of this study, if the clinical utility of this theory has a chance to realized, further empirical testing needs to be conducted to first establish construct validity for posttraumatic growth.
Summary

In summary, findings of the current study did not provide support for the construct of posttraumatic growth as measured by the PTGI. Specifically, in Hypothesis II and III, a correlational and exploratory factor analysis, respectively, did not reveal the theoretical link that was purported between posttraumatic growth and the personality constructs of hardiness, sense of coherence, resilience, locus of control, self-efficacy, and optimism. In the correlational analysis, the only significant relation between posttraumatic growth and the personality variables was between posttraumatic growth and optimism and resilience. However, while the association was statistically significant, it only accounted for 2 and 4% of the variance and was not considered significant (Cohen, 1987). Results of the exploratory factor analysis also did not reveal the expected relation between posttraumatic growth and the six personality variables. Based on the first two hypothesis, it is unclear on the nature of the relationship between posttraumatic growth and the personality variables. These findings also indicate considerable ambiguity around the theoretical and empirical underpinnings of this theory.

The construct validity of the five domain model of posttraumatic growth was also examined through a confirmatory factor analysis. Findings and subsequent modification suggestions did not provide an adequate fit for the current sample and thus continue to raise questions surrounding the construct validity of posttraumatic growth as measured by the PTGI.

Future research surrounding the construct of posttraumatic growth should begin by clearly defining what posttraumatic growth is measuring. This may be accomplished by further exploring the nature of the relation between posttraumatic growth and
constructs that it should be closely related to. In addition it will be important to explore the underlying factor structure of this construct through the use of exploratory factor analysis, with a diverse sample, so that a reliable and consistent measure of posttraumatic growth can be developed. Calhoun and Tedeschi (2000) have provided numerous strong examples of the clinical utility of this construct; however, before considering how posttraumatic growth can be utilized in a clinical context, further research must be conducted to explore if construct validity can be attained.
REFERENCES


Tedeschi, R. G. (1989). The masculine gender role as impediment to rehabilitation. In G. Brooks (Chair), *Beyond the masculine mystique: Loosening male gender role bonds*. Symposium conducted at the annual meeting of the American Psychological Association, New Orleans, LA.


APPENDICES
APPENDIX A

POSTTRAUMATIC GROWTH INVENTORY

Tedeschi & Calhoun (1996)

Indicate for each of the statements below the degree to which this change occurred in your life as a result of your crisis, using the following scale.
1 = I did not experience this change as a result of my crisis.
2 = I experienced this change to a very small degree as a result of my crisis.
3 = I experienced this change to a small degree as a result of my crisis.
4 = I experienced this change to a moderate degree as a result of my crisis.
5 = I experienced this change to a great degree as a result of my crisis.
6 = I experienced this change to a very great degree as a result of my crisis.

1. My priorities about what is important in life.     ______
2. I’m more likely to try to change things which need changing.  ______
3. An appreciation for the value of my own life.    ______
4. A feeling of self-reliance.       ______
5. A better understanding of spiritual matters.     ______
6. Knowing that I can count on people in times of trouble.   ______
7. A sense of closeness with others.     ______
8. Knowing I can handle difficulties.      ______
9. A willingness to express my emotions.     ______
10. Being able to accept the way things worked out.    ______
11. Appreciating each day.       ______
12. Having compassion for others.     ______
1 = I did not experience this change as a result of my crisis.
2 = I experienced this change to a very small degree as a result of my crisis.
3 = I experienced this change to a small degree as a result of my crisis.
4 = I experienced this change to a moderate degree as a result of my crisis.
5 = I experienced this change to a great degree as a result of my crisis.
6 = I experienced this change to a very great degree as a result of my crisis.

13. I’m able to do better things with my life.     ______
14. New opportunities are available which wouldn’t have been otherwise.  ______
15. Putting effort into my relationships.         ______
16. I have a stronger religious faith.         ______
17. I discovered that I’m stronger than I thought I was.  ______
18. I learned a great deal about how wonderful people are.  ______
19. I developed new interests.       ______
20. I accept needing others.       ______
21. I established a new path for my life.       ______
APPENDIX B

GENERALIZED SELF EFFICACY SCALE

Schwarzer & Jerusalem (1995)

Instructions: Next you will see statements dealing with your feelings about yourself. Please choose the extent to which you agree or disagree with these statements.

1. I can always manage to solve difficult problems if I try hard enough.
   
<table>
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<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all true</td>
<td>Hardly True</td>
<td>Moderately True</td>
<td>Very True</td>
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2. If someone opposes me, I can find the means and ways to get what I want.
   
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<tbody>
<tr>
<td>Not at all true</td>
<td>Hardly True</td>
<td>Moderately True</td>
<td>Very True</td>
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3. It is easy for me to stick to my aims and accomplish my goals.
   
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<td>Not at all true</td>
<td>Hardly True</td>
<td>Moderately True</td>
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4. I am confident that I could deal efficiently with unexpected events.
   
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<td>Not at all true</td>
<td>Hardly True</td>
<td>Moderately True</td>
<td>Very True</td>
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5. Thanks to my resourcefulness, I know how to handle unforeseen situations.
   
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<td>Not at all true</td>
<td>Hardly True</td>
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6. I can solve most problems if I invest the necessary effort.

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<td>Not at all true</td>
<td>True</td>
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7. I can remain calm when facing difficulties because I can rely on my coping abilities.

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<td>Not at all true</td>
<td>True</td>
<td>True</td>
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8. When I am confronted with a problem, I can usually find several solutions.

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<td>Not at all true</td>
<td>True</td>
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9. If I am in trouble, I can usually think of a solution.

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<td>Not at all true</td>
<td>True</td>
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10. No matter what comes my way, I am usually able to handle it.

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<td>Not at all true</td>
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APPENDIX C

ADULT NOWICKI-STRICKLAND INTERNAL-EXTERNAL CONTROL SCALE

Nowicki & Duke (1973)

Instructions: Please read the following questions and respond either “Yes” or “No” to each.

1. Do you believe that most problems will solve themselves if you don’t fool with them?
   Yes     No

2. Do you believe that you can stop yourself from catching a cold?
   Yes     No

3. Are some people just born lucky?
   Yes     No

4. Most of the time, did you feel that getting good grades means a great deal to you?
   Yes     No

5. Are you often blamed for things that just aren’t your fault?
   Yes     No

6. Do you believe that if somebody studies hard enough, he or she can pass any subject?
   Yes     No

7. Do you feel that most of the time it doesn’t pay to try hard because things never turn out right anyway?
   Yes     No
8. Do you feel that if things start out well in the morning that it’s going to be a great day, no matter what you do?
   Yes    No

9. Do you feel that most of the time parents listen to what their children have to say?
   Yes    No

10. Do you believe that wishing can make good things happen?
    Yes    No

11. When you get rejected, does it usually seem it’s for no good reason at all?
    Yes    No

12. Most of the time do you find it hard to change a friend’s opinion?
    Yes    No

13. Do you think that cheering, more than luck, helps a team to win?
    Yes    No

14. Did you feel that it is nearly impossible to change your parents’ mind about anything?
    Yes    No

15. Do you believe that parents should allow children to make most of your own decisions?
    Yes    No

16. Do you feel that when you do something wrong there’s very little you can do to make it right?
    Yes    No

17. Do you believe that most people are just born good at sports?
    Yes    No

18. Are most of the other people your age and sex stronger than you are?
    Yes    No
19. Do you feel that one of the best ways to handle most problems is just not to think about them?

Yes    No

20. Do you feel that you have a lot of choice in deciding who your friends are?

Yes    No

21. If you find a four leaf clover, do you believe that it might bring good luck?

Yes    No

22. Did you often feel that whether or not you did your homework had much to do with what kind of grades you got?

Yes    No

23. Do you feel that when a person your age decides to angry with you, there’s little you can do to stop him or her?

Yes    No

24. Have you ever had a good luck charm?

Yes    No

25. Do you believe that whether or not people like you depends on how you act?

Yes    No

26. Did your parents usually help you if you ask them to?

Yes    No

27. Have you ever felt that when people were angry with you, it was usually for no reason at all?

Yes    No

28. Most of the time, do you feel that you can change what might happen tomorrow by what you do today?

Yes    No
29. Do you believe that when bad things are going to happen they just are going to happen no matter what you do to try to stop them?
   Yes       No

30. Do you think that people can get their own way if they just keep trying?
   Yes       No

31. Most of the time, did you find it useless to try to get your own way at home?
   Yes       No

32. Do you feel that when good things happen, they happen because of hard work?
   Yes       No

33. Do you feel that when somebody your age wants to be your enemy, there’s little you can do to change matters?
   Yes       No

34. Do you feel that it’s easy to get friends to do what you want them to do?
   Yes       No

35. Did you usually feel that you had little to say about what you got to eat at home?
   Yes       No

36. Do you feel that when someone doesn’t like you there’s little you can do about it?
   Yes       No

37. Did you usually feel that it was almost useless to try in school because most other students were just plain smarter than you were?
   Yes       No

38. Are you the kind of person that believes that planning ahead makes things turn out better?
   Yes       No
39. Most of the time, did you feel that you had little to say about what your family decided to do?

Yes  No

40. Do you think it’s better to be smart than to be lucky?

Yes  No
APPENDIX D

LIFE-ORIENTATION TEST REVISED

Scheier, Carver, & Bridges (1994)

Instructions:

Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no “correct” or “incorrect” answers. Answer according to your own feelings, rather than how you think “most people” would answer.

1. In uncertain times, I usually expect the best.

   0           1           2           3           4
   Strongly Disagree Neutral Agree Strongly Agree
   Disagree

2. It’s easy for me to relax.

   0           1           2           3           4
   Strongly Disagree Neutral Agree Strongly Agree
   Disagree

3. If something can go wrong for me, it will.

   0           1           2           3           4
   Strongly Disagree Neutral Agree Strongly Agree
   Disagree

4. I’m always optimistic about my future.

   0           1           2           3           4
   Strongly Disagree Neutral Agree Strongly Agree
   Disagree
5. I enjoy my friends a lot.

   0  1  2  3  4
Strongly Disagree Neutral Agree Strongly Agree

6. It’s important for me to keep busy.

   0  1  2  3  4
Strongly Disagree Neutral Agree Strongly Agree

7. I hardly ever expect things to go my way.

   0  1  2  3  4
Strongly Disagree Neutral Agree Strongly Agree

8. I don’t get upset too easily.

   0  1  2  3  4
Strongly Disagree Neutral Agree Strongly Agree

9. I rarely count on good things happening to me.

   0  1  2  3  4
Strongly Disagree Neutral Agree Strongly Agree

10. Overall, I expect more good things to happen to me than bad.

   0  1  2  3  4
Strongly Disagree Neutral Agree Strongly Agree
APPENDIX E

SENSE OF COHERENCE SCALE

Antonovsky (1993)

Instructions: Here is a series of questions relating to various aspects of our lives. Each question has seven possible answers. Please mark the number, which expresses your answer, with numbers 1 and 7 being extreme answers. If the words under 1 are right for you, circle 1, if the words under 7 are right for you, circle 7. If you feel differently, circle the number which best expresses your feeling. Please give only one answer to each question.

1. When you talk to people, do you have the feeling that they don’t understand you?

1 2 3 4 5 6 7
never have always have
this feeling this feeling

2. In the past, when you had to do something, which depended upon the cooperation with others, did you have the feeling that it:

1 2 3 4 5 6 7
surely wouldn’t surely would
get done get done

3. Think of the people with whom you come into contact daily, aside from the ones to whom you feel closest. How well do you know most of them?

1 2 3 4 5 6 7
you feel that you know
they’re strangers them well
4. Do you have the feeling that you don’t really care about what goes on around you?

1 2 3 4 5 6 7
very seldom very often
or never

5. Has it happened in the past that you were surprised by the behavior of people with whom you thought you knew well?

1 2 3 4 5 6 7
never always
happened happened

6. Has it happened that people whom you counted on disappointed you?

1 2 3 4 5 6 7
never always
happened happened

7. Life is:

1 2 3 4 5 6 7
full of completely
interest routine

8. Until now your life has had:

1 2 3 4 5 6 7
no clear goals very clear
or purpose at goals and
all purpose
9. Do you have the feeling that you're being treated unfairly?

1 2 3 4 5 6 7
very seldom very often
or never

10. In the past ten years your life has been:

1 2 3 4 5 6 7
full of changes without your knowing what will happen next
completely consistent and clear

11. Most of the things you do in the future will probably be:

1 2 3 4 5 6 7
completely fascinating
deadly boring

12. Do you have the feeling that you are in an unfamiliar situation and don’t know what to do?

1 2 3 4 5 6 7
very seldom very often
or never
13. What best describes how you see life:

1    2    3    4    5    6    7
one can                          there is no
always find                      solution to
a solution                       painful things
to painful                      in life
things in
life

14. When you think about your life, you very often:

1    2    3    4    5    6    7
feel how                         ask yourself
good it is                       why you exist
to be                           at all
alive

15. When you face a difficult problem, the choice of a solution is?

1    2    3    4    5    6    7
always                          always
confusing                       completely
and hard                        clear
to find

16. Doing the things you do every day is:

1    2    3    4    5    6    7
a source                        a source of
of deep                         pain
pleasure and                    and
satisfaction                   boredom
17. Your life in the future will probably be:

1 2 3 4 5 6 7
full of completely
change consistent
without your and clear
knowing what
will happen
next

18. When something unpleasant happened in the past your tendency was:

1 2 3 4 5 6 7
“to eat to say “okay,
yourself up” that’s that, I
about it have to live
with it,” and
go on

19. Do you have very mixed-up feelings and ideas?

1 2 3 4 5 6 7
very seldom very often
or never

20. When you do something that gives you a good feeling:

1 2 3 4 5 6 7
it’s certain that it’s certain that
you’ll go on something will
feeling good happen to
spoil the feeling
21. Does it happen that you have feelings inside you that you would rather not feel

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<td>very seldom</td>
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22. You anticipate that your personal life in the future will be:

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<tr>
<td>totally without</td>
<td>full of</td>
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<td>meaning or</td>
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<td>purpose</td>
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23. Do you think that there will *always* be people whom you’ll be able to count on in the future?

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<tr>
<td>you’re certain</td>
<td>you doubt</td>
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<td>there will be</td>
<td>there will be</td>
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24. Does it happen that you have the feeling that you don’t know exactly what’s about to happen?

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<td>very seldom</td>
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<td>or never</td>
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25. Many people, even those with a strong character, sometimes feel like sad sacks (losers) in certain situations. How often have you felt this way in the past?

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<tr>
<td>never</td>
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<td></td>
<td></td>
<td>very often</td>
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141
26. When something happened, have you generally found that:

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<tr>
<td></td>
<td>you overestimated or underestimated its importance</td>
<td>you saw things in the right proportion</td>
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27. When you think of difficulties you are likely to face in important aspects of your life, do you have the feeling that:

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<td></td>
<td>you will always succeed in overcoming the difficulties</td>
<td>you won’t succeed in overcoming the difficulties</td>
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28. How often do you have the feeling that there’s little meaning in the things you do in your daily life?

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<td>very seldom</td>
<td>very often or never</td>
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29. How often do you have feelings that you’re not sure you can keep under control?

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<td>very often or never</td>
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APPENDIX F

PERSONAL VIEWS SURVEY III-R

Maddi & Koshaba (2001)

Instructions: Please answer the following 18 questions to the best of your ability, and as honestly as possible. There are not right or wrong answers. Please answer each question by circling the number that best describes your current views and life situation.

1. By working hard, you can always achieve your goals.
   
   1 2 3 4
   Not at all true Somewhat True Very True

2. I don’t like to make changes in my everyday schedule.

   1 2 3 4
   Not at all true Hardly True Moderately True Very True

3. I really look forward to my work.

   1 2 3 4
   Not at all true Hardly True Moderately True Very True

4. I am not equipped to handle the unexpected problems of life.

   1 2 3 4
   Not at all true Hardly True Moderately True Very True

5. Most of what happens in life is just meant to be.

   1 2 3 4
   Not at all true Hardly True Moderately True Very True
6. When I make plans, I’m certain I can make them work.

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<td>Not at all true</td>
<td>Hardly</td>
<td>Moderately</td>
<td>Very True</td>
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<td>True</td>
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7. Now matter how hard I try, my efforts usually accomplish little.

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8. I like a lot of variety in my work.

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9. Most of the time, people listen carefully to what I have to say.

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10. Thinking of yourself as a free person just leads to frustration.

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11. Trying your best at what you do usually pays off in the end.

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12. My mistakes are usually very difficult to correct.

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13. it bothers me when my daily routine gets interrupted.

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14. I often wake up eager to take up life wherever it left off.

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15. Lots of times, I really don’t know my own mind.

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16. Changes in routine provoke me to learn.

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17. Most days, life is really interesting and exciting for me.

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18. It’s hard to imagine anyone getting excited about working.

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APPENDIX G

QUEST SCALE

Batson (1991)

1. I was not very interested in religion until I began to ask questions about the meaning and purpose of my life.

-3 -2 -1 0 1 2 3
Strongly Disagree

2. I have been driven to ask religious questions out of a growing awareness of the tensions in my world and in my relation to my world.

-3 -2 -1 0 1 2 3
Strongly Disagree

3. My life experiences have led me to rethink my religious convictions.

-3 -2 -1 0 1 2 3
Strongly Disagree

4. God wasn’t very important for me until I began to ask questions about the meaning of my own life.

-3 -2 -1 0 1 2 3
Strongly Disagree

5. It might be said that I value my religious doubts and uncertainties.

-3 -2 -1 0 1 2 3
Strongly Disagree
6. For me, doubting is an important part of what it means to be religious.

7. I find religious doubting upsetting.

8. Questions are far more central to my religious experience than are answers.

9. As I grow and change, I expect my religion also to grow and change.

10. I am consistently questioning my religious beliefs.

11. I do not expect my religious convictions to change in the next few years.

12. There are many religious issues on which my views are still changing.
APPENDIX H

IMPACT OF EVENTS SCALE-REVISED

Weiss & Marmar (1997)

Have you ever experienced a traumatic or life-altering event?
Yes  No

If you answered yes, please identify the event you are thinking about: __________________________________________________________

Instructions: Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you **During The Past Seven Days** with respect to the traumatic or life-altering event you identified above.

1. Any reminder brought back feelings about it.

   0  1  2  3  4
   Not at A little Moderately Quite a Extremely
   all bit bit bit

2. I had trouble staying asleep.

   0  1  2  3  4
   Not at A little Moderately Quite a Extremely
   all bit bit bit

3. Other things kept making me think about it.

   0  1  2  3  4
   Not at A little Moderately Quite a Extremely
   all bit bit bit

4. I felt irritated and angry.

   0  1  2  3  4
   Not at A little Moderately Quite a Extremely
   all bit bit bit
5. I avoided letting myself get upset when I thought about it or was reminded of it.

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<tbody>
<tr>
<td>Not at all</td>
<td>A little bit</td>
<td>Moderately</td>
<td>Quite a bit</td>
<td>Extremely</td>
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6. I thought about it when I didn’t mean to.

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<td>Not at all</td>
<td>A little bit</td>
<td>Moderately</td>
<td>Quite a bit</td>
<td>Extremely</td>
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7. I felt as if it hadn’t happened or wasn’t real.

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<td>Moderately</td>
<td>Quite a bit</td>
<td>Extremely</td>
</tr>
</tbody>
</table>

8. I stayed away from reminders about it.

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<th>1</th>
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<td>A little bit</td>
<td>Moderately</td>
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9. Pictures about it popped into my mind.

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10. I was jumpy and easily startled.

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11. I tried not to think about it.

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</table>
12. I was aware that I still had a lot of feelings about it, but I didn’t deal with them.

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<th></th>
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13. My feelings about it were kind of numb.

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14. I found myself acting or feeling as though I was back at that time.

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15. I had trouble falling asleep.

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16. I had waves of strong feelings about it.

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<td>Quite a bit</td>
<td>Extremely</td>
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17. I tried to remove it from my memory.

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18. I had trouble concentrating.

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</table>
19. Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.

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</table>

20. I had dreams about it.

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21. I felt watchful or on-guard.

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22. I tried not to talk about it.

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APPENDIX I

BIDR VERSION 6- FORM 40

Paulhus (1984, 1990)

Instructions: Using the scale below as a guide, select the number that indicates how much you agree with each statement

1  2  3  4  5  6       7
Not True    Somewhat True        Very True

1. My first impression of people usually turns out to be right.  _____
2. It would be hard for me to break any of my bad habits.   _____
3. I don’t care to know what other people really think of me.   _____
4. I have not always been honest with myself.     _____
5. I always know why I like things.       _____
6. When my emotions are aroused, it biases my thinking.     _____
7. Once I have made up my mind, other people can seldom change my opinion. _____
8. I am not a safe driver when I exceed the speed limit.    _____
9. I am fully in control of my own fate.       _____
10. It’s hard for me to shut off a disturbing thought.  _____
11. I never regret my decisions.            _____
12. I sometimes lose out on things because I can’t make up my mind soon enough _____
<p>| | | | | | | |</p>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not True</td>
<td>Somewhat True</td>
<td>Very True</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. The reason I vote is because my vote can make a difference. ________
14. My parents were not always fair when they punished me. ________
15. I am a completely rational person. ________
16. I really appreciate criticism. ________
17. I am confident of my judgments. ________
18. I have sometimes doubted my ability as a lover. ________
19. It’s all right with me if some people happen to dislike me. ________
20. I don’t always know the reasons why I do the things I do. ________
21. I sometimes tell lies if I have to. ________
22. I never cover up my mistakes. ________
23. There have been occasions when I have taken advantage of someone. ________
24. I never swear. ________
25. I sometimes try to get even rather than forgive and forget. ________
26. I always obey laws, even if I’m unlikely to get caught. ________
27. I have said something bad about a friend behind his or her back. ________
28. When I hear people talking privately, I avoid listening. ________
29. I have received too much change from a salesperson without telling him or her. ________
30. I always declare everything at customs. ________
31. When I was young I sometimes sold things. ________
32. I have never dropped litter on the street. ________
33. I sometimes driver faster than the speed limit. ________
<table>
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<tr>
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<td>Not True</td>
<td>Somewhat True</td>
<td>Very True</td>
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<tr>
<td>34.</td>
<td>I never read sexy books or magazines.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>35.</td>
<td>I have never done things that I don’t tell other people about.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>36.</td>
<td>I never take things that don’t belong to me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>37.</td>
<td>I have taken sick-leave from work or school even though I wasn’t really sick.</td>
<td></td>
<td></td>
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<tr>
<td>38.</td>
<td>I have never damaged a library book or store merchandise without reporting it.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>39.</td>
<td>I have some pretty awful habits.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>40.</td>
<td>I don’t gossip about other people’s business.</td>
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</table>
APPENDIX J

DEMOGRAPHIC QUESTIONNAIRE

Demographic Information

Instructions: This questionnaire is designed to provide us with information which will help us describe the people who participated in this research. All information is anonymous and confidential. Please select or fill in responses for the following items.

Please provide your age in years: __________

Gender: Male     Female     Transgendered     Intersexed     Androgynous

Major: ___________________________

Year in School: Freshman     Sophomore     Junior     Senior     Other_________

Race/Ethnicity:     Religious Affiliation:

African/African American     Christianity
Asian/Pacific Islander     Judaism
Caucasian/White     Islam
Hispanic, Latino(a), Chicano(a)     Hinduism
Native-American/American Indian     Buddhism
Biracial/Bi-ethnic     Nonreligious/Spiritual
Multiracial/Multiethnic     Nonreligious/Agnostic/Atheist
Other _____________     Other _____________
Hello!

My name is Brian Bossick. Thank you for coming to participate in my dissertation study: *Posttraumatic Growth and Its Relationship to Personality*. If you are completing the survey for extra credit, you will be prompted to enter your email address so that extra credit can be assigned. However, all responses will be anonymous as your email address will be separated from your responses and deleted once the extra credit is assigned.

Also, you will be asked if you would like to be entered into a drawing for an *I-Pod Mini*. If you choose yes, your email address will be kept separate from your responses to protect your confidentiality.

If you have any questions regarding the survey please feel free to contact me at admin@growthsurvey.us or at 765-494-6995. Thanks again.

Please click on the link below to begin.

**Please click here to begin the survey:**

**What's New?**

Have a chance to win an I-Pod Mini by participating in the study!!
Informed Consent and Introduction

Name of Study: Posttraumatic Growth and its Relationship to Personality

Thank you for your interest in this research project. The purpose of this study is to examine the role that certain personality characteristics play in helping a person cope with stressful situations.

This study has been approved by the Institutional Review Board of the University of Akron. Please read this page carefully before you agree to participate. You are free to stop participating at any time without prejudice or explanation and there is no penalty for discontinuing your participation. Your anonymity as a respondent will be protected throughout the study and publication of the results. If you should agree to participate, you will be asked to continue to the next page and
begin completing the surveys. For each set of questions please read the specified instructions before responding. It is expected that completion of the self-report measures will take approximately twenty to thirty minutes.

There are minimal foreseeable risks or discomforts that are implicit in this process. These risks may be associated with the process of recalling specific stressful events or situations that you have encountered. There are however, several benefits associated with this study, including encouraging critical thinking and reflection about your personality style, exploration of the strengths that you have due to your personality, and positive benefits you may have experienced as a result of your struggle with a stressful situation. After you have completed the self-report measures you will receive a debriefing page that provides further background information on the study.

Thank you in advance for your participation.

If you have any questions or comments, email the researcher, Brian Bossick, at bbossick@purdue.edu or call at 765-494-6995. If, at any time, you feel your questions have not been adequately answered, you may request to speak with the Chair of the Department of Psychology (Dr. Paul Levy, 330-972-8369), Associate Chair of the Department of Psychology (Dr. Linda Subich, 330-972-7280) or the Interim Director of Research Services of the University of Akron (Ms. Sharon McWhorter, 330-972-8311, toll free 1-888-232-8790).

Please print this page for yourself for future reference.
IF YOU AGREE TO PARTICIPATE IN THE STUDY PLEASE CLICK ON THE BOX BELOW INDICATING THAT YOU WISH TO PARTICIPATE IN THIS STUDY.

* 

1. Do you wish to participate in this study?
   ☑️ Do you wish to participate in this study? Yes, I wish to participate in this study
   ☑️ No, I do not wish to participate in this study
Information/Debriefing Sheet
Posttraumatic Growth and its Relation to One’s Personality

Overview: I would like to thank you for your participation in this study. The primary purpose of this project is to examine the relations between the positive growth that one may experience from enduring and encountering a stressful event and the personality factors that help one cope with a stressful/traumatic situation. This study seeks to better understand this relationship with the hope that this knowledge will ultimately contribute to a better understanding of how individuals cope with and potentially grow from stressful and traumatic situations.
Method: All participants’ responses are anonymous. Responses will be computer scored in aggregate form (everyone’s responses will be averaged together).

Important Reminders: If you have any questions or comments feel free to contact the investigator, Brian Bossick, M.A. through email (bbosick@purdue.edu) or by phone at: 765-494-6995.

If completing the questionnaires caused you any concern, you may wish to contact one of the following two agencies. You can initiate contact by phone or in person.

Counseling, Testing, and Career Center
Student Affairs Building
Hazzleton East Simmons Hall, 304-306
277 East Buchtel Avenue
University of Akron
(330) 972-7082 (Free for UA students)

Department of Psychology Counseling Clinic
Arts and Sciences Building
3rd Floor, Room: 342
290 East Buchtel Avenue
University of Akron
(330)-972-6714 (Free for both community members and UA students)

**Please print this page for future reference**