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Posttraumatic Growth Development: Core Belief Disruption, Event Centrality, and Time Since Trauma

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POSTTRAUMATIC GROWTH DEVELOPMENT: CORE BELIEF DISRUPTION, EVENT
CENTRALITY, AND TIME SINCE TRAUMA

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You have been my support when I needed strength, my encouragement when I was weary, and my inspiration when I needed to be more than I was. I am a better scholar, teacher, counselor, and man because of you – Heather.

Caspian, Cade, Haley – At least in part, I have done what I can to create something better for you. I hope that my successes and my failures can be instrumental in making a better world for you, and in helping you to be better people for a world in need.

ABSTRACT

Posttraumatic growth describes positive changes that individuals may experience in the aftermath of traumatic events that have significantly disrupted their core beliefs about themselves and their understanding of the world. Alternate models of posttraumatic growth have challenged the conceptualization of posttraumatic growth as personality change, in part due to lack of research that supports a relationship between the development of posttraumatic growth and the amount of time since the traumatic experience, and factors related to the development of posttraumatic growth. Recent research on the role that event centrality plays in the development of posttraumatic growth is promising (e.g., Johnson & Boals, 2014). This research study explores the relationship between posttraumatic growth and time since traumatic experience by taking event centrality and a related construct, core belief disruption, into consideration. Differences in posttraumatic growth between individuals with high or low event centrality and core belief disruption were compared. Differences in event centrality, core belief disruption, and posttraumatic growth were compared based on the amount of time since the traumatic experience for individuals who have experienced trauma in the past year.

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LIST OF ABBREVIATIONS

ANOVA ....Analysis of Variance

CBI..Core Beliefs Inventory

CES .... Centrality of Event Scale

MANOVA..Multivariate Analysis of Variance

PTG.. Posttraumatic Growth

PTGI...Posttraumatic Growth Inventory

PTSD...Posttraumatic Stress Disorder

CHAPTER 1 INTRODUCTION

In 1991, Jerry Sittser's van was hit by an oncoming car. The accident took the lives of his mother, his wife, and his four-year-old daughter, leaving him a single father of three young children who had just survived the same accident. Sittser wrote about that catastrophic and traumatizing event, and his subsequent struggles with doubt, depression, anger, and grief, "to show how it is possible to live in and *be enlarged by* loss, even as we continue to experience it" (1995, pg. 10, emphasis mine). Sittser describes his experience not as a unique event solely defined by loss, grief, and negative posttraumatic symptomology, but as a normal and continuing life experience that includes growth and positive change in the midst of heartache.

Most people will experience a traumatic event during the course of their lifetime, such as incurring a significant injury, developing a serious illness, experiencing physical or sexual violence, or suddenly losing a loved one (Bonanno, 2004; Simiola, Neilson, Thompson, & Cook, 2015). Traumatic experiences produce a variety of human responses, such as *resilience*, *coping*, *pathology*, *recovery*, and *growth*. Many who experience difficult events and hardships in life are resilient to trauma, and are able to continue to function normally with little life disruption due to their ability to adapt to the situation and their resistance to the development of symptoms of Posttraumatic Stress Disorder (PTSD; Levine, Laufer, Stein, Hamama-Raz, & Solomon, 2009; Tan, 2013). Stratta et al. (2015) distinguish resilience, which they conceptualize as positive adaptation to adversity that is protective against the negative effects of trauma, from

coping, which describes management of internal or external challenges. Resilience can also be described in terms of recovery. Specifically, resilience can refer to the process of a return to the individual's normal level of functioning following a period of psychopathology in the aftermath of a traumatic event (Bonanno, 2004; Lepore & Revenson, 2006). Not everyone is resilient, and coping is not always successful (Campbell-Sills, Cohen, & Stein, 2006; Stratta et al., 2015). Between 2% and 8% of the general population in the United States either are not resilient or fail to cope successfully, and as a result respond pathologically to traumatic events with the development of PTSD (Gill, Page, Sharps, & Campbell, 2008; Haagsma et al., 2012) or an adjustment disorder (Lancaster, Kloep, Rodriguez, & Weston, 2013). These individuals experience symptoms as a result of traumatic events that are highly disruptive to their normal functioning. The level of disruption that people experience as a result of a traumatic event depends on a variety of factors including the characteristics of the trauma itself (e.g., severity of the event, suddenness of the event, etc.), environmental factors (such as the amount of social support that the trauma survivor experiences or extended social networks), and personal characteristics (how the individual perceives the event, cognitive functioning, etc.) (Bonanno, 2004; Stratta et al., 2015). PTSD symptoms were found by Haagsma et al. to be present at a rate between 5% and 39% more than one year after traumatic experiences among major trauma patients (2012), while others are able to recover. Thus, individual response to traumatic experience varies greatly. Some of these categories of response overlap, such as the case of individuals who initially develop PTSD (pathology) but later return to normal functioning (resilience; Haagsma et al., 2012).

Posttraumatic growth (PTG) is distinct from recovery, resilience, and pathology (Lepore & Revenson, 2006; Tedeschi & Calhoun, 2004). PTG describes the experience of positive outcomes "in the aftermath of an extremely stressful event (traumatic event)" (Zoellner & Maercker, 2006, p. 628) that are not part of a typical developmental process or the result of smaller stressful events. It is the experience of a new benefit or something positive that has been added to the individual's life. While philosophers and religious teachers have believed and taught for millennia that humans often experience positive growth and change following difficult experiences, posttraumatic growth has only been formally studied in the social sciences using that term since the mid-1990s (Calhoun & Tedeschi, 2006). However, at least one theory of adaptive change goes back at least a decade earlier (Taylor, 1983). Posttraumatic growth differs from resilience, coping, and PTSD in that PTG describes the positive benefits an individual experiences as a result of the trauma which are independent of the presence of PTSD or trauma-related symptomology (Boals, Steward, & Schuettler, 2010; Groleau, Calhoun, Cann, & Tedeschi, 2013). This is not to say that the traumatic experience itself is thought to be good or positive. Rather the focus is on the positive factors that result from the process of dealing with the traumatic experience. These positive effects are commonly categorized into five domains of growth: new possibilities, relating to others, personal strength, spiritual change, and appreciation for life (Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 1996). While the process of posttraumatic growth development has been conceptualized in several different ways (Calhoun & Tedeschi, 2006; Janoff-Bulman, 2006; Neimeyer, 2006), most models contain at least a few common key elements, as demonstrated by the following three descriptions of PTG.

1. After experiencing a traumatic event, many people think about that event in an effort to understand it and make sense of it in the context of their lives. The pain of the traumatic event itself is only part of the difficulty that is experienced – survivors of trauma must also find a way to integrate their personal beliefs and prior experiences with the traumatic experience in order for new perspectives on life to take place and growth to occur. This process has been conceptualized as a function of rumination and meaning-making (Calhoun & Tedeschi, 2006), where individuals first experience intrusive rumination which then gives way to intentional rumination through which meaningfulness emerges resulting in PTG.

2. Growth can be conceptualized through a narrative lens, in which trauma prompts a disruption in the individual's self-narrative that leads to meaning reconstruction (Neimeyer, 2006).

3. Growth can also be described as the process of schema-change. Schemas are a cognitive structures "which act as coherent concepts or naïve theories that render the world manageable" (Fiske, 2004, p. 143). Schema are changed when people experience trauma and, through cognitive processing, gain a sense of the event's significance for their lives. Growth occurs as a result (Janoff-Bulman, 2006).

Common to each of the perspectives is that engagement in cognitive processing following a worldview disruption can result in found meaning or making sense of the traumatic experience in such a way that growth results.

Problem Statement

The above models all conceptualize posttraumatic growth as a positive change in personality that results from intensely stressful or difficult life experience (Calhoun &

Tedeschi, 2006; Jaywickreme & Blackie, 2014). However, several competing theories have emerged that conceptualize PTG as something other than change in personality (e.g., Jaywickreme & Blackie, 2014; Joseph & Linley, 2005; Zoellner & Maercker, 2006). Posttraumatic growth has been conceptualized as psychological well-being (Joseph et al., 2012), adaptive coping (Taylor & Armor, 1996), meaning-making or lesson-learning (Jaywickreme & Blackie, 2014), and as a combination of perceived growth and actual growth (Frazier et al., 2009). This would indicate that while there appears to be agreement that PTG represents a genuine, viable construct, there is disagreement about how useful of a construct it is and what precisely is represented by the construct of posttraumatic growth (Jaywickreme & Blackie, 2014). Little research has been conducted on differences between varying models of PTG or how contributing factors of PTG may support one model over others (e.g., Hallam & Morris, 2014), and at least one researcher has commented on the need for a clearly defined, agreed upon definition of PTG (Jaywickreme & Blackie, 2014). One function of the present state of PTG research is a lack of understanding about how PTG develops. It is unclear when change takes place in the process of PTG. Reported PTG immediately following traumatic experience may be the result of adaptive coping (Taylor & Armor, 1996), perceived change (Joseph et al., 2012), or a form of learning. Differences in PTG at various points in time following the traumatic event could shed light on the developmental process of PTG, and help clarify the various models of PTG. Previous attempts to measure differences in PTG at time intervals following the traumatic experience have yielded inconsistent results (e.g., Carboon, Anderson, Pollard, Szer & Seymour, 2005; Danhauer et al., 2013; Triplett et al., 2012). However, recent research

examining the role of event centrality in PTG development has brought new promise to the field (Johnson & Boals, 2014).

Therefore, to advance our understanding of posttraumatic growth and its usefulness as a construct for helping individuals who have experienced trauma, additional research is needed. Specifically, PTG research can benefit from studies that attempt to support or refute specific models of PTG, studies that examine time as a component of PTG development, and studies that examine the role that event centrality, and other constructs of worldview disruption, play in the development of PTG. One way to do this would be to measure the variables of the primary model of posttraumatic personality change over time in the period immediately following a traumatic experience. Such a study could examine core belief disruption, the event centrality of difficult life experiences, and the relationship between these two predictors of posttraumatic growth and time.

Social Significance

Difficult experiences are a natural part of life that most people will have to face: chronic and terminal illness, the loss of a loved one, war, natural disasters, and accidental injury all represent potentially traumatic events. These are all circumstances that have the potential to be psychologically distressful and emotionally painful, but also can provide an initiating context for posttraumatic growth (Milam, 2006; Paton, 2006; Rosner & Powell, 2006; Stanton, Bower, & Low, 2006; Znoj, 2006). Although investigation into the potential for growth following trauma is progressing, most research on the effects of trauma focuses on negative outcomes (Calhoun & Tedeschi, 2006). It is important to better understand PTG given the prevalence of trauma in American society (Bonanno,

2004). A better understanding of PTG could potentially supplement the current treatment of traumatic and difficult experiences. Treatment currently focuses primarily on reduction of negative symptoms that arise from the experience of trauma or difficult experiences (Zoellner & Maercker, 2006a). However, as PTG is better understood, a prognosis of growth could become a norm for treatment. Currently there is reason for caution against the expectation of growth for clients, as that expectation could minimize the severity of traumatic experience, set clients up for failure, and cultivate further detrimental symptoms if they do not experience growth (Calhoun & Tedeschi, 2006). However, if expectations are managed and the growth process is better understood, treatment focus could change.

Additionally, with further information about traumatic experience and PTG, trauma and difficult life experiences can be normalized as a part of the human experience, including the growth process (Zoellner & Maercker, 2006a). When the high occurrence of traumatic experience in the United States is considered, any research that can help clarify the process of growth and positive change has social significance (Simiola, Neilson, Thompson, & Cook, 2015). Posttraumatic growth and posttraumatic distress appear to have unique developmental processes even though they are each initiated from the same event or series of events (Groleau, Calhoun, Cann, & Tedeschi, 2012). As the process of growth is better understood, clinicians and clients will be able to better manage the aftermath of difficult experiences (Zoellner & Maercker, 2006a).

Finally, various fields of treatment of physical, medical, and psychological problems can be assisted by continued research into posttraumatic growth. Doctors and healthcare workers will be better equipped to assist the terminally ill with return to

normal functioning (Milam, 2006; Stanton, Bower, & Low, 2006). Grief counselors can assist their clients with loss (Znoj, 2006). Treatment for soldiers post-deployment can be improved (Rosner & Powell, 2006). Disaster relief workers and first responders can assist survivors with the implementation of psychological first aid (Paton, 2006).

Professional Significance

Continued research is needed to better understand what posttraumatic growth is, the developmental process of PTG, and how it might be used clinically to help individuals who have experienced diagnosable trauma or difficult life circumstances. It may not always be possible to find clinical interventions to help facilitate PTG, and not everyone experiences PTG (Calhoun & Tedeschi, 2013). Understanding factors that influence PTG can help clinicians identify clients who might be ready to look at their traumatic experiences from a growth perspective, and avoid unwarranted expectations of growth in other clients (Calhoun & Tedeschi, 2013).

As there are several theories of what PTG represents (Jaywickreme & Blackie, 2014), research that helps distinguish which model is the best fit can guide future research, allowing some factors to be left out of predictive models and helping to refine our understanding of how PTG develops. Further research in the area of PTG can also provide data that could potentially confirm and strengthen the associations between core belief disruption, event centrality, meaning making, cognitive processing, and personality change outcomes that are components of the most well established models (Calhoun & Tedeschi, 2006; Janoff-Bulman, 2006), as well as provide a better understanding of the process of "schema disruption" and growth following the traumatic event (Janoff-Bulman, 2006).

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Theoretical Foundation

Søren Kierkegaard, the father of existential philosophy, described conflict between the difficult life experiences that individuals face and their worldview:

> So it happens at times that a person believes that he has a world-view, but that there is yet one particular phenomenon that is of such a nature that it baffles the understanding, and that he explains differently and attempts to ignore in order not to harbor the thought that this phenomenon might overflow the whole view, or that his reflection does not possess enough courage and resolution to penetrate the phenomenon with his world-view. (Kierkegaard, pg. 188)

Kierkegaard's understanding of this conflict is remarkably similar to recent descriptions of how traumatic experiences can threaten to subsume the worldview or sense of identity held by people prior to their traumatic experience. Kierkegaard, and the existential thinkers who followed him, wrote in reaction to a view of the world as a "closed, coherent, intelligible system" (Blackburn, 2008, "Existentialism") in which people would ultimately find "comprehension within an all-embracing objective understanding of the universe" (Baldwin, 2005, "Existentialism", 2nd paragraph). Rather, existence is a uniquely human experience that carries with it the responsibility of making sense of a world that is ultimately absurd (Blackburn, 2008). Theorists such as Viktor Frankl, Rollo May, and Irvin Yalom built their approaches to therapy on existential philosophy (Yalom, 1980). Existential thought can be seen clearly in the title of Frankl's book, *Man's Search for Meaning* (1959), but Yalom developed a more comprehensive approach to understanding and helping psychological pain in his work *Existential Therapy* (1980).

Yalom believed that psychological conflict flowed from the individual's confrontation with the given realities found in the world (1980). Awareness of the reality of death and ultimate concerns provokes anxiety and the individual's defenses are raised. However, "occasionally, some jolting experience in life tears a rent in the curtain of defenses and permits raw death anxiety to erupt into consciousness" (pg. 44). The crisis and danger of that confrontation with death leads to personal change – inner change that can only be seen as growth (Yalom, 1980). Existential theory in general, and Yalom's conceptualization specifically, provide a general framework upon which the following theory of PTG is built.

Theory of Trauma and Posttraumatic Growth

Yalom conceptualized psychological conflict as a confrontation between the world as the individual imagines it, and the realities of that world as experienced by the individual (1980). Growth and change can occur when an individual who is confronted with difficult realities of life is able to accept those realities and build a worldview that takes those realities into consideration. Similarly, traumatic experiences are complicated by the fact that in addition to the damaging experience of the trauma itself, the individual's worldview is often disrupted, forming an additional domain of the problem that accompanies the pain of the traumatic experience. The event that is disruptive of the individual's worldview presents an inescapable counter example that conflicts with the individual's concept of the world and shatters that coherent view of self and the world that was previously held (Janoff-Bulman, 2004; Jayawickreme & Blackie, 2014; Zoellner & Maercker, 2006). The mental pictures that people have about themselves or the way the world works, often called schema, can be disrupted or shattered by traumatic

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experiences (Janoff-Bulman, 2006). For example, when one thinks of the world predominantly as a safe place, and then experiences a life-threatening injury or physical harm in an attack by another, that image of the world as a safe place can cease to make sense. In this way, traumatic experiences can be doubly disturbing because, beyond the event itself causing psychological pain, the individual's entire view of the world can seem to be under attack. Trauma can shatter the foundation of an individual's core beliefs and greatly disrupt the individual's functioning as a result (Calhoun & Tedeschi, 2006; Janoff-Bulman, 2006). One of the goals of this study is to provide additional evidence that confirms this theory of growth by exploring the relationships between core belief disruption, event centrality, and PTG. In the following sections I discuss the constructs of core belief disruption, event centrality, and posttraumatic growth.

Meaning Making and Event Centrality

Events that are vivid and highly accessible take a central place in the formation of meaning and provide structure for how life narratives are formed (Berntsen & Rubin, 2006). Central life events are specific events that have a prominent place in the formation of identity and life story. Events that hold this prominent place in identity development are considered to have *event centrality*. Researchers have studied the centrality of both positive and negative events as identity forming components (i.e., Berntsen & Rubin, 2006; Pillemer, 1998), but recent research has emerged that examines the event centrality of negative events in the formation of positive change (e.g., Boals, Steward & Schuettler, 2010). PTG occurs when, as a result of core belief disruption due to traumatic experiences, people are forced to wrestle with the conflict between their old schema and worldview that no longer makes sense in light of their traumatic experience (Janoff-

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Bulman, 2006). People try to make sense of their trauma by reconstructing a view of the world that includes their traumatic experience (Howells, & Fletcher, 2015; Linley & Joseph, 2011). This cognitive process often manifests as intrusive, unwanted rumination that gradually shifts into deliberate rumination that includes a process of meaning making (Taku, Cann, Tedeschi, & Calhoun, 2009). The most well-established models of PTG all include some version of the meaning making process as an influencing factor in the development of PTG (Zoellner and Maercker, 2006b). This cognitive processing often results in the traumatic experiences becoming central to the survivor's sense of personal identity (Boals, Steward & Schuettler, 2010; Janoff-Bulman, 2006). In this way, the traumatic events are conceptualized as central life events. Shattered assumptions, core belief disruption, and event centrality are all components of the developmental structure of growth that occurs in traumatic aftermath. Event centrality, defined as the degree to which a traumatic event becomes central to the identity of an individual who experiences it, has been demonstrated to be a predictive factor of PTG, with research indicating that those who experience a high degree of event centrality are more likely to report PTG (Boals, Steward, & Schuettler, 2010). One goal of this study is to provide confirmatory evidence for this theory, and to understand how time since traumatic event may influence the development of PTG.

Core Belief Disruption

As discussed in the previous sections, posttraumatic growth is more likely to occur when the survivor's beliefs are disrupted (Calhoun & Tedeschi, 2006). Janoff-Bulman (1992) describes this disruption of beliefs as a shattered world: the set of assumptions and beliefs that make up the individuals view of the world is challenged by

the traumatic experience. The challenge can be distressful, and can cause intrusive thinking about the event or the individual's life or beliefs. In theory, this intrusive thinking is the mind's effort to construct a new worldview or internal reality in light of the traumatic experience that has challenged the individual's core beliefs (Calhoun & Tedeschi, 2006; Janoff-Bulman, 2006; Tedeschi & Calhoun, 2004). While the disruption of core beliefs can add to the distress that individuals feel in the aftermath of trauma (Calhoun & Tedeschi, 2006; Janoff-Bulman, 2006), that very same disruption of beliefs can also be the impetus for growth because "it is the individual's struggle with the new reality in the aftermath of trauma that is crucial in determining the extent to which posttraumatic growth occurs" (Tedeschi & Calhoun, 2004, p. 5). One question that emerges from this theory of PTG is whether core belief disruption, which is a related construct to event centrality, is also predictive of PTG in the same way that event centrality is, and what differences exist between how event centrality and core belief disruption are related to PTG outcomes. In theory, both event centrality and core belief disruption can be described as part of the meaning making process that drives PTG (Calhoun & Tedeschi, 2006; Calhoun & Tedeschi, 2013).

Purpose of Study

This study is designed to examine the above described theory of PTG. The purpose of this study has several components. Posttraumatic growth is conceptualized as personality change that develops when individuals face significant events that disrupt their beliefs about themselves and their world and promote the internalization of the traumatic event as a central event in identity formation (Boals et al., 2010; Calhoun & Tedeschi, 2006; Cann et al., 2010; Janoff-Bulman, 2006). This study will examine that

model by focusing on the relationships between core belief disruption, event centrality, time, and PTG. Core belief disruption could be conceptualized as the beginning point of the developmental process, as in PTG theory it stands as the causal component that triggers the cognitive process leading to PTG (Cann et al., 2010; Janoff-Bulman, 2006). Likewise, event centrality could be conceptualized as an endpoint marker of the developmental process because, theoretically, some amount of cognitive processing must take place before the traumatic event is considered to be an event that is highly influential to identity formation (Boals et al., 2010; Calhoun & Tedeschi, 2006). Therefore, the overall purpose of the study is to examine differences in event centrality, core belief disruption, and PTG at different time intervals following a traumatic event.

<div align="center">**Research Questions and Hypothesis**</div>

In the light of the study's purpose, I examined the following research questions:

Research Question 1

Do individuals who experience life difficulties as a central life event and experience core belief disruption experience more PTG than those who do not experience life difficulties as a central life event or core belief disruption (Table 1.1)?

Hypothesis 1a. Individuals who experience life difficulties as a central life event, as measured by an upper quartile score on the Centrality of Event Scale (CES; Berntsen & Rubin, 2006), will report greater PTG than those who do not report life difficulties as a central life event, as measured by the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996).

Hypothesis 1b. Individuals who experience core belief disruption as a result of life difficulties, as measured by an upper quartile score on the Core Beliefs Inventory

(CBI; Cann et al., 2010), will report greater PTG than those who do not report core belief disruption, as measured by the PTGI (Tedeschi & Calhoun, 1996).

Table 1.1

Variables and Analyses Associated with Research Questions

Question	IVs	DVs	Analysis
Question 1	Event Centrality (CES[a]), Core Belief Disruption (CBI[a])	Posttraumatic Growth (PTGI[b])	ANOVA
Question 2	Time since Trauma	Event Centrality (CES[b]), Core Belief Disruption (CBI[b]), Posttraumatic Growth (PTGI[b])	MANOVA

[a]Categorical variables of two groups, based on an upper quartile vs. lower three-quartiles split of instrument score. [b]Continuous variables, based on instrument score.

Research Question 2

Are there differences in core belief disruption, event centrality, and posttraumatic growth based on time since traumatic event (Table 1.1)?

Hypothesis 2. As time since difficult life experience increases, core belief disruption, measured as a continuous variable on the CBI (Cann et al., 2010), will remain stable, and event centrality, measured as a continuous variable on the CES (Berntsen & Rubin, 2006), will increase. As time since trauma increases, posttraumatic growth, as measured by the PTGI (Tedeschi & Calhoun, 1996), will also increase. Time since traumatic experience will be measured in the following categories: less than two weeks ago, between two weeks ago and eight weeks ago, between eight weeks ago and six months ago, and six to twelve months ago.

Research Design

This study uses a cross-sectional research design. As such, individuals were invited to participate in research about PTG and were recruited to answer questions about the most difficult life experience they have had in the past year. Participants were recruited through email invitation to the study. Potential participant email lists were compiled through my relationships with several organizations with which I am affiliated, including current and past students at a graduate school in the southeastern United States and a religious organization with which I am affiliated. Eligibility criteria were that participants be over the age of 18 and have experienced what they would consider to be a traumatic event or difficult life experience in the year prior to participation. These criteria items were included on the participation invitation and the informed consent. Before beginning data collection, IRB approval was obtained. Information about informed consent was provided to potential participants, and participants were asked to complete the Core Beliefs Inventory (CBI; Cann et al., 2010) the Centrality of Event Scale (CES; Berntsen & Rubin, 2006), the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996), and a collection of questions used to gather demographic information (Appendix A).

Participants

In this study I recruited participants who are interested in participating in PTG research, who report a difficult life experience in the year prior to participation. I targeted participants with diverse educational backgrounds and diverse experiences of difficult life situations.

Population

Most people will experience a traumatic event at some point in their lives (Bonanno, 2004), and recent research has demonstrated that the type of trauma experienced has little effect on growth (Shakespeare-Finch & Barrington, 2012). Therefore, the type of traumatic event experienced will not be a restriction on the population. This study focused on the experience of adults, purposefully to the exclusion of children and adolescents. Children and adolescents may not be the best candidates for PTG because the growth process assumes that there are established cognitive schema that are challenged by extreme difficulty (Tedeschi & Calhoun, 2004) and children and adolescents are still experiencing significant cognitive development (i.e., schema development). Adults of all ages were viable candidates for inclusion in this study. Older adults might have a tendency to experience less PTG as they might tend to a) be less open to new ways of conceptualizing difficulty, and b) might have already learned their life lessons through difficult experiences (Tedeschi & Calhoun, 2004). Even so, adult participants were not screened by age because no data exists to support a suitable cutoff age for PTG development. Because previous research findings have indicated that PTG in general (Ullman, 2014) and the PTG domains of *relating to others* and *personal strength* specifically are negatively correlated with level of education (Grubaugh & Resick, 2007), participants were recruited from a variety of educational backgrounds. Additionally, psychological research in general suffers from an over-reliance on college student participants, largely because college students are a readily available group for those involved in psychological research at large universities (Heppner & Heppner, 2004), and PTG research appears to be no exception (e.g., Barton, Boals, & Knowles, 2013; Bernard

et al., 2015; Boals et al., 2010; Boals & Schuettler, 2011; Cann et al., 2010; Cann et al., 2015; Johnson & Boals, 2015; Groleau et al., 2013; Lancaster et al., 2013; Lindstrom et al., 2013; Schuettler & Boals, 2011; Su & Chen, 2015; Triplett et al., 2012) Thus, in an effort to expand findings to the broader population, I did not recruit participants exclusively via association with educational institutions. In particular, recruitment targeted graduate-level students, graduate school alumni, and individuals from the broader community that are likely to have diverse educational backgrounds.

Sampling Method

The sampling frame for this study consists of adults who agreed to participate in research about how people respond to challenges in life. In participant recruitment for this study I intentionally sought participants other than undergraduate university students. I recruited participants without regard to the specific type of life difficulties that have been experienced, because the type of trauma experienced and the presence of related constructs appear to have little influence on the development of PTG (Shakespeare-Finch & Barrington, 2012; Tedeschi & Calhoun, 2004; Zoellner & Maercker, 2005).

I recruited participants from five primary avenues, with an expectation of reaching a minimum of 2,925 potential participants. A detailed strategy for participant recruitment is outlined in Chapter Three. An overview of that strategy follows. First, I recruited participants through their connection to the graduate school that I work at. I recruited students by requesting their participation in the classes that I teach, and by collaborating with my colleagues to recruit students in my colleagues' classes. Students were given an opportunity in class to take the survey. Students and alumni who were not in my classes or my colleagues' classes were contacted via email with a request to

participate. I also recruited staff members at the institution. Second, I recruited a community sample of individuals who were members of or attendees of the church denomination with which I am affiliated, via email invitation. Third, I planned to recruit military families via two means. The first of these means is through a marriage conference for military personnel and their spouses. I planned to attend the conference and address the group to extend an invitation to participate in the research. The second means of recruiting military personnel was via a mental health clinic. I planned to partner with the founder of the clinic and staff members in the clinic to invite new patients to participate in the research when they arrived for their first visit to the clinic. Fourth, by partnering with colleagues who teach at various other universities, I recruited participants by inviting students to participate. Finally, I partnered with participants at several local mental health service providers from the community to recruit participants who were involved in mental health group treatment. Participants had the option to either complete a survey when I meet them in their groups or complete it at home via an online survey. Of the 2,925 potential participants, at least 720 were anticipated to participate. This study would reach sufficient power for data analysis if only 25% of those 720 who are anticipated to participate actually participated.

   This research design uses a convenience sample. Simple random sampling was not a feasible option for this study due to the broad population under consideration, the inability to predict a traumatic incident, and the time constraints that limit the scope of this research project.

Sample Size

Each of my research questions were analyzed with between group comparison analyses. Wilson Van Voorhis and Morgan (2007) recommend a minimum of seven participants per cell for measuring group differences, with cell sizes of 30 for 80% power. Research question one needed a minimum of 120 participants according to this calculation, given two independent variables with two categories each, and one independent variable. For each independent variable, the two categories were based on a ¼ to ¾ split in the participant sample. Given a 30 participant minimum per cell, the total sample size was calculated to be at least 120.

Research question two also required a minimum of 120 participants, as the design calls for one independent variable with four categories, and two dependent variables. Four categories of the dependent variable, with 30 participants per cell, requires a minimum of 120 participants. However, a complicating factor was present in that the categories for the independent variable is time since traumatic event. It was unknown in advance of data collection how many participants would be in each category.

Additional sources provide greater context for the necessary sample size. Pallant (2010) recommends a minimum of seven participants per cell, requiring a minimum of 28 participants. A power analysis was conducted using G*Power. An ANOVA ($f = 0.25$, $\alpha = 0.05$, power = 0.80) with four groups requires 180 participants. This represents a wide discrepancy in the number of participants required for this study. In view of these recommendations and power analyses, I attempted to recruit a minimum of 200 participants.

Participant Selection

Participants who were eligible for this study must (a) be at least 18 years old, and (b) consent to participate in the research study. I did not limit participant recruitment based on gender, ethnicity, type of trauma experienced, type of traumatic symptoms, or degree of traumatic symptoms. There is little to no evidence for type of traumatic experience effecting PTG (Shakespeare-Finch & Barrington, 2012). Trauma survivors have reported growth benefits as early as two weeks after the traumatic event (i.e., Frazier, Conlon, & Glaser, 2001), and to remain for up to 13 years after the event (Powell, Gilson, & Collin, 2012). This indicates that PTG has the potential to develop very quickly. Thus, in this research I attempted to gather data as soon after the traumatic experience as possible.

<div align="center">

Instruments

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Core Beliefs Inventory

The Core Beliefs Inventory (CBI; Cann et al., 2010) is a nine-item instrument that was the first instrument designed to assess the degree to which an individual's core beliefs or assumptions are disrupted by a traumatic experience. The CBI measures core belief disruption following a stressful life event, does not require the individual to have experienced clinically defined trauma, and focuses on "religious and spiritual beliefs, human nature, relationships with other people, meaning of life, and personal strengths and weaknesses" (Cann et al., 2010, pg. 21). The CBI demonstrated good reliability across three studies with alpha coefficients between 0.82 and 0.89. Additionally, the CBI is related to posttraumatic growth ($r = .57$, $p < .001$) and moderately correlated with current stressfulness ($r = .30$, $p < .001$), and stressfulness at the time of the event ($r = .23$,

p < .01). Moderate correlations are to be expected when examining disruptions of life events, as some stressful events will challenge core beliefs, while others fit with existing beliefs while still being stressful. Responses to each question are made on a six point scale (0-5), with answers ranging from "not at all" to "a very great degree." For the purpose of this study, the CBI was used to measure the degree of core belief disruption that participants have experienced as a result of their recent traumatic experience.

CBI items have been used as dichotomous variables, with item score responses indicating that beliefs in the given area were disrupted "to a very small degree" representing no core belief disruptions and items scored higher representing belief disruption (LoSavio et al., 2011). This study used CBI scores as both continuous variables and as categorical variables based on the upper quartile of response.

Centrality of Event Scale

The Centrality of Event Scale (CES**,** Berntsen & Rubin, 2006) is a 20-item scale designed to "measure the extent to which a memory for a stressful event forms a reference point for personal identity and for the attribution of meaning to other experiences in a person's life" (p. 220). The CES has high reliability (α = .94), and a short-form made up of seven items (α = .88). In assessing for validity, significant differences were found between individuals who felt intense fear, horror, or helplessness as a result of their traumatic experience and those who did not, but no significant differences were found between those who reported that the event involved actual or threatened death or injury and those who did not. This indicates that the CES is sensitive to the emotional response resulting from the traumatic event, and not simply the event itself. Additionally, the CES is associated with depression (r = .38, *p* < .0001) and

Posttraumatic Stress Disorder symptomology (r = .23, p < .01), both of which are to be

expected among people who have experience a stressful event that is a reference point for

identity formation. The Centrality of Event Scale has been used in recent research to

assess for the degree to which a traumatic experience has become a central event. This is

consistent with PTG theory that hypothesizes that traumatic events are most likely to

produce growth when they disrupt the individual's personal narrative (Calhoun &

Tedeschi, 2006). For the purpose of this study, I used the CES as an instrument to

measure the degree to which the traumatic event that participants have experienced is a

formative event for the purpose of identity formation and understanding the world.

Calhoun and Tedeschi hypothesize that once a minimum threshold is reached, narrative

disruption may not predict for PTG. This study used the long form of the CES both as a

continuous variable and a categorical variable based on the upper quartile of response.

Posttraumatic Growth Inventory

The Posttraumatic Growth Inventory (PTGI, Tedeschi & Calhoun, 1996) is a 21-

item scale with five subscales. The PTGI measures how successful people are in

"restructuring or strengthening their perceptions of self, others, and the meaning of

events" (p. 455). Changes have been found to occur in three broad categories: perception

of self, interpersonal relationships, and philosophy of life. The five subscales fall within

these three broad categories and include factors of New Possibilities, Relating to Others,

Personal Strength, Spiritual Change, and Appreciation for Life. Internal consistency of

the 21-item PTGI is acceptable (α = .90), and the five factors also demonstrate good

internal consistency (New Possibilities: α = .84, Relating to Others: α = .85, Personal

Strength: α = .72, Spiritual Change: α = .85, Appreciation for Life: α = .67). Test-retest

reliability is acceptable ($r = .71$). The PTGI was analyzed for construct, concurrent, and discriminant validity. Individuals reporting greater severity of traumatic experience reported significantly more PTG, which was to be expected. Posttraumatic growth is expected to be related to some personality characteristics, such as optimism and religiosity, which would be associated with people who tend to see the benefits of trauma, and not correlated with social desirability, which would occur if posttraumatic growth was a socially desirable feature that was not actually present. PTGI scores have a mild negative correlation to social desirability ($r = -.15$, $p < .01$), and have low to moderate correlations with optimism ($r = .23$, $p < .01$), religiosity ($r = .25$, $p < .01$), and the personality traits of extroversion ($r = .29$, $p < .01$), and openness ($r = .21$, $p < .01$). The PTGI has become the standard in the field of PTG research for retrospectively assessing the presence and degree of PTG.

Data Analysis

Prior to analyzing data based on my research questions, I conducted a preliminary analysis of the data to check assumptions such as the presence of outliers, normality, linearity, homoscedasticity, multicollinearity of variables. Additionally, I conducted a check for missing data, with appropriate steps taken to correct for missing data.

Analysis of Research Question 1

I analyzed research question one with a two-way multivariate analysis of variance (MANOVA). Event centrality, as measured by the CES (Berntsen & Rubin, 2006) as a dichotomous variable, and core belief disruption, as measured by the CBI (Cann et al., 2010) as a dichotomous variable, were the independent variables for this research question. The continuous dependent variables were PTG, as measured by the PTGI

(Tedeschi & Calhoun, 1996). This analysis examined mean differences in PTG scores between individuals who report high event centrality and core belief disruption as compared to those who do not report high event centrality and core belief disruption.

Analysis of Research Question 2

I analyzed research question two with a one-way multivariate analysis of variance (MANOVA) to explore mean differences in core belief disruption and event centrality. For research question two the independent variable was time since most difficult life experience in the past year with the following categories: less than two weeks, between two weeks and eight weeks, between eight weeks and six months, and between six months and one year. The dependent variables were core belief disruption, as measured by the CBI (Cann et al., 2010) as a continuous variable, event centrality, as measured by the CES (Berntsen & Rubin, 2006) as a continuous variable, and posttraumatic growth, as measured by the PTGI (Tedeschi & Calhoun, 1996).

<center>**Definition of Terms**</center>

Trauma

In this document, trauma is defined as any life event or situation that significantly challenges the individual in a way that might require a response such as a change in thinking or behavior as a way of handling the challenge. This definition is consistent with a broader view of trauma that has been adopted in the PTG literature (i.e., Tedeschi and Calhoun, 2004), that does not require a diagnosis of PTSD. Rather, trauma is self-defined by the individual who experiences it. Terms that are used synonymously with trauma include *crisis, extreme difficulty,* and *catastrophic event*.

Posttraumatic Growth

Posttraumatic growth is a term used to describe the positive results or benefits that are sometimes experienced as a result of traumatic events (Zoellner & Maercker, 2006). It has been described as perceived change (i.e. Zoellner, & Maercker, 2006), psychological well-being (i.e. Joseph & Linley, 2008), and adaptive coping (i.e. Taylor, 1983) in addition to positive results and benefits.

Core Belief Disruption

Traumatic events often produce significant distress in the individuals who experience them, such that their understanding of themselves or their world are disrupted, creating the need to reorganize one's worldview to accommodate the traumatic event. This disruption of the survivor's worldview is called core belief disruption (Cann et al., 2010).

Event Centrality

"Highly accessible and vivid personal memories" help individuals form their understanding of the world and themselves (Berntsen & Rubin, 2006; p. 1). Events that have this formative effect on a person's understanding of their life can be positive or negative. These events have a place of centrality in the individual's mind and serves an organizational role for the building of the sense of self (Boals et al., 2010). This function is referred to as event centrality.

Personality

The definition of personality varies greatly among personologists (Maddi, 1996). Gordon Allport notoriously presented nearly fifty definitions for personality (1937), while Hall, Lindzey, & Campbell assert, "it is our conviction that no substantive

definition of personality can be applied with any generality" (pg. 9). For the purposes of

this study, PTG as personality change is a description that distinguishes Calhoun &

Tedeschi's (2006) theory from other conceptualizations of PTG (e.g., Taylor & Armor,

1996; Zoellner, & Maercker, 2006). Drawing from Maddi (1996), personality can be

defined as the set of relatively stable tendencies and characteristics of a people that help

account for psychological and behavioral differences and commonalities between

individuals that are not the result of temporary, current biological and social pressures. In

the context of this study in the area of PTG, personality changes are considered to be

changes in the individual's tendencies or characteristics that are stable over time and

distinct from perceived change (i.e. Zoellner, & Maercker, 2006), psychological well-

being (i.e. Joseph & Linley, 2005), or adaptive coping (i.e. Taylor, 1983).

Limitations

The proposed research assumes that a personality change model of PTG is

accurate and that core belief disruption, event centrality, and time since traumatic

experience are elements of the process of PTG development (Calhoun and Tedeschi,

2006). Underlying philosophical assumptions are present. Existential theory provides a

philosophical base for research in this area. Existential theory assumes that meaning and

purpose are important components of life and provide adequate motivation that can spur

on psychological growth (Yalom, 1980).

A further assumption that was be examined in this study is that as individuals

experience life, they construct a paradigm or an assumptive world that is their foundation

for action and provides "a general sense of meaning and purpose" (Tedeschi & Calhoun,

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2004, pg. 5). These paradigms are disrupted by traumatic events that are incongruent with some component of the assumptive world (Janoff-Bulman, 1992).

This study assumes that a broad sample provides an accurate representation of the diverse population who has traumatic experiences, given the prevalence of traumatic experiences in American culture (Bonanno, 2004), and the similarity of outcomes relative to PTG regardless of type of trauma (Shakespeare-Finch & Barrington, 2012).

A significant limitation of this study is the absence of a baseline measurement of the PTG domains prior to traumatic experience. It could be than any growth that is observed represents a difference that is not associated with the traumatic experience, but is a representation of personal differences or personality differences.

Many studies use specific groups as the target population, such as natural disaster survivors (Zhou & Wu, 2015; Zhou, Wu, & Chen, 2015) or survivors of sexual abuse (Frazier, Conlon, & Glaser, 2001). My study recruited members who have experienced any kind of trauma in an effort support the overarching model of growth and expand previous research to the general population. However, this limits application to specific groups.

Questions have been raised about the validity and appropriateness of the most commonly used method of measuring PTG (Joseph, Murphy, & Regel, 2012), the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). As Jayawickreme and Blackie (2014) have pointed out, there are theoretical and observational problems with using a retrospective, cross-sectional instrument to measure personality change. This research study did not attempt to address these concerns.

Contributing to the confusion about how PTG is defined and which model most accurately represents PTG are problems with the way that PTG is measured. Posttraumatic growth is purported to happen to individuals in the aftermath of difficult experience, yet studies that attempt to examine the change process following traumatic experiences through longitudinal research are rare, though they are often called for (e.g., Frazier et al., 2009; Jayawickreme & Blackie, 2014; Steger, Owens, & Park, 2015). This represents a significant weakness in a body of research that is based on a theory of personality change. The time limitation inherent to this research means that this weakness in the literature was not addressed in this study.

Finally, some factors that may contribute to growth were not in view in this study. Personality traits, such as optimism, may factor into PTG, but were not examined as predictive factors here (Tedeschi & Calhoun, 2004).

Summary

Posttraumatic growth is a common experience for those who have encountered difficult life experiences (Park & Lechner, 2006), yet much is still unknown. Difficulties with longitudinal studies (Frazier et al., 2014) combined with a controversial instrument as the most widely used form of measurement (Jayawickreme & Blackie, 2014) allows room for doubt as to whether the current dominant model of PTG is predictive of growth as personality change or something else. For the concept of PTG to be a useful construct for counselors and educators, supportive research is vital. This research seeks to add to that body of knowledge by testing the dominant model with a cross-sectional study that takes time since event into consideration and recruits a broader participant population than previous studies. If the hypothesis presented here is affirmed, then researchers,

therapists, and counselors will be able to add confirmatory evidence to the dominant model of PTG as personality growth. Chapter two will review research and literature that is relevant to the present study, with particular emphasis on outlining the dominant model of PTG, examining competing theories of PTG, analyzing the difficulties inherent in PTG research, and exploring factors related to the development of PTG. Chapter three will provide a detailed description of the research design, research methods and statistical analysis that will be used to conduct the present study. Chapter four will contain a summary of the findings of this study, with a description of how those results related to the research questions and proposed hypotheses. Chapter five will discuss the relevance of the findings of this study to future research in the area of PTG and the relevance of these findings to the field of posttraumatic research and education, clinical practice of treating trauma and significance related to social change.

Introduction

As stated in chapter 1, the focus of this study is to explore a model of PTG as personality change by examining the relationships between core belief disruption, event centrality, and time since traumatic incident. The questions under consideration have to do with testing a basic model of PTG, namely, that following a traumatic event, core belief disruption and event centrality are useful constructs for predicting PTG and that these constructs related to growth and to each other in a developmental process among the broad population of people who have experienced life difficulties. This chapter attempts to provide a rationale for these questions and the accompanying assumptions.

Purpose and Organization

First, in this chapter I will review various models of PTG, with a view toward assessing similarities and distinctions between models. This review of the literature will help provide a rationale for my research questions and the subsequent research design. Second, I will review the state of current PTG research regarding the relationships between core belief disruption, event centrality, and PTG. Third, I will review how researchers have addressed the developmental process of PTG in the context of PTG as personality change. Fourth, I will review PTG research methodology as it relates to participant selection in PTG research.

Relevant Research Search Strategy

I conducted a search of PsychInfo, using the search term PTG, for peer-review articles that have been published since 2010. The research contains various theories of PTG, which when explored resulted in a conceptualization of the basic model of PTG as personality change. I cross-referenced these articles with the terms "belief disruption," "meaning," "rumination," "event centrality," and similar terms. I conducted a review of these articles with attention paid to the cited works in the reviewed articles. I reviewed relevant research cited in the collected articles in addition to the articles that were found in article database search. I omitted related constructs, such as Posttraumatic Stress Disorder, resilience, and symptoms of traumatic experience, from the search and review once it became clear that these were independent constructs that were unrelated to the research interest of this study. Additionally, I selected key texts as a starting point for exploring the concept of PTG, such as *Foundations for Posttraumatic Growth: An Expanded Framework*, by Calhoun and Tedeschi (2006), and Janoff-Bulman's books *Shattered Assumptions: Towards a New Psychology of Trauma* (1992) and *Schema Change Perspectives on Posttraumatic Growth* (2006).

Models of Posttraumatic Growth

Researchers have proposed several models of PTG and have also grouped these models in a variety of ways (Cho, & Park, 2013; Jayawickreme & Blackie, 2014; Zoellner & Maercker, 2006). A review of the models and their groupings reveals four basic approaches to PTG. It must be acknowledged that these categories do not represent clearly demarcated schools of thought in PTG research. Rather, they are categories designed to group different theoretical approaches together in order to demonstrate

distinctions between models. Even between categories there is much overlap among the various models of PTG.

Personality Change via Cognitive Processing

Janoff-Bulman (1992) began to examine what happened in the aftermath of trauma and applied the concept of "schema change" to traumatic experience, arguing that the assumptions people make about themselves and their world can become shattered by traumatic experience. A "schema" is a "mental structure that represents organized knowledge about a given concept or type of stimulus" (1992, pg. 28). Schema change would take place when an individual's fundamental assumptions about herself or her world, assumptions about safety, security, competence, or self-assurance, for example, are challenged by an event that contradicts that assumption (Janoff-Bulman, 2006). Changes in fundamental assumptions can be likened to paradigm shifts in scientific inquiry (Kuhn, 1962). New information that causes intense crisis can lead to very different ways of viewing the world in a short amount of time (Janoff-Bulman, 2006).

Calhoun & Tedeschi (2004; 2006; Tedeschi & Calhoun, 2004) based their work on Janoff-Bulman's theory of shattered assumptions, developing the term "posttraumatic growth," and expanding the theory to include a process for change and specific domains in which growth is thought to occur. Trauma represents a "seismic event," which is an event that provokes enough cognitive disruption for core beliefs about self and the world to be challenged (Calhoun & Tedeschi, 2006). Emotional distress often accompanies the process, particularly if the seismic event has been significant enough to challenge core beliefs (Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 2004). Many factors are thought to influence how the seismic event affects the individual: the characteristics of

the experience and the individual, the cognitive process that occurs in the aftermath of the difficult life experience, social and relational influences, and the management of distressful emotions are all factors (Calhoun & Tedeschi, 2006).

Two distinctive features of Calhoun & Tedeschi's model are significant for this study. First, growth is thought to be primarily a function of a specific cognitive process. When an individual experiences a seismic event, fundamental assumptions about life are shattered (Janoff-Bulmann, 1992) and the individuals' core beliefs are disrupted (Calhoun & Tedeschi, 2006). In the face of this cognitive disruption, many people begin to ruminate about their experience and what it may mean for their lives. People often initially experience this as an intrusive process that is distressful. In the growth process, as time passes, the intrusive rumination is gradually replaced by deliberate rumination, in which people think intentionally about how to integrate their previous beliefs and assumptions with the new experience that conflicts with those core beliefs. In this process, if the trauma survivor is able to find a way to make sense out of his seismic event in a way that shifts his view of himself and his worldview, then growth can occur (Calhoun & Tedeschi, 2006).

The second distinctive of Calhoun and Tedeschi's model is that growth represents genuine personal change (Tedeschi & Calhoun, 2004), which I and others call personality change (Jayawickreme & Blackie, 2014), that occurs in different life domains (Calhoun & Tedeschi, 2006). Three broad categories of growth are changes to perceptions of self, changes in relating to others, and changes in philosophy of life. Changes in perceptions of self include recognition of one's inner strengths that were previously hidden, openness to new opportunities and possibilities in life, and understanding one's own vulnerabilities

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and accepting them. There is often changes in how people relate to others, including increased compassion for the problems of other people, increased priority of interpersonal relationships, a greater sense of connectedness with a community rather than isolation, and a greater sense of intimacy and closeness with others. Changes in philosophy of life are also common. Priorities may shift as a result, and a greater appreciation for life is often experienced. Finding answers to existential questions often becomes more important, and in a culture such as the United States, where religion and spirituality have widespread importance, spiritual growth may result (Calhoun & Tedeschi, 2006). These areas of growth are organized into five domains: new possibilities, relating to others, personal strength, appreciation for life, and spiritual growth (Tedeschi & Calhoun, 1996). Central to this model of PTG is the cognitive process composed of core belief disruption, rumination, and meaning making, which leads to identity and worldview reconstruction (Calhoun & Tedeschi, 2006).

Psychological Well-Being

Other models of PTG conceptualize growth not as change of personality, but rather as a measure of current standing psychological well-being (Joseph & Linley, 2008; Joseph, Murphy, and Regel, 2012). Psychological well-being has been understood a variety of ways (Ryff, 1985), but in this conceptualization it includes "high levels of autonomy, environmental mastery, positive relations with others, openness to personal growth, purpose in life and self-acceptance" (Joseph et al., 2012, pg. 318). As with the personality change model, growth is provoked by the shattered assumptions that accompany traumatic experience (Janoff-Bulman, 1992; Joseph et al., 2012). However, in the psychological well-being theory of growth, PTG is conceptualized as a natural and

restorative process that is driven by intrinsic motivation as the individual "works through" (Joseph et al., 2012, pg. 320) the experience, and is only one path toward natural growth that occurs in human experience (Cho & Park, 2013). Survivors of trauma must either *assimilate* the difficult experience into their understanding of the world (such as when a victim blames herself in order to preserver her view of justice), or *accommodate* their worldview with the new information which required a change of perspective (Joseph & Linley, 2008). Assimilation and accommodation can both lead to recovery and reduction of emotional distress, but only accommodation can lead to growth, as old conceptualizations of the world are challenged by new information and the individual finds meaning in the experience in terms of significance rather than comprehensibility (Joseph & Linley, 2008). Posttraumatic growth only refers to benefits that are found in the context of posttraumatic stress, while other perceived benefits that may result (learning new coping skills, for example) are not growth. Growth represents only one component of overall increased psychological well-being that people are intrinsically motivated toward as part of their overall process of self-actualization (Joseph et al., 2012). In this model, as in the personality change model, core belief disruption, cognitive processing of the traumatic event, and finding meaning are critical predictive factors of increased well-being (Joseph & Linley, 2008; Joseph et al., 2012). Event centrality, however, appears to be most closely associated with the accommodation component of growth, which represents true growth. As such, from this perspective event centrality should be more closely associated with accommodation and less closely associated with assimilation.

Coping as Adaptive Response

The largest and most diverse group of models are those that conceptualize PTG as an adaptive coping response (e.g., Davis, Nolen-Hoeksema, & Larson, 1998; Filipp, 1999; Park, 2010; Park & Folkman, 1997; Roepke, Jayawickreme, & Riffle, 2013; Taylor, 1983; Taylor & Armor, 1996; Wong, Reker, &Peacock, 2006). Zoellner & Maercker (2006) reviewed several of these models of growth as coping strategies and concluded that the contrast between models of true growth and models of adaptive coping is an artificial but useful distinction. It is artificial because there is still so much overlap between the conceptual components that large portions of the models are based on similar constructs. It is useful because this represents one of the sharpest contrasts and points of contention in the literature (see Tedeschi & Calhoun, 2004 and Calhoun & Tedeschi, 2004 for part of this exchange).

One of the earliest of the coping models was articulated by Taylor (1983), and further developed by Taylor & Armor (1996). This model conceptualizes growth as a "positive illusion" that has the function of enhancing the self in order to cope with threatening events. Adjustment to threatening events depends on three primary tasks in Taylor's model: searching for meaning concerning the event, gaining a sense of mastery over the event, and enhancement of the self with restored self-esteem (Taylor, 1983). As with other models, a meaning making process is present, but distinct in this view is that these tasks are adaptive rather than transformative. In other words, the individual does not really change on a fundamental level as much as he finds new ways of coping with the threatening event – a means of managing dysfunction until a return to normalcy is evidenced. Specifically, the completion of the three tasks described by Taylor is

dependent upon the individual's ability to construct and maintain a set of illusions (Taylor, 1983).

A related model is that of benefit attribution (Davis, Nolen-Hoeksema, & Larson, 1998), in which people need to have two questions answered, "Why did the traumatic experience happen" and "What did it happen for?" Growth is identified as finding benefit in the experience in a way that helps answer those fundamental questions. In this conceptualization, growth is subjective and is simply a strategy for coping with difficult experiences and answering these two fundamental questions.

Jayawickreme and Blackie (2014) also identify several models that seem to best fit in the category as adaptive coping models (Park, 2010; Roepke et al., 2013; Wong et al., 2006), referring to them as models of "finding meaning and learning lessons" (pg. 314;). In the aftermath of a traumatic event, people may engage in a process of restructuring the narrative of their life with a mind toward understanding how the event changed them (Jayawickreme & Blackie, 2014). Growth is primarily understood in terms of learning lessons about one's self or finding meaning, without reference to personality change.

Perceived vs. Actual Growth

Another group of models understands PTG as a combination of perceived growth and genuine or actual growth (Hobfoll, Hall, Canetti-Nisim, Galea, Johnson, & Palmieri, 2007; Maercker & Zoellner, 2004; Zoellner & Maercker, 2006). This "Janus-Face" model (Zoellner & Maercker, 2006; p. 639) is related to both Taylor's model of positive illusion (1983) and the personality change model (Calhoun & Tedeschi, 2006), in that it conceptualizes both an illusory component called perceived growth, and a genuine

growth component (Maercker & Zoellner, 2004; Zoellner & Maercker, 2006). When illusory growth is present as a function of deceptive self-preservation without the presence of actual growth it will be maladaptive (Maercker & Zoellner, 2004). The functional growth side and the illusory maladaptive side are thought to have different developmental processes. If the two components exist together, then the illusory side may serve as a short term coping mechanism while the development of actual growth proceeds (Zoellner & Maercker, 2006). Support for this two-component model (Maercker & Zoellner, 2004) could be affirmed by differences in individuals' experience of growth, decline, or stability following difficult life experiences, or if PTG were to arise quickly without an observable developmental process. This may be represented by the presence of core belief disruption, when event centrality is not found.

Park & Folkman (1997) describe growth as the process of benefit finding amidst a worldview clash. *Global meaning* is "the most abstract and generalized sense of meaning," which enables individuals to make sense of their past, present, and future in a cohesive and consistent way (pg. 116). *Situational meaning* is the manner in which global meaning helps people function in the particular context in which they find themselves. Trauma creates a clash of these two meaning worlds, sparking a need to integrate global meaning and situational meaning. Manifestations of growth are viewed as changes in either situational meaning (coping or benefit finding) or global meaning (enduring changes in worldview) (Park & Folkman, 1997; Zoellner & Maercker, 2006b). While this view can be categorized as a coping model (i.e., Zoellner & Maercker, 2006b), the model conceptualizes some changes as enduring and describes them in terms of a lasting

alteration of worldview, which would indicate that actual growth is a perceived possible outcome.

A final model that differentiates between perceived and actual growth conceptualizes PTG as "action focused growth" (Hobfoll et al., 2007), which adds an important component of action and behavior to PTG. Hobfall et al. (2007) discriminate between perceived growth and actual growth by associating actual growth with action and behavior. Whereas in the personality change model growth is understood as emerging incomplete in the adjustment process, and then developing more fully in time, "action focused growth" conceptualizes actual growth as only that which is accompanied by changed action or behavior (Hobofall et al., 2007). It is unclear from current research whether the behavior and action that Hobfoll et al. (2007) proposes is an outcome of growth or a factor that contributes to the development of growth.

Discriminating Between Theories

To date, there is no consensus model or definition of PTG (Joseph et al., 2012), although the Calhoun & Tedeschi model is the most widely adopted theory (Jayawickreme & Blackie, 2014). Identifying the "gold standard" model (Joseph et al., 2012, pg. 318) is difficult for several reasons. As noted by others (Maercker & Zoellner, 2004) and as observed above, most or all of the models have common concepts that are difficult to operationalize in ways that are distinctive to the given model. For example, the construct of meaning making can be a predictive factor of personality change (Calhoun & Tedeschi, 2006), an illusory factor that enables coping (Taylor, 1983), a function of psychological well-being that is present not only in the aftermath of difficult experiences but also in normal and natural growth (Joseph & Linley, 2004), or a function

of integrating one's situational and global worlds (Park & Folkman, 1997). In all cases, reprocessing one's worldview to create new meaning in light of the traumatic experience is a central part of the growth process (Jayawickreme & Blackie, 2014). Research that examines the contributing components of posttraumatic growth as a function of time since traumatic experience could give insight into the process that may aid in discriminating between these models. Following a brief description of how posttraumatic growth fits into clinical practice, I will turn to a review of the primary constructs under consideration in this research, namely core belief disruption and event centrality, followed by a review of research surrounding the conceptualization of PTG as a developmental process.

Posttraumatic Growth in Clinical Work

Rates of growth range from 30% to 90% of individuals who experience trauma (Calhoun & Tedeschi, 2006). With such a wide range of prevalence, it is difficult to anticipate when to expect an experience of growth for clients. Indeed, Calhoun and Tedeschi (2013) recommend against setting an expectation of growth for clients, because it is not a universal experience and the expectation of growth followed by a lack of perceived growth can be discouraging and even damaging to clients. There are, on the other hand, some recommended procedures for working with clients who have experienced trauma and may experience growth. First, the clinician should adopt the stance of an expert companion, that is, of one who both has professional expertise but will also demonstrate supportive human companionship. Integrating evidence-based trauma treatment to reduce trauma or stress-related symptoms is a fundamental component of treatment. Once symptoms are manageable, the course of talk therapy can

move to more existential topics, where meaning is constructed and the traumatic event is located in a cohesive view of the client's world. The clinician should be listening for growth-related language, noting and labeling such language when it occurs, and be open to growth possibilities for the client (Calhoun & Tedeschi, 2013). Clinicians can be aware of the domains of growth so as to be able to recognize growth language and patterns when they occur. Clinicians can take a narrative approach to fostering growth in clients (Neimeyer, 2006), and growth work can be incorporated into working with a wide variety of clients, such as those who have survived cancer (Stanton, Bower, & Low, 2006), the loss of a loved one (Znoj, 2006), combat (Rosner & Powell, 2006), HIV/AIDS (Milam, 2006), natural disasters, and emergency situations (Paton, 2006), and can be incorporated into clinical work with children (Kilmer, 2006), and as a part of the forgiveness process (Fischer, 2006).

Core Beliefs and Event Centrality in Posttraumatic Growth Development

While event centrality and core belief disruption appear to be related constructs, they are not equivalent, as Boals, Steward, & Schuettler (2010) indicated. Groleau, Calhoun, Cann, & Tedeschi (2013) examined PTG, core beliefs challenge, and event centrality in a sample of 187 undergraduate students using a multiple hierarchical regression analysis. They found that event centrality and core beliefs challenge were significantly related ($r = .47$, $p < .01$), and that after core beliefs challenge, intrusive rumination, and search for meaning were controlled for, event centrality accounted for an additional 4% of the variation in PTG (Fchange = 10.91, $p < .01$). Event centrality appears to be a construct that is related to but distinct from core belief disruption. The

following will review the existing data on core belief challenge and event centrality in PTG research.

Core Belief Disruption

The World Assumption Scale (WAS; Janoff-Bulman, 1989) was designed to measure three core worldview assumptions: the individual's belief in the benevolence of the world, the individual's belief about meaning in life, and the individual's belief of his or her own self-worth (Janoff-Bulman, 1992). In keeping with a schema-change theory of trauma, Janoff-Bulman designed the WAS as a tool to determine if core beliefs and assumptions differed between trauma survivors and those who have not experienced trauma. After the creation of the WAS, Carboon, Anderson, Pollard, Szer, & Seymour (2005) provided an early example of first examinations of the shattered world theory with relation to PTG. They recruited 62 cancer patents as part of a larger longitudinal study. Among individuals diagnosed with cancer, WAS scores did not significantly change over the course of the five month time span between measures (Carboon, Anderson, Pollard, Szer & Seymour, 2005). This research represented an early effort to detect core belief disruption, but as no change was detected, no determination about the relationship between core belief disruption and growth could be made.

Cann et al. (2010a) took an additional step toward understanding and measuring predictive factors of PTG by developing the Core Beliefs Inventory (CBI), an instrument designed with the intention of measuring disruption of core beliefs. Since its development, researchers have measured core belief disruption primarily, if not exclusively, via the CBI. This was a step further than the WAS, in that while the WAS was designed to measure core beliefs and assumptions, the CBI was designed to

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specifically measure disruption to those assumptions. No researchers previously developed an instrument with the specific intention of measuring core belief disruption, which is central to PTG theory. Soon after the development of the CBI, Boals, Steward, & Schuettler (2010) proposed that core belief disruption could potentially be used as a means of predicting greater PTG, just as event centrality had been show to do in their research. However, this proposal has not been consistently tested or implemented. At present, I am aware of only one study that uses a cutoff score on the CBI to differentiate between groups or to create a categorical variable (LoSavio et al., 2011).

LoSavio et al., (2011) used the Core Beliefs Inventory as a dichotomous variable to predict stress-related growth in a longitudinal study. Eighty-two college students made daily reports about the worst event of their day each night for seven days. Students who responded to any question on the CBI with a score corresponding to a "very small degree" (pg. 772) of core belief disruption or higher scored as having experienced core belief disruption. Notably, individuals who reported core belief disruption and higher rumination also reported higher PTG, and within-person moderate correlations (r = .37) were found between CBI scores and PTG scores, as measured on the PTGI. Additionally, participants answered the question, "To what extent do you feel resolved about this event? In other words, is the event no longer causing you distress?" in an effort to determine whether the distressful event was resolved. Those who reported high resolution (1+ SD above M), high rumination (1+ SD above M), and the presence of core belief disruption (any item on CBI > 2) also reported greater PTG (LoSavio et al., 2011, pp. 775-776). While event resolution and event centrality are independent constructs, it raises the question of whether event resolution, as conceptualized by LoSavio et al. (2011),

contributes to identity development, as represented in the construct of event centrality. Most of the daily scores reported by participants did not meet the threshold for core belief disruption (63%), and levels of PTG were relatively mild. This study reported no rationale for the chosen cutoff method, except that a majority of daily scores were below this cutoff, which would be expected given daily nature of the reporting. In spite of these limitations, this study suggests there may be value in further research that investigates the usefulness of core belief disruption as a means of categorizing experiences as more likely to produce PTG. Other research examining core belief disruption and PTG can be grouped according to whether the research examines correlations or predictive models, as discussed in the following sections.

Correlations between Core Belief Disruption and Posttraumatic Growth. I was able to find only seven studies that reported correlations between core belief disruption and PTG. All of the studies reported moderate to strong significant correlations between core belief disruption and PTG ranging from $r = .39$, $p < .001$ (Su & Chen, 2015) to $r = .66$, $p < .01$ (Danhauer et al., 2013), primarily among undergraduate students (Cann et al., 2010b; Groleau, Calhoun, Cann, & Tedeschi, 2013; Lindstrom et al., 2013; Su & Chen, 2015).

Cann et al. (2010b) reported a strong positive correlation between core belief disruption and PTG, as measured by the Paired Format Posttraumatic Growth Inventory (PTGI-42, Baker et al., 2008). The PTGI-42 matches each growth item on the PTGI with a negatively worded item in an effort to measure posttraumatic depreciation. Cann et al. set as a pre-requirement for participation in the study that participants must have experienced "any of a series of traumatic or highly stressful events" (p. 154) in the past 3

years, thus limiting the study only to individuals who self-identify has having a serious life difficulty relatively recently. The study excluded participants who reported one of these events, but reported less than 4 on a 7-point scale (1 = not at all stressful, 7 = extremely stressful). Thus, higher CBI scores were likely to have been overrepresented. While PTG and core belief disruption were positively correlated ($r = .63$, $p < 0.05$), the reported stressfulness of the event at the time that it took place was not significantly related to PTG. This indicates that the disruption of core beliefs rather than the severity or stressfulness of the event itself is likely to be relevant for the development of PTG.

Danhauer et al. (2013) designed a longitudinal study with leukemia patients who were asked to complete a battery of instruments at three times: the time of diagnosis or admission to treatment (within 0-7 days); at 5-6 weeks post-diagnosis/admission, or time of discharge if discharged prior to week 5 (31.2 mean days from baseline); and at readmission for chemotherapy approximately 9-13 weeks after diagnosis/admission (73.1 mean days from baseline). Mean PTG scores, as measured by the PTGI, demonstrated significant differences across time for the 37 patients who completed the survey at all three times (T1 M = 63.4; T2 M = 65.3; T3 M = 73.1). Total PTGI scores were significantly related to days from baseline ($p = .03$), age ($p = .03$), deliberate rumination ($r = .61$, $p < .001$), and core beliefs ($r = .66$, $p < .01$).

Groleau, Calhoun, Cann, and Tedeschi (2013) developed the only study I am aware of that examined both core belief disruption and event centrality, as measured by the CES. Groleau, Calhoun, Cann, and Tedeschi limited their participants to undergraduate students who had experienced at least one of twelve pre-determined traumatic events in the two years prior to the study. As with prior research (Cann et al.,

2010b), the exclusion of events not on the pre-determined list may have limited the normal range of core belief disruption that is likely to be found in the general population. Regardless, event centrality ($r = .38$, $p < .01$) and core belief disruption ($r = .45$, $p < .01$) were significantly correlated to PTG, as measured by the PTGI, and to each other ($r = .47$, $p < .01$).

Su and Chen (2015) and Lindstrom et al. (2013) also examined the relationship between core belief disruption and PTG among undergraduate students. In the United States, Lindstrom et al. found significant correlations between core belief disruption and PTG ($r = .58$, $p < .01$). Sue and Chen (2015) conducted their research 810 Taiwanese undergraduate students, 110 of whom completed two surveys two months apart, and who experienced a potentially traumatic event between these two survey times. Time elapse between the potentially traumatic event and the second survey was between 1 day and 10.6 weeks (M = 22.2 days). They found positive correlations between core belief challenge and PTG ($r = .39$, $p < .001$), as measured by a single item on a 4-point Likert scale: "*Sometimes people who had experienced a traumatic event may produce some positive changes in this experience. The nature of such changes might differ among individuals. Have you found anything positive from this experience?*" This method of measuring PTG may account for the lower correlation between core belief disruption and PTG compared with other studies.

Two studies did not use undergraduate students as their participants. Roepke & Seligman (2014) used a broad sample of people recruited from a university-affiliated website that is primarily used by people interested in positive psychology, and from a website that recruits Americans and Indians to complete surveys for Amazon.com credit.

Participants reported how long it had been since their most traumatic life event (M = 3-5 years), what the event was, and completed the CBI and the PTGI-42. Core belief disruption was correlated with PTG ($r = .49$, $p < .01$). Roepke & Seligman also measured the degree to which participants had engagement with new possibilities in the aftermath of trauma with their own instrument, the Door Opening Questionnaire (DOQ; Roepke & Seligman, 2014). Those who reported engagement with new possibilities deteriorated less, but did not demonstrate an increase in the effect of core belief disruption on growth. Roepke & Seligman also distinguished between high core belief disruption (1 SD above the mean CBI score) and low core belief disruption (1 SD below the mean CBI score) in this study.

A final study related core belief disruption and PTG in middle school students who had survived an earthquake. Zhou, Wu, Fu, & An (2015) conducted a study in China with children (N = 354) 4.5 years after the 2008 Wenchuan earthquake. Core belief disruption and PTG, as measured by a modified PTGI (PTGI; Zhou, Wu, An, Chen, & Long, 2014) were significantly positively correlated ($r = .56$, $p < .001$). The modified PTGI included an additional item and three subscales instead of the five subscales in the original PTGI (Tedeschi & Calhoun, 1996). The three subscales correspond to the three primary categories of personality change represented in PTG (Tedeschi & Calhoun, 2006): changes in self, changes in relationships with others, and changes in philosophy of life. It is unclear why the authors revised the PTGI in this study. Some questions exist about rates of PTG in adults as compared to that of children and adolescents (Tedeschi & Calhoun, 2004). This study helped establish the case for PTG prevalence across ages.

Core Belief Disruption and Posttraumatic Growth in Predictive Models. The other primary research design present in the PTG literature consists of predictive models such as regression analyses, structural equation models, and path analyses.

Cann et al. (2010b) designed a research study examining PTG and posttraumatic depreciation as predictors of well-being. Participants recruited from introductory psychology courses had experienced "any of a series of traumatic or highly stressful events" in the past 3 years (p. 154). Researchers excluded participants who reported one of these events, but reported less than 4 on a 7-point scale (1 = not at all stressful, 7 = extremely stressful). They used the PGTI-42 (Baker et al., 2008) to measure PTG. As part of a predictive model for PTG that included recent deliberate rumination (β = .237, $p <$ 0.05) and recent intrusive rumination (β = -.258, $p < 0.05$), core belief disruption accounted for the greatest amount of variance (β = .534, $p < 0.05$). The overall model was significant F = 16.04, R^2_{adj} = .44, $p < .001$, and contained insignificant predictors (intrusive rumination soon after the event, deliberate rumination soon after the event, and stress soon after the event.). The fact that core belief disruption and recent rumination were significant predictors, while rumination soon after the traumatic event was not, may signify the presence of a developmental cognitive process that influences PTG. Further investigation into that process is warranted.

Triplett et al. (2012) conducted a path analysis in which the total effect of core belief disruption (.55, $p < .01$), intrusive rumination (.15, $p < .01$) and deliberate rumination (.34, $p < .01$) predicted PTG (R^2 = .39), as measured by the PTGI. Variance in core belief disruption accounted for 30% of variance in PTGI. Students participants could participate if they had experienced one of nine listed traumatic events in past 2 ½ years.

Core belief disruption, in this model, is conceptualized as a factor that is logically and developmental prior to rumination, growth, found meaning and life satisfaction. They examined the effect of time since event on growth, with no significant effects found. However, it is not clear how the researchers analyzed the effect of time since event.

Groleau, Calhoun, Cann, & Tedeschi (2013) recruited undergraduate students who had experienced at least one of twelve pre-described traumatic events in the past 2 years. A hierarchical multiple regression determined model of core belief challenge, intrusive rumination, deliberate rumination, found meaning, and event centrality accounted for 58% of the variance in PTG (PTGI). Core belief challenge was loaded in the model first, accounting for 45% ($p < .01$) of the variance in PTG, and event centrality was loaded last, accounting for an additional 4% ($p < .01$) of the variance in PTG beyond the other four factors. Event centrality is seen to be distinct from core belief challenge, while both contribute to the predictive model of PTG.

Lindstrom et al. (2013) designed a stepwise regression analysis with undergraduate students. Core belief disruption was loaded first, and accounted for 34% ($p < .001$) of the variance in PTG, as measured by the PTGI. The full model accounted for 44% ($p < .001$) of the variance in PTG, and contained the following significant predictors: core belief challenge, deliberate rumination soon after the event, intrusive rumination soon after the event. Non-significant predictors included recent deliberate rumination, recent intrusive rumination, positive disclosure about the event, and negative disclosure about the event. A single closed question that asked whether the participant discussed the negative and positive consequences of the traumatic event determined negative and positive disclosure about the event. Recent rumination was a contributing

factor to the model even when rumination soon after the event was controlled for. This could be interpreted as supportive of a developmental view of PTG. Core belief challenge was the strongest predictor in this model.

Core belief challenge has also been demonstrated to be a significant predictor in advanced models with more factors. Wilson, Morris & Chambers (2014) built a structural equation model that examined growth in prostate cancer survivors. In the best fitting model, core belief disruption was directly causally related to peer support ($\beta = .394$, $p < .05$), intrusive rumination ($\beta = .512$, $p < .05$), and PTG ($\beta = .474$, $p < .05$), as measured by the PTGI. Core belief disruption was directly causally influenced by event related distress ($\beta = .288$, $p < .05$), as measured by Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979) and whether the event was appraised as a challenge ($\beta = .277$, $p < .05$), as measured by a revised version of the Stress Appraisal Measure (SAM; Peacock & Wong, 1990). This model was complex, examining the relationships between resilience, challenge appraisal, core belief disruption, cancer-related distress, intrusive rumination, peer support, deliberate rumination, social constraints, PTG, and all five of the domains of PTG.

Ullman (2014) examined a less complex hierarchical regression model whose participants were victims of sexual abuse. In this model, components were added in three blocks. No rationale was provided for the factors added in each step. Core belief disruption was added in the third step of the hierarchical model ($\beta = .15$, $p = .000$). The overall model accounted for 40% of the variance in PTG $F(16, 1064) = 41.64$, $p = .000$, $R^2_{Adj} = .40$ (as measured by the short-form PTGI), and included age, race, education, sexual assault severity, pre-assault drinking habits, life threat, maladaptive coping,

adaptive social coping, adaptive individual coping, perceived control, character self-blame, core belief disruption, acknowledgement without support, social reactions, and PTSD.

In another regression model, Su and Chen (2015) recruited 110 Taiwanese undergraduate students who completed two surveys, two months apart. All participants experienced potentially traumatic event sometime between the first and second survey. The elapsed time between the event and the second survey was between 1 day and 10.6 weeks (Mean 22.2 days). In a three step hierarchical regression model that predicted for PTG, Su and Chen placed gender and age in block one, with no significant effect, added core belief challenge at Time 2, deliberate rumination, and perceived social support in block 2 ($R^2 = .296$, $p < .01$), and added T1 pre-trauma ruminative style at Time 1 and distraction style in block 3 ($R^2 = .364$, $p < .001$).

Zhou, Wu, Fu, & An (2015) conducted a study in China with middle school students (N = 354) 4.5 years after the 2008 Wenchuan earthquake. Using a structural equation model design, intrusive rumination mediated the relationship between core belief disruption and PTSD, but not PTG. Deliberate rumination mediated the relationship between core belief disruption and growth, but not PTSD. Additionally, the relationship between core belief disruption and PTG followed a path of significance, first through intrusive rumination and then through deliberate rumination. The structural equation model predicting for PTG with core belief disruption and intrusive and deliberate rumination was a good fit, $\chi^2(17) = 36.07$, CFI = 0.989, TLI = 0.976, RMSEA [90% CI] = 0.056 [0.030, 0.082], SRMR = 0.029.

In another study, also involving participants who had experienced an earthquake, Taku, Cann, Tedeschi, & Calhoun (2015) explored the relationships between core belief disruption, intrusive and deliberate rumination, and PTG among Japanese undergraduate students in a hierarchical regression analysis. The best fit model included the following predictors, from strongest to weakest: core belief disruption ($\beta = 0.46$, $p < 0.001$), age ($\beta = -0.18$, $p < 0.001$), deliberate rumination ($\beta = 0.18$, $p < 0.05$), and intrusive rumination ($\beta = 0.15$, $p < 0.05$). The authors recommended follow up research using a longitudinal design.

In each of these models, core belief disruption is a strong predictor for PTG, usually more so than any other predictor variable. Core belief disruption can be seen to be, with a relatively high degree of certainty, a construct that is positively correlated with PTG, and is likely to be a contributing factor to PTG, among other factors. What is unknown is whether core belief disruption occurs immediately following a traumatic experience, or if it develops over time, and how it is related to PTG and event centrality at various stages of the growth process.

Event Centrality

Studies investigating event centrality and core belief challenge in the context of PTG emerged at approximately the same time (e.g. Boals et al., 2010; Cann et al., 2010). Although research using the Centrality of Event Scale (CES) first emerged in 2006 (i.e., Burntsen & Rubin), it does not appear to have been an instrument used in PTG research until 2010. The construct of event centrality is measured primarily, if not exclusively, with the CES.

Berntsen and Rubin (2006) developed the Centrality of Event Scale (CES) to assess the degree to which traumatic experience influence identity formation. They designed the CES with the theory in mind that, similar to shattered world theory, highly negative events could create moments in which the individual's narrative changed. Generally, Berntsen and Rubin (2006) argued, positive events are largely in view when researchers and writers explore how "highly accessible and vivid personal memories" (p. 1) contribute to identity formation, but negative events can also impact identity formation.

Boals, Steward, & Schuettler (2010), based on the assumption that when core beliefs are disrupted the individual is likely to experience the disrupting event as a central life event, conducted a study with 2,321 college students that examined centrality of life event as a discriminating factor. Those who had experienced trauma as a central life event, as defined by CES scores that fell in the upper quartile range of scores, reported stronger negative associations between PTG and anxiety ($r = -.36$, $p < .001$), depression ($r = -.22$, $p < .001$), global distress ($r = -.23$, $p < .001$), and physical health ($r = -.10$, $p < .05$). The research found stronger positive associations with positive affect ($r = .31$, $p < .001$) and quality of life ($r = .30$, $p < .001$). In this study, event centrality clearly influenced the expected associations. The upper quartile score comparison with the lower three quartiles distinguished between high and low scores, while maintaining a large sample size in each group. Conversion of CES scores to a categorical variable is consistent with conceptualizations of the predictive factors of PTG such as Calhoun & Tedeschi (2006), who theorized that core belief disruption may have a threshold effect,

meaning that beyond a certain threshold of trauma severity and core belief disruption PTG would improve while denying a correlational relationship.

Other researchers suggest a curvilinear relationship between event centrality and PTG (Zebrack et al., 2015), with the greatest amount of PTG taking place at the apex of the curve (Hallam & Morris, 2014), but there is limited evidence to either support or reject this suggestion.

Event Centrality and Posttraumatic Growth in Correlational Research.
Research examining the relationship between event centrality and PTG has primarily used correlational and predictive model research designs, with a few notable exceptions. Correlational research demonstrates a strong positive correlation between event centrality and PTG, ranging from $r = .39$, $p < .001$ (Roland, Currier, Rojas-Flores, & Herrera, 2014) to $r = .61$, $p < .0001$ (Schuettler & Boals, 2011), and primarily utilizes undergraduate student participants (Boals & Schuettler, 2011; Johnson & Boals, 2015; Schuettler & Boals, 2011). An exception is the research of Roland, Currier, Rojas-Flores, and Herrera (2014), who examined event centrality and PTG outcomes in the context of pervasive violence among 257 violence-exposed teachers in El Salvador. This study used Spanish versions of questionnaires, with positive bivariate correlation between PTG and CES ($r = .39$, $p < .001$) demonstrating moderate correlation. This research found less positive correlation between event centrality and PTG than other research using American university students. This could be related to translation differences, cultural differences, educational differences, age differences, a blend of the above factors, or factors unknown.

A significant research design developed by Johnson and Boals (2015) used 1,295 undergraduate students as participants in an attempted duplication of Frazier et al. (2009).

Johnson and Boals added event centrality as a distinguishing factor, splitting participants into two groups: high experience of event centrality and low experience of event centrality. An upper quartile versus lower three quartiles split in CES scores distinguished high event centrality from low event centrality. Event centrality and PTG, as measured by the PGTI, were positively correlated ($r = .57$, $p < .001$). In addition to using the PTGI to measure PTG, following the method of Frazier et al. (2009), five other instruments represented four of the five domains of PTG. Event centrality had low correlations with some of the instruments used to assess PTG as personality measures such as gratitude ($r = -.08$, $p < .01$) as measured by the Gratitude Questionnaire (GQ-6; McCullough, Emmons, & Tsang, 2002), positive relations with others ($r = -.10$, $p < .05$) as measured by the Positive Relations with Others subscale of the Psychological Well Being Scale (PWBS; Ryff, 1989), and satisfaction with life ($r = -.13$, $p < .001$) as measured by the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). Most importantly, in reference to the most significant traumatic lifetime experience that the participants had up to that point, significant differences in the domain measurements of PTG occurred by differentiating between participants who experienced high event centrality and participants who experienced low event centrality (see Table 2.1).

These findings support important assumptions in PTG research, namely, that growth as measured by the PTGI is related to prospective personality measures in various domains of PTG, and that that event centrality is an important factor that can help identify individuals who are likely to experience PTG.

Table 2.1

Correlations Between PTGI and Domain Measures of PTG Based on Event Centrality

Measure	Low CES	High CES
Gratitude	.23	.44
Positive Relations	.14	.49
Satisfaction with Life	.18	.51
Religious Commitment	.17	.39
Meaning in Life	.22	.40

Note. $p < .001$ for all correlations. CES = Centrality of Event Scale; Gratitude = Gratitude Questionnaire-6; Positive Relations = Positive Relations with Others subscale of the Psychological Well Being Scale; Satisfaction with Life = Satisfaction with Life Scale; Religious Commitment = Religious Commitment Inventory; Meaning in Life = Presence of Meaning subscale of the Meaning in Life Questionnaire.

Event Centrality and Posttraumatic Growth in Predictive Models. Research

examining predictive models of PTG with event centrality as a factor relies heavily upon

undergraduate participants, with event centrality as a significant predictor of PTG.

Among 929 undergraduates, Boals and Schuettler (2011) found event centrality to be the

strongest predictor of PTG, as measured by the PTGI, $t(1, 846) = 14.77$, $p < .001$, b = .46

in a 13 variable multiple regression model. Other significant predictors included PTSD

symptoms, as measured by the PTSD Checklist (PCL-S, Blanchard, Jones-Alexander,

Buckley, & Forneris, 1996), $t(1, 846) = 7.35$, $p < .001$, b = .25, problem-focused coping

$t(1, 846) = 6.10$, $p < .001$, b = .19, cognitive restructuring $t(1, 846) = 5.09$, $p < .001$, b =

.14, downward comparisons $t(1, 846) = 3.97$, $p < .001$, b = -.11, depression $t(1, 846) =$

3.33, $p < .001$, b = -.10, and resolution $t(1, 846) = 2.07$, $p < .001$, b = .07.

Also among undergraduate students, Schuettler and Boals (2011), in a stepwise

forward regression model, found event centrality ($\beta = .52$, $p \leq .001$) to be one of three

factors to significantly predict for PTG, as measured by PTGI, $F(3, 101) = 29.54$, $p <$

.0001. The model accounted for 48% of variance in PTG. Other predictor factors were

problem-focused coping (β = .27, $p \leq$ .001), and the positive subscale of the Perspectives on Addressing Trauma Symptoms Scale (PATS, Tarakeshwar, Hansen, Kochman, Fox, & Sikkema, 2006) (β = .21, $p \leq$ .001).

In a study combining 500 undergraduate psychology students and one treatment seeking sample of 53 women receiving assistance at a community outreach clinic as participants, Barton, Boals, and Knowles (2013) examined the unique contribution of event centrality in predicting PTG. Most of the treatment seeking women were sexually or physically abused. A multiple regression analysis among the university student participants revealed significant predictors of event centrality, $t(496)$ = 16.80, $p <$.001, β = .65, and posttraumatic cognitions, $t(496)$ = 3.63, $p <$.001, β = -.14, as measured by Posttraumatic Cognitions Inventory (PTCI; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999). The PTCI measures thoughts and beliefs related to a traumatic incident that are not positively adaptive. The model was significant, $F(2, 497)$ = 147.87, $p <$ .001, R^2 = .37. This study also examined differences between participants who experienced high event centrality and low event centrality, based on upper quartile CES scores and lower three quartile CES scores. Among participants who experienced high event centrality, the model was significant, $F(2, 139)$ = 13.43, $p <$ .001, R^2 = .16, with event centrality, $t(138)$ = 3.21, $p =$.002, β = .25, and posttraumatic cognitions, $t(138)$ = 4.61, $p <$ .001, β = -.36, as significant predictors. In the low event centrality model, the model was significant, $F(2, 361)$ = 50.58, $p <$ .001, R^2 = .22, with only event centrality as a significant predictor, $t(360)$ = 9.21, $p <$ .001, β = .49). In the treatment seeking sample, high event centrality was not a significant predictor. In this sample, event centrality was not able to be used as a dichotomous variable due to lack of sufficient low event centrality cases. This research

study duplicated Lancaster et al. (2011), with the addition of event centrality as a predictive factor.

Research shows event centrality to be a significant predictor for domains of growth in addition to overall PTG. Lancaster, Kloep, Rodriguez, and Weston (2013), in a study with 405 undergraduate students included event centrality as one predictor in a series of multiple regression analyses. Event centrality was the only significant predictor in the model for three of the five PTGI subscales: Appreciation of Life ($B = .120$, $p < .01$); Relating to Others ($B = .205$, $p < .01$); and Spiritual Change ($B = .062$, $p < .01$). Event centrality was the strongest predictor for the other two domains, Personal Strength ($B = .155$, $p < .01$), and New Possibilities ($B = .198$, $p < .01$), with the World subscale of the PTCI being the other significant predictor for Personal Strength ($B = .114$, $p < .01$), and New Possibilities ($B = .065$, $p < .05$). Additionally, event centrality predicted for New Possibilities differently among women ($B = .155$, $p < .01$) than among men ($B = .263$, $p < .01$).

Bernard, Whittles, Kertz & Burke (2015) recruited 214 undergraduate students in a hierarchical linear regression model that loaded trauma exposure in block 1, and trauma exposure, negative event centrality, and positive event centrality as predictors. Negative event centrality referred to the participant's score on the CES when considering their most negative life event. Positive event centrality referred to the participant's score on the CES when considering their most negative life event. In block 1, trauma exposure was a significant predictor for PTG, as measured by the PTGI, $F(1, 212) = 12.21$, $\beta = .50$, $p = .001$, $R^2_{Adj} = .05$. In block 2, trauma exposure was no longer a significant predictor for PTG, but positive event centrality ($\beta = .20$, $p = .001$) and negative event centrality ($\beta =$

.37, $p < .001$) were significant predictors. The model as a whole was significant $F(2, 210)$

$= 22.39, \beta = .50, p < .001, R^2_{Adj} = .24$

Roland, Currier, Rojas-Flores, and Herrera (2014) looked at event centrality

among 257 violence-exposed teachers in El Salvador, rather than among undergraduate

students. A hierarchical multiple regression model placed age, gender, marital status,

rural or urban residence, lifetime exposure to violence, and depression in the first step as

predictor variables, with no significance. Step two included event centrality as a predictor

variable, and was a significant predictor ($\Delta R^2 = .14$, $F_{change} (1, 246) = 43.17, p < .001$) of

PTG.

Finally, in an additional study that did not use undergraduate students, Wolfe and

Ray (2015) recruited 175 adults, aged 18-52 years, who had experienced at least one

significant traumatic event in the past two years. In a multiple regression analysis, event

centrality ($\beta = .25, p < .001$), social support ($\beta = .34, p < .001$), and emotion-focused

coping ($\beta = .28, p < .001$) were significant predictors for PTG, as measured by the PTGI,

and the model accounted for 39.5% of the variance in PTG, $R^2 = .395$; $F(4, 98) = 15.35, p$

$< .001$. The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet,

Dahlem, Zimet, & Farley, 1988) measured social support, and the emotion-focused

subscale of the Brief COPE (Carver, 1997) measured emotion-focused coping.

In each of these studies, event centrality was a significant predictor for PTG, even

with various other predictors in the model.

Additional Research with Event Centrality and Posttraumatic Growth. In a

means comparison study, Blix, Birkeland, Hansen, and Heir (2015) examined PTG and

event centrality longitudinally among 229 survivors of the 2011 Oslo bombing who were

employees of the Norwegian ministries. While levels of PTG (T1 M = 3.17; T2 M = 3.14) and CES (T1 M = 2.36; T2 M = 2.46) were stable at 1 year post-event and 2-years post-event, event centrality was contra-indicated to have a long-term effect on PTG in this study. This data suggests that the relationship between event centrality and PTG reflects parallel processes, and may also suggest that a Janus-face model may account for the results, in which case event centrality is more closely related to the self-deceptive, illusory aspect of PTG. This aspect of PTG is separate from authentic PTG that develops over a longer time period and is genuine and constructive.

While event centrality and core belief disruption appear to be related constructs, they are not equivalent, as Boals, Steward, & Schuettler (2010) indicated. Groleau, Calhoun, Cann, & Tedeschi (2013) examined PTG, core belief disruption, and event centrality in a sample of 187 undergraduate students using a multiple hierarchical regression analysis. They found that after core beliefs challenging, intrusive rumination, and search for meaning were controlled for, event centrality accounted for an additional 4% of the variation in PTG (Fchange = 10.91, $p < .01$), while there were moderate correlations between the three variables. Event centrality appears to be closely related to, but distinct from, core belief disruption. This was also the only study found that incorporated both event centrality and core belief disruption in PTG research.

Observing Change in Posttraumatic Growth Research

Two important factors arise in a review of the literature concerning methodology in PTG research: instrument selection and change observation in PTG research (Frazier et al., 2009; Jayawickreme & Blackie, 2014; Frazier et al., 2014; Damian & Roberts, 2014). Instrument selection concerns will not be addressed in my research. However, these

difficulties will be addressed in the limitations and future research sections of chapter five.

A second methodological issue in PTG research, which is more germane to my research, involves the observation of change. Because PTG is thought to be a growth process that leads to actual change (Jayawickreme & Blackie, 2014; Tedeschi and Calhoun, 2006), there is benefit in examining the process whereby PTG develops. Several designs have been constructed in an effort to do this: cross-sectional research designs that take time into consideration (e.g., Frazier, Conlon & Glaser, 2001), designs that attempt to measure a predictive factor at different stages in the PTG developmental process (e.g., Lindstrom et al., 2013), and longitudinal studies (e.g., Blix, Birkeland, Hansen, & Heir, 2015; Zhou & Wu, 2015; Zhou, Wu, & Chen, 2015), which represents the most commonly used of these three designs.

Several researchers in the past few years have advocated for the more frequent use of longitudinal studies in PTG research (Anusic & Yap, 2014; Frazier et al., 2014; Jayawickreme & Blackie, 2014). These recent voices calling for longitudinal research echo an earlier acknowledgment that longitudinal research would be a useful addition to the body of PTG research (Calhoun, Cann, Tedeschi & McMillan, 2000). For the purpose of this study, it is important to highlight a few trends in the literature involving longitudinal studies.

First, longitudinal research primarily focuses on means comparison pre-and post-incident data. Marshall, Frazier, Frankfurt, & Kuijer, (2015) reported finding fourteen longitudinal studies in the research that examined PTG over time. My own search yielded more than 35, with at least ten published in 2015 alone. While this increase in

longitudinal designs represents a positive step forward for PTG research, a majority of these studies, like the fourteen reviewed by Marshall et al. (2015), represent analysis of average levels of growth, rather than methods that would examine individual differences. When used exclusively, this trend can hide important patterns that could shed light on the process of PTG (Marshall et al., 2015). Marshall et al. argue that finding individual differences would support a perceived versus actual growth model (Zoellner & Maercker, 2006). However, individual differences could also be accounted for by longitudinal designs that take into consideration predictive factors based on other models. My research will not attempt to collect pre-incident data.

Second, longitudinal PTG research has emphasized examining growth over long time periods. Only half of the studies noted by Marshall et al. (2015) reported measurement within six months of the traumatic experience, limiting our understanding of the process of growth in the immediate aftermath of trauma. This trend continues in much of the most recent literature as well (Blix, Birkeland, Hansen, & Heir, 2015; Zhou & Wu, 2015; Zhou, Wu, & Chen, 2015). For example, two longitudinal studies (Zhou & Wu, 2015; Zhou, Wu, & Chen, 2015) examined adolescent Chinese students following the earthquake in China. Measures were taken 3 ½, 4 ½, and 5 ½ years after the earthquake. Frazier, Conlon, & Glaser (2001), in a longitudinal study of 171 female sexual assault survivors, positive posttraumatic change was reported in as little as two weeks from the time of the traumatic incident in 20% of the sample. This increased to 39% of the sample at two months post-incident, and then appeared to remain stable. Dong, Gong, Jiang, Deng, & Liu, (2015) also reported mid-low levels of PTG among 232 accidental injury victims within three months post-injury. These studies suggest that

research that only examines long-term growth patterns may miss the developmental process of PTG. Additionally, in a study with 118 students who reported experiencing a highly stressful event in the previous three years, Cann, Calhoun, Tedeschi, & Solomon (2010) reported correlations between both intrusive and deliberate rumination soon after the event and PTG that was stronger than correlations between recent intentional and deliberate rumination and PTG. This indicates that the cognitive process that leads to development of growth may occur relatively soon after the event. If PTG can develop quickly, as suggested by Frazier et al. (2001), then studies conducted over such a long time period may not be able to assess variables that examine the development process. The current study, although not using a longitudinal design, will focus more on short-term differences in PTG in an effort to better understand the developmental process of PTG.

In addition to longitudinal research, efforts to examine how PTG develops following trauma have used other research designs. Among the most common of these are studies that take the amount of time between traumatic incident and the measurement of PTG or related factors into consideration. Some examples of this research include the work of Cann et al. (2010b) who limited participant inclusion only to those who reported "any of a series of traumatic or highly stressful events" (p. 154) in the three years prior to the study, and the research of Zhou, Wu, Fu, & An (2015), who conducted a study in China with middle school students (N = 354) 4.5 years after the 2008 Wenchuan earthquake. In both of these cases, the time span between traumatic event and data collection was either known or was held constant to some degree. There is very limited research that examines the relationship between core belief disruption, event centrality,

and PTG in the context of time or development. The following section discusses what few studies exist.

Posttraumatic Growth, Change, and Event centrality. Only a small handful of studies examine the development of event centrality in PTG research. In a longitudinal study, following the Oslo bombing of 2011, Blix, Birkeland, Hansen, and Heir (2015) measured PTG and event centrality, finding that levels of PTG and event centrality were stable 1 year post-event and 2-years post-event. This data could be interpreted to support the view that PTG and event centrality, if they are going to develop in the aftermath of trauma, are likely to develop in the first year following the traumatic experience.

In the most robust time-related research study that examines how event centrality influences PTG, Johnson & Boals (2015) examined the relationship between PTGI scores and changes in seven other measures of personality that were related to four of the five domains of PTG to determine whether there were differences in mean scores based on high event centrality versus low event centrality. These measurements were taken approximately eight weeks following the first measurement of growth, with the difficult life experience that each participant reported on at Time 2 occurring anytime between the two measurements. Event centrality had a significant effect on the results (see Table 2.2), but the research design did not allow for examining how PTG or event centrality may develop over time.

In the only study of which I am aware that examines both event centrality and core belief disruption in the same study, Groleau, Calhoun, Cann, and Tedeschi (2013) interacted very little with the developmental component of PTG. They limited their participants to individuals who had experienced a traumatic event in the two years prior

to the study. A limitation that prevents drawing any time-related conclusions from this study is that there is no data that indicates when in the past two years the trauma occurred.

Table 2.2

Correlations Between PTGI and Change Scores in Measures of Actual Growth

Measure	Low CES	High CES	z score
Gratitude	.09**	.45***	4.34***
Positive Relations	.10***	.31***	2.50*
Satisfaction with Life	.12***	.41***	3.46***
Religious Commitment	.12***	.15	0.34
Meaning in Life	.10***	.31***	2.42*

Note. CES = Centrality of Event Scale; Gratitude = Gratitude Questionnaire-6; Positive Relations = Positive Relations with Others subscale of the Psychological Well Being Scale; Satisfaction with Life = Satisfaction with Life Scale; Religious Commitment = Religious Commitment Inventory; Meaning in Life = Presence of Meaning subscale of the Meaning in Life Questionnaire.
* $p < .05$. ** $p < .01$. *** $p < .001$

Posttraumatic Growth, Change, and Core Belief Disruption. In an early effort to detect core belief disruption among individuals diagnosed with cancer, researchers examined scores on the World Assumption Scale (WAS; Janoff-Bulman, 1989) and found no significant change over the course of the five month time span between measures (Carboon, Anderson, Pollard, Szer & Seymour, 2005). The lack of change in WAS scores could be interpreted in several ways. There could have been insufficient time between the time of diagnosis and the time of the second measure (approximately six months) for core assumptions to change. Another possible interpretation is that core assumptions changed prior to the first measure with little to no change by the time of the second measure. It also may be that either the diagnosis of cancer or the experience of having cancer did not cause world assumptions to change. Whatever interpretation best

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fits, this lack of change was unexpected given the hypothesis that core belief disruption is an element of the traumatic aftermath that leads to growth.

Other attempts to examine the development of core belief challenge in relationship to PTG are sparse. Wilson, Morris, and Chambers (2014) asked participants how long it had been since their diagnosis of prostate cancer ($M = 7.50$ years), but time since diagnosis was not included in the structural model for growth.
In contrast, Triplett et al. (2012) did attempt to factor in time since traumatic incident ($M = 380.33$ days) in a path analysis of PTG. Students who participated in the study indicated whether they had experienced one of nine listed traumatic events in past 2 ½ years. Participants who indicated that they had not experienced one of the events were excluded from the study. They found no significant time effect in their path analysis. However, as demonstrated by other research (e.g., Boals & Johnson, 2015), it is likely to be event severity rather than event type that is a more accurate predictor of growth. It is not clear from the methods description how the effect of time since event was analyzed. In best fitting model, core belief disruption was a significant predictor of PTG (30% of variance in PTGI explained by variance in CBI). Core belief disruption, in this model, is conceptualized as a factor that is logically and developmental prior to rumination, growth, found meaning and life satisfaction, and has significant correlations with each.

Danhauer et al. (2013), in a longitudinal design, measured PTG scores, age of participant, core belief disruption, and deliberate rumination among leukemia patients at time of diagnosis or admission to treatment (0-7 days from time of diagnosis/admission), at time of discharge ($M = 31.2$ days from baseline), and a final measurement ($M = 73.1$ days from baseline. PTG was significantly related to days from baseline ($p = .03$), age (p

= .03), deliberate rumination (r = .61, p < .001), and core beliefs (r = .66, p < .01). The study did not examine the relationship between core belief disruption and time since diagnosis.

Lindstrom et al. (2013) created a unique research design that asked undergraduate college students about the rumination that they experienced both soon after the traumatic incident they described, and "recently." Rumination soon after the event and recently significantly predicted for PTG. The entire model, consisting of core belief disruption, deliberate and intrusive rumination (both soon after the incident and recent), and positive and negative disclosure accounted for 44% (*p* < .001) of the variance in PTG, with significant correlation between core belief disruption and PTG (*r* = .58, *p* < .01). Additionally, recent rumination was a contributing factor to the model even when rumination soon after the event was controlled for. This could be interpreted as supportive of a developmental view of PTG. This study did not examine the relationship between core belief disruption and time since traumatic incident. Additionally, there was no quantitative description of what rumination "soon after the event" and "recent" (p. 52) rumination entailed.

As can be seen, there is limited data that examines how core belief disruption and event centrality are related to time since the traumatic event. If PTG is a process that develops over time causing genuine change, understanding the developmental process is important. In this study, I will contribute to posttraumatic research by using a cross-sectional design that examines mean differences in PTG outcomes and the PTG predictive factors of belief disruption and event centrality based on time since traumatic event. This design is intended to examine mean differences between growth and

predictive factors in an effort to better understand how time contributes to the developmental process and track how differences at various times following a traumatic event may contribute to PTG.

Participant Recruitment in Posttraumatic Growth Research

A final methodological issue that needs to be addressed involves participant selection. It is a well-known, but not unproblematic, feature of social science research that undergraduate students comprise an overrepresented participant group due to the ease of access that researchers have to that population as individuals who are primarily employed by large universities (Heppner & Heppner, 2004). This problem is not absent in PTG research. Out of eleven research articles reviewed that examined event centrality in the context of PTG, eight of them recruited participants largely or exclusively from undergraduate students (Barton, Boals, & Knowles, 2013; Bernard, Whittles, Kertz, & Burke, 2015; Boals & Schuettler, 2011; Boals, Steward, & Schuettler, 2010; Groleau, Calhoun, Cann, & Tedeschi, 2013; Johnson & Boals, 2015; Lancaster, Kloep, Rodriguez, & Weston, 2013; Schuettler & Boals, 2011). Out of twelve research articles that examined core belief disruption in the context of PTG, seven of them recruited participants largely or exclusively from undergraduate students (Cann et al., 2010; Groleau et al., 2013; Lindstrom et al., 2013; LoSavio et al., 2011; Su & Chen, 2015; Taku et al., 2015; Triplett et al., 2012). Additionally, among the eight remaining research articles that examined either core belief disruption or event centrality in the context of PTG, one recruited approximately 22% of its participants from a university-affiliated website (Roepke & Seligman, 2015). Thus, research with undergraduate students as the primary or exclusive participants comprises nearly 70% of research examining event

centrality and core belief challenge in the context of PTG. This may present difficulties with generalizability of results, as education level (Ullman, 2014) and age (Tedeschi & Calhoun, 2004) may both influence the experience of PTG.

Among research that has not used undergraduate students as primary or exclusive participants, participant recruitment generally occurs on the basis of experience of a specific traumatic event. Participants include leukemia patients (Danhauer et al., 2013), prostate cancer survivors (Wilson et al., 2014), sexual assault victims (Ullman, 2014), child earthquake survivors (Zhou, Wu, Fu, & An, 2015), El Salvadoran teachers (Roland et al., 2014), and bombing survivors (Blix et al., 2014).

Only two studies that examine event centrality or core belief disruption in the context of PTG recruited participants from the general population, and neither examined the developmental context of growth, the effect of time on PTG, or predictive factors of PTG. This study will expand on previous research by using a broad participant pool from a variety of educational and age backgrounds, and examining PTG, event centrality, and core belief disruption in the context of time since traumatic event. This strategy is an effort to add to our knowledge of the developmental process of PTG in the general population.

<p style="text-align:center">Summary</p>

This chapter surveyed many of the existing models that attempt to define the construct of PTG and explain its development. I reviewed the literature examining how core belief disruption and event centrality are represented in PTG research, and the methodological difficulties inherent to PTG research. This study seeks to clarify the interactions of these constructs as they relate to understanding how PTG develops.

Introduction

This chapter describes the methods used in this study. First, the research questions and hypotheses will be reviewed and a rationale will be provided. Next, the research method will be described followed by a description of the participants, including population description, sampling method, sample size, participant selection, and characteristics of the participants. The measures used in this study will be listed with a rationale for each instrument: the Core Beliefs Inventory (CBI), the Centrality of Event Scale (CES), and the Posttraumatic Growth Inventory (PTGI). The process of data collection will be reviewed and the independent variables and dependent variables will be defined. Finally, a description of the means comparison analyses used to analyze the data will be described.

Research Questions and Hypotheses

As described in Chapter 1, I designed this study to contribute to the body of research that examines contributing factors to PTG by testing the model of growth as personality change. Event centrality is a factor that assists in discriminating between events that are likely to produce PTG and events that are not likely to produce PTG among university students (Boals et al., 2010; Johnson & Boals, 2015). Core belief disruption has strong positive correlations with event centrality (Groleau et al., 2013), and is believed to be a contributing factor to PTG (Cann et al., 2010). In the light of the study's purpose, I proposed the following questions:

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Research Question 1

Do individuals who experience life difficulties as a central life event and experience core belief disruption experience more PTG than those who do not experience life difficulties as a central life event or core belief disruption?

Hypothesis 1a. Individuals who experience life difficulties as a central life event, as measured by an upper quartile score on the Centrality of Event Scale (CES; Berntsen & Rubin, 2006), will report greater PTG than those who do not report life difficulties as a central life event, as measured by the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996).

Hypothesis 1b. Individuals who experience core belief disruption as a result of life difficulties, as measured by an upper quartile score on the Core Beliefs Inventory (CBI; Cann et al., 2010), will report greater PTG than those who do not report core belief disruption, as measured by the PTGI (Tedeschi & Calhoun, 1996).

Research Question 2

Are there differences in core belief disruption, event centrality, and posttraumatic growth based on time since traumatic event?

Hypothesis 2. As time since difficult life experience increases, core belief disruption, measured as a continuous variable on the CBI (Cann et al., 2010), will remain stable, and event centrality, measured as a continuous variable on the CES (Berntsen & Rubin, 2006), will increase. Additionally, as time since trauma increases posttraumatic growth, as measured by the PTGI (Tedeschi & Calhoun, 1996), will increase. Time since traumatic experience will be measured in the following categories: less than two weeks

ago, between two weeks ago and eight weeks ago, between eight weeks ago and six months ago, and six to twelve months ago.

Research Design

This study examined differences between individuals who experienced event centrality and core belief disruption as a result of trauma, explored the relationship between core belief disruption and event centrality for those who have had difficult life experiences, and examined the role of time since traumatic event on PTSD for those who have experience high event centrality and high core belief disruption. This study used a cross-sectional, within-subjects design. In this cross-sectional study I collected data at a single point in time, and categorized that data based on time since difficult life experience. Individuals from various educational and occupational settings were invited to participate in research about PTG. Prior to beginning data collection IRB approval was obtained. I provided participants with information to obtain informed consent, and asked participants to complete the CBI (Cann et al., 2010), the CES (Berntsen & Rubin, 2006), the PTGI (Tedeschi & Calhoun, 1996), and a collection of questions used to gather demographic information. Demographic data that was gathered included: age, ethnicity, gender, level of education completed, a description of the most difficult life experience the individual has had in the past year, the elapsed time since that event, a short description of the most difficult event that the participant has ever experience, how long ago that event occurred, and a rating of the perceived severity of that event on a 6-point scale.

I designed this research to minimally interfere with the natural progression of the process of growth in the aftermath of trauma, because one of the goals of this study is to

aid in understanding the developmental process of PTG. Participant response came from life in their normal environment, with no experimental design present. I also asked participants about any ongoing treatment.

<div align="center">

Participants
</div>

Population

Previous research on the relationships between event centrality and PTG focused on undergraduate university students (e.g., Barton, Boals, & Knowles, 2013; Bernard et al., 2015; Boals et al., 2010; Boals & Schuettler, 2011; Johnson & Boals, 2015; Lancaster et al., 2013; Schuettler & Boals, 2011). Only three studies found examined the relationship between PTG and event centrality that recruited participants who were not undergraduate college students (Blix et al., 2015; Roland et al., 2014; Wolfe & Ray, 2015). Research exploring the relationships between core belief disruption and PTG have also primarily included undergraduate university students (Cann et al., 2010; Cann et al., 2015; Groleau et al., 2013; Lindstrom et al., 2013; Su & Chen, 2015; Triplett et al., 2012). Five studies examining the relationship between core belief disruption or core belief challenge and PTG recruited participants from other populations. Four of these five recruited participants who experienced a specific traumatic event (Danhauer et al., 2013; Ullman, 2014; Wilson, Morris, & Chambers, 2014; Zhou et al., 2015). Only Roepke and Seligman (2015) recruited participants who were diverse in educational background and type of trauma experienced. I recruited participants for the current study from the community in an effort to confirm findings from previous research that focused primarily on undergraduate university students (e.g., Frazier et al., 2008; Johnson & Boals, 2015) and expand those findings to the broader population. Because previous research findings

indicated that PTG in general (Ullman, 2014) and the PTG domains of relating to others and personal strength specifically are negatively correlated with level of education (Grubaugh & Resick, 2007), recruitment was open to participants from a variety of educational backgrounds. In particular, recruitment targeted graduate-level students, graduate school alumni, and individuals from the broader community that were likely to have diverse educational backgrounds. Because most people will experience a traumatic event at some point in their lives (Bonanno, 2004), and evidence suggests that the type of trauma experienced has little effect on the level of growth that people experience (Shakespeare-Finch & Barrington, 2012), individuals who have experienced a variety of difficult life experiences were recruited.

Children and adolescents may not be the best candidates for PTG since the growth process assumes that there are established cognitive schema that are challenged by extreme difficulty (Tedeschi & Calhoun, 2004) and children and adolescents are still experiencing significant cognitive development. Older adults may have a tendency to experience less PTG as they may tend to a) be less open to new ways of conceptualizing difficulty, and b) may have already learned their life lessons through difficult experiences (Tedeschi & Calhoun, 2004). Even so, I did not screen adult participants based on age because no data exists to support a suitable cutoff age for the development of PTG.

Sampling Method

The sampling frame for this study consisted of adults who agreed to participate in research about how people respond to challenges in life. Sampling methods in PTG literature have faced two specific difficulties. First, psychological research suffers from an over-reliance on college student participants, largely because they are a readily

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available group for those involved in psychological research at large universities (Heppner & Heppner, 2004). As demonstrated above, PTG research is no exception to this limitation. Second, participant recruitment is complicated by the fact that, in general, it is impossible to know when people will experience a difficult life event. Additionally, it is impossible to know when people will experience an event that is likely to result in PTG. I compensated for these two limitations by recruiting participants from a variety of sources, which has the following advantages. First, participant recruitment for this study intentionally recruited other participants besides undergraduate university students. Broadening the sampling pool is important because of the effect that level of education may have on the process of PTG (Grubaugh & Resick, 2007; Ullman, 2014). Second, the construct of PTG is most commonly defined as a reaction to difficult life circumstances (Calhoun & Tedeschi, 2006), regardless of whether the experience can be described as clinically-defined trauma. PTG is a distinct construct from Posttraumatic Stress Disorder (Tedeschi & Calhoun, 2004; Zoellner & Maercker, 2005), and as such difficult life circumstances that lead to PTG should not be confused with clinically-defined trauma. Therefore, I recruited participants without regard to specific life difficulties that have been experienced.

I recruited participants from five primary avenues that will yield a potential recruitment pool of in excess of 2,925 potential participants. Because response rate estimates are difficult to determine, I developed conservative estimates of participation rates. What is clear is that participation rates increase when potential participants are recruited face-to-face and when they have an affiliation with someone in the organization who is gathering data (Fowler, 2014). First, I recruited participants through their

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connection to the graduate school that I work at. I recruited students by requesting their participation in the classes that I teach, and by collaborating with my colleagues to recruit students in my colleagues' classes. I gave students an opportunity in class to take the survey. I contacted students, alumni, and staff members who were not in my class or my colleagues' classes via email with a request to participate. While some faculty members may have given extra credit for participation, I did not offer grade bonuses to students who participated in order to avoid potential ethical conflicts or conflicts of interest. There was the potential to reach in excess of 1,500 of the 2,925 total potential participants with an offer to participate in the research. I expected a participation rate of 20%. Second, I recruited a community sample of individuals who were members of or attendees of the church denomination with which I am affiliated. I sent potential participants an email invitation to participate. There was the potential to reach 500-1,000 of the 2,925 total potential participants via this avenue of recruitment. I had an expected participation rate of 20%. Third, I planned to recruit military families via two means, but was unable to complete this part of my recruitment plan. Fourth, by partnering with colleagues who teach at various other universities, I recruited participants by inviting students to participate. This avenue had the potential reach an additional 100 participants, with an expected participation rate of at least 20%. Finally, I recruited participants from the community through partnerships with several local mental health service providers. I attended group meetings for individuals who were receiving mental health services, and invited individuals to participate at those meetings. I made an effort to make contact with an additional 200 potential participants via this recruitment avenue, with an expected participation rate of at least 50%. However, mental health professionals proved to be very

protective of their clients, and this recruitment method yielded few results. These recruitment methods allowed me to track the number of individuals who were invited to participate so I was able to calculate a response rate. Recruitment via multiple streams allowed for a more diverse population sample that included access to individuals who represented diversity in educational experience and socioeconomic status. At the anticipated response rates given above, I anticipated 720 participants.

Participant Selection

Eligible participants for this study met the following qualifications: a) 18 years of age or older, b) consented to participate in the research study, c) spoke English well enough to participate in an English-language survey, and d) experienced a self-described difficult life experience in the 12 months prior to participating in this research. I enforced no participant limitations based on gender, ethnicity, type of trauma experienced, type of traumatic symptoms, or presence of traumatic symptoms. At the time of this study, I found no research that demonstrates significant differences in PTG outcomes based on these criteria.

Sample Size

I analyzed each of my research questions with between group comparison analyses. Wilson Van Voorhis and Morgan (2007) recommend a minimum of seven participants per cell for measuring group differences, with cell sizes of 30 for 80% power. Research question one needed a minimum of 120 participants according to this calculation, given two independent variables with two categories each, and one dependent variable. For each independent variable, I based the two categories on a ¼ to

¾ split in the participant sample. Given a 30 participant minimum per cell, I needed at least 120 participants.

Research question two also required a minimum of 120 participants, as the design called for one independent variable with four categories, and three dependent variables. Four groups, with 30 participants per group, required a minimum of 120 participants. However, a complicating factor was present in that the categories for the independent variable is time since traumatic event. It was unknown in advance of data collection how many participants would be in each category.

I consulted several additional sources in an effort to determine sample size. Pallant (2010) recommends a minimum of seven participants per cell, requiring a minimum of 28 participants for research questions. However, a power analysis was conducted for each research question using G*Power, which yielded a need for a larger sample size. For research question one, an analysis of variance (f=0.25, α=0.05, power=0.80) with two factors, each with two levels, required a minimum of 158 participants. For research question two, an analysis of variance with one independent variable ($f = 0.25$, $\alpha = 0.05$, power $= 0.80$) with four groups required 180 participants. This represents a wide discrepancy in the number of participants required for this study.

In view of these recommendations and power analyses, I made an effort to recruit a minimum of 200 participants to ensure sufficient power for the data analyses.

Measures

Participants completed a survey that was composed of the demographic information found in the Appendix, and the instruments described below.

Demographic Information

I asked participants for the following demographic information: age, gender, ethnicity, a brief description of the most difficult life experience they had during the 12 months prior to participating, the amount of time that has elapsed since their traumatic experience, the most difficult life experience they have had if it is different from the experience in the past 12 months, when that experience occurred, whether or not they are receiving treatment for the traumatic experience or posttraumatic symptoms, and the type of treatment they are receiving, if any (see Appendix A).

Core Beliefs Inventory

The Core Beliefs Inventory (CBI; Cann et al., 2010) is the first instrument designed to assess the degree to which an individual's core beliefs or assumptions are disrupted by a traumatic experience (Cann et al., 2010). The CBI was designed to measure core belief disruption following a stressful life event, and does not require the individual to have experienced clinically defined trauma, and focuses on "religious and spiritual beliefs, human nature, relationships with other people, meaning of life, and personal strengths and weaknesses" (Cann et al., 2010, pg. 21). The CBI is a nine-item instrument that demonstrated good reliability across three studies with alpha coefficients between 0.82 and 0.89. Validity is shown through correlation with posttraumatic growth ($r = .57$, $p < .001$) and moderate correlations with current stressfulness ($r = .30$, $p < .001$), and stressfulness at the time of the event ($r = .23$, $p < .01$). Moderate correlations are to be expected when examining disruptions of life events, as some stressful events will challenge core beliefs, while others fit with existing beliefs while still being stressful. Responses to each question are made on a six point scale (0-5), with answers ranging

from "not at all" to "a very great degree." Higher scores represent greater core belief disruption across several domains of thinking, including: fairness in life, control over life, personal competence and mastery, and personal relationships. The CBI moderately correlated to the Impact of Event Scale-Revised (Weiss & Marmar, 1997), the Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996), and a factor analysis was conducted that indicated that a single dominant factor was present in the CBI (Cann et al., 2010).

For the purpose of this study, I used the CBI to measure the degree of core belief disruption that participants have experienced as a result of their recent traumatic experience, which is consistent with its design.

LoSavio et al. (2011) used CBI items as dichotomous variables, with item score responses indicating that beliefs in the given area were disrupted "to a very small degree" representing no core belief disruptions and items scored higher representing belief disruption. This study examined differences between individuals who reported high core belief disruption, as defined by an upper quartile score on the CBI, and individuals who reported lower core belief disruption, as defined by a lower three quartiles score on the CBI. This mimics the methodology used in previous research (Barton et al., 2013; Boals et al., 2010; Johnson & Boals, 2015), replacing the CES used in those studies with the CBI. As core belief disruption and event centrality are both believed to be contributing factors in the development of PTG (e.g., Wilson et al., 2014), are measured by strongly correlated instruments (Groleau et al., 2013), and have both been used as cutoff instruments that have been correlated with reports of greater PTG, this seems an appropriate method for this study.

Centrality of Event Scale

The Centrality of Event Scale (Berntsen & Rubin, 2006) was designed to "measure the extent to which a memory for a stressful event forms a reference point for personal identity and for the attribution of meaning to other experiences in a person's life" (p. 220). The CES is a 20-item scale with high reliability ($\alpha = .94$), that has a short-form made up of seven items ($\alpha = .88$). In assessing for validity, individuals who felt intense fear, horror, or helplessness as a result of their traumatic experience reported significant differences from those who did not, but those who reported that the event involved actual or threatened death or injury reported no significant differences from those who did not. This indicates that the CES is sensitive to the emotional response resulting from the traumatic event, and not simply the event itself. Additionally, the CES is associated with depression ($r = .38$, $p < .0001$) and Posttraumatic Stress Disorder symptomology ($r = .23$, $p < .01$), both of which are to be expected among people who have experience a stressful event that is a reference point for identity formation. Item responses occur on a five-point Likert scale, ranging from 1 ("totally disagree") to 5 ("totally agree"). Recent research used the Centrality of Event Scale to assess the degree to which a traumatic experience has become a central life event in the development of the individual's identity, with higher scores indicating a greater influence of the event in question on the development of identity. This is consistent with PTG theory that hypothesizes that traumatic events are most likely to produce growth when they disrupt the individual's personal narrative (Calhoun & Tedeschi, 2006). Calhoun & Tedeschi also hypothesize that once a minimum threshold is reached, further increased narrative disruption may not predict for increased PTG.

The CES correlates moderately with PTSD symptoms (0.38) and depression (0.23). The CES was originally developed using an undergraduate student population. The research proposed in this study will contribute to the small body of research that examines the relationship between event centrality and PTG among non-undergraduate student populations (Blix et al., 2015; Roland et al., 2014; Wolfe & Ray, 2015), as level of education may influence PTG (Grubaugh & Resick, 2007; Ullman, 2014).

For the purpose of this study, I used the CES as an instrument to measure the degree to which the traumatic event that participants report as their most difficult life experience in the past year is a formative event for the purpose of identity formation and understanding the world. I used the CES as a screening instrument to separate individuals who have high event centrality from those who have low event centrality by differentiating between the upper quartile and the lower three quartile scores.

Posttraumatic Growth Inventory

The Posttraumatic Growth Inventory (PTGI, Tedeschi & Calhoun, 1996) is a 21-item scale with five subscales. The PTGI measures how successful people are in "restructuring or strengthening their perceptions of self, others, and the meaning of events" (pg. 455). Responses to each item occur on a six-point Likert scale, with higher scores representing greater PTG. Possible scores for each item range from 0 ("I did not experience this change as a result of my crisis") to 5 ("I experienced this change to a very great degree as a result of my crisis"). Changes occur in three broad categories: perception of self, interpersonal relationships, and philosophy of life. The development of these three categories resulted from previous studies that examined individuals who had experienced trauma, such as individuals who survived the sinking of a cruise ship

(Joseph, Williams, & Yule, 1993) and parents with ill and high-risk children (Affleck, Allen, Tennen, McGrade & Ratzan, 1985; Affleck, Tennen, & Gershman, 1985). Individuals often come through difficult experiences with a greater sense of their own personal strength and vulnerabilities, which falls into the category of changes in perception of self. Others find their personal relationships growing stronger, deeper, more intimate or having greater priority. These changes are categorized as changes in interpersonal relationships. The changed philosophy of life categorizes changes such as greater appreciation for life, strengthening of religious or spiritual beliefs, changes in philosophy of life, and changes in one's understanding of life's meaning or purpose. The five subscales fall within these three broad categories and include factors of New Possibilities (5 items, 17% of variance), Relating to Others (7 items, 16% of variance), Personal Strength (4 items, 11% of variance), Spiritual Change (2 items, 9% of variance), and Appreciation for Life (3 items, 9% of variance) (PTGI, Tedeschi & Calhoun, 1996).

Internal consistency of the 21-item PTGI is acceptable (α = .90), and the five factors also demonstrate good internal consistency (New Possibilities: α = .84, Relating to Others: α = .85, Personal Strength: α = .72, Spiritual Change: α = .85, Appreciation for Life: α = .67). Test-retest reliability is acceptable (r = .71). Researchers analyzed the PTGI for construct, concurrent, and discriminant validity. Individuals reporting greater severity of traumatic experience reported significantly more PTG, which was expected. Posttraumatic growth is expected to be related to some personality characteristics, such as optimism and religiosity, which would be associated with people who tend to see the benefits of trauma, and not correlated with social desirability, which would occur if posttraumatic growth was a socially desirable feature that was not actually present. The

PTGI has a mild negative correlation to social desirability ($r = -.15$, $p < .01$), and low to moderate correlations with optimism ($r = .23$, $p < .01$), religiosity ($r = .25$, $p < .01$), and the personality traits of extroversion ($r = .29$, $p < .01$), and openness ($r = .21$, $p < .01$). The PTGI is currently the standard in the field of PTG research for assessing the presence and degree of PTG.

Procedures

Data Collection

I recruited potential participants through my relationship with various educational and religious institutions. I contacted course instructors, institution administrators, local pastors, church administrators, and institutional leaders in an effort to build a recruitment list of potential participants. I found potential participants through student lists, alumni lists, and church membership lists, and contacted them via an email that described the research project and invited individuals to participate. I recruited other individuals by directing them to the website address where the survey was hosted using other face-to-face or flier recruitment means. The email contained both a personal invitation from the contact person and an invitation from me to join the research project.

I informed all potential participants of their right to confidentiality in a statement that indicated their information would not be used for any purpose other than this research study, and that their email address would not be sold, released, or given to any other person, group, or organization should they choose to release it. Additionally, assurance was given to each participant that their email addresses would not be collected or used for any other purpose without explicit additional permission granted. Individuals who choose to participate were directed to complete the survey with all of measures

described above, either on paper or via an online survey website. A thank you message was at the end of each paper and online survey.

Participants' Rights Protections

Participants remain anonymous. Participants' names were not collected or compile at any time during the study, with presentation of data in an aggregate form to protect the individual identities of the participants. I provided explicit instructions to participants that they would be asked to recall and reflect on the most difficult life experience they have had in the past year. Participant recollection and recall of these events presents a mild risk for psychological pain as a result of the study, as a result of reflection on their traumatic experiences (Eisma, Schut, Stroebe, Boelen, van den Bout & Stroebe, 2015). The introductory letter informed participants of the risk and of their option to discontinue the study at any time. The introductory letter also contained information regarding the mild personal benefits that could occur from participation, namely that by thinking about their traumatic experience and potential growth could experience positive psychological benefit (Eisma, Schut, Stroebe, Boelen, van den Bout & Stroebe, 2015). Additionally, the introductory letter also contained a description of the overall projected research benefit of this study.

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Variables

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Variables for Research Question 1

I analyzed research question one by using a two-way ANOVA with two independent, categorical variables. The first independent variable was event centrality, operationalized as a dichotomous variable. Individuals in the upper quartile of responses on the CES (Berntsen & Rubin, 2006) will be scored positively as having experienced

their difficult life event as a life event that is highly central to their sense of identity. Previous research used this method to distinguish between those who have and those who have not experienced trauma as a central life event (Barton et al., 2013; Boals et al., 2010; Johnson & Boals, 2015). Research question one also asked whether the same pattern of distinction is present for core belief disruption, and used the same upper quartile split on the CBI (Cann et al., 2010) as a dichotomous independent variable.

The dependent variable was PTG, measured by the PTGI (Tedeschi & Calhoun, 1996), which is a continuous variable.

Variables for Research Question 2

For research question two the independent variable was time since most difficult life experience in the past year with the following categories: less than two weeks, between two weeks and eight weeks, between eight weeks and six months, and between six months and one year. The dependent variables were core belief disruption, as measured by the CBI (Cann et al., 2010) as a continuous variable, and event centrality, as measured by the CES (Berntsen & Rubin, 2006) as a continuous variable, and PTG, as measured by the PTG (Tedeschi & Calhoun, 1996) as a continuous variable.

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Data Analyses

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Analysis of Research Question 1

I analyzed research question one by using a two-way analysis of variance (ANOVA). Event centrality, as measured by the CES (Berntsen & Rubin, 2006) as a dichotomous variable, and core belief disruption, as measured by the CBI (Cann et al., 2010) as a dichotomous variable, were the independent variables in this study. The continuous dependent variable was posttraumatic growth, as measured by the PTGI

(Tedeschi & Calhoun, 1996). This analysis examined mean differences in PTG scores between individuals who report high event centrality and high core belief disruption as compared to those who do not report high event centrality and high core belief disruption.

Analysis of Research Question 2

I analyzed research question two by using a multivariate analysis of variance (MANOVA) to explore mean differences in core belief disruption, event centrality, and posttraumatic growth. For research question two the independent variable was time since most difficult life experience in the past year with the following categories: less than two weeks, between two weeks and eight weeks, between eight weeks and six months, and between six months and one year. The dependent variables were core belief disruption, as measured by the CBI (Cann et al., 2010) as a continuous variable, event centrality, as measured by the CES (Berntsen & Rubin, 2006) as a continuous variable, and posttraumatic growth, as measured by the PTGI (Tedeschi & Calhoun, 1996).

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Summary

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This chapter described the methods used in this study. First, I reviewed the research questions and hypotheses and provided a rationale. Next, I described the research method. I outlined a description of potential participants, including population description, sampling method, sample size, participant selection, and characteristics of the participants. I described the measures used in this study, including a rationale for each instrument: the Core Beliefs Inventory (CBI), the Centrality of Event Scale (CES), and the Posttraumatic Growth Inventory (PTGI). Next, I reviewed the process of data collection. I defined the independent and dependent variables and how they were used for each research question. Finally, I described the means comparison analyses. Chapter Four

will provide the results of this study and Chapter Five will be a discussion and application of the results.

CHAPTER 4 RESULTS

Introduction

The current study purported to confirm and expand previous findings concerning the relationship between event centrality, core belief disruption, and posttraumatic growth; namely, that event centrality and core belief disruption, taken as dichotomous variables, could be predictors of posttraumatic growth. Additionally the study aimed to examine differences between reports of event centrality, core belief disruption, and posttraumatic growth based on the elapsed time since the life difficulty occurred. The existence of such differences could support the view of posttraumatic growth as a developmental process.

In chapter four, I review my data collection procedures and participant demographics. I describe my preliminary analysis and checks of assumptions, and provide an explanation of my data analysis and primary findings.

Data Collection Procedures

The current study is a correlational survey design. The study sought to recruit a community sample of individuals who (a) are eighteen years old or older and (b) have experienced a self-described life difficulty in the twelve months prior to completing the survey. I recruited participants through two primary means. First, I met with individuals and groups of people who were likely to have experienced a life difficulty in the past year to offer the opportunity to participate in this research. Individuals who were recruited included members of psychotherapy and psychoeducation groups in private practice,

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church small groups, and groups of therapists and counselors. Second, participants were recruited via mass email invitations to complete the survey which were sent to groups such as (a) students at a small graduate school located at two campuses in the Northeast and Southeast United States, (b) a local church located in the Southeast United States, (c) groups of therapists and counselors located in the Southeast United States, (d) alumni from a graduate school in the Southeast United States, but located across the United States, and (e) individuals selected by myself and my colleagues from across the United States who reported the experience of a life difficulty to myself or one of my colleagues in the twelve months prior to recruitment. Recruitment from the student population included international students.

I also engaged in face-to-face recruitment practices with groups that were likely to include members who were good candidates for this research. Groups were selected based on the focus of the group, such as support groups for trauma survivors. I presented each group with basic information about posttraumatic growth, and provided psychoeducation that was tailored to each group in a way that would have benefit for the group. Following the brief presentation that took between ten and twenty minutes, I offered individuals a chance to participate in my research. I informed potential participants that there was no payment for participating, nor was there a penalty for not participating. Participants were either given a paper copy of the survey to complete or directed to the online survey site at which they could access the survey.

For mass email recruitment, I compiled lists of potential participants from the sources listed above. I pre-screened for suitability for the study based on age and the presence of a life difficulty in the past twelve months by including a notification in the

email that participants must be eighteen years old or older and must have experienced a

significant life difficulty in the past twelve months. I sent two follow up reminder emails

to potential participants that included the date that the survey would close. I sent the first

reminder one week after the initial invitation, and the second two weeks after the initial

invitation.

Participant Descriptions

Response Rate

In total, 1,884 individuals received an invitation to participate in this study via

face-to-face or email invitation. A total of 290 individuals completed the survey, for a

total response rate of 15.4%. After all data were collected, I completed a preliminary

analysis that included screening data for participants who completed the survey but did

not meet requirements for the survey, screening for incomplete surveys, and checking for

erroneous data. No participants recorded an age that was below the cutoff. Three

participants were excluded from the study because they did not experience a life

difficulty in the prior twelve months to completing the survey (i.e., responded "none" or

indicated that they did not experience a minor or major life difficulty when asked). One

additional participant was excluded because the response to the prompt asking for a

description of the life difficulty experienced was likely fictional (response: "I consumed a

burrito the size of my forearm, and found the resulting indigestion to be hellacious"). The

survey website that I used requires participants to click through to the end of the survey

and submit the survey in order to be tallied. Any individual who did not submit the

survey was not included as a participant. After eliminating the above responses, 286

individuals completed surveys for a final response rate of 15.2%.

Participant Demographics

In this section, I review relevant participant demographics. First, I report on and analyze missing data. Second, I describe relevant demographic information regarding the sample population.

Missing Data. Demographic data describing the participants follows. Missing data for demographic questions are listed in Table 4.1.

Table 4.1

Missing Data for Demographic Questions

Question	Responded	Missing
Time since event	286	0
Currently receiving mental health treatment related to event	286	0
Was event described most difficult of life	286	0
Gender	282	4
Ethnicity	276	10
Highest level of education completed	281	5
Age	279	7
Religious affiliation	281	5
Means of recruitment	284	2

I conducted t-test analyses to determine any differences in posttraumatic growth (PTG) as measured by the Posttraumatic Growth Inventory (PTGI), event centrality as measured by the Centrality of Event Scale (CES), and core belief disruption as measured by the Core Beliefs Inventory (CBI) between participants who responded and participants with missing data. I conducted an independent means t-test between those who reported gender ($n = 282$) and those who did not ($n = 4$). I found no group differences in PTG between those who reported gender ($M = 49.91$, $SD = 20.12$) and those who did not ($M = 68.25$, $SD = 31.98$), t(284) = 1.80, $p = .074$ (2-tailed). I found no group differences in event centrality between those who reported gender ($M = 62.24$, $SD = 19.01$) and those

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who did not (*M* = 72.00, *SD* = 14.81), t(284) = 1.02, *p* = .308 (2-tailed), nor group

differences in core belief disruption between those who reported gender (*M* = 23.31, *SD*

= 10.80) and those who did not (*M* = 25.75, *SD* = 10.63), t(284) = .45, *p* = .654 (2-tailed).

I conducted an independent t-test between those who reported ethnicity (*n* = 276)

and those who did not (*n* = 10), finding no group differences in PTG between those who

reported ethnicity (*M* = 48.84, *SD* = 20.22) and those who did not (*M* = 59.20, *SD* =

23.25), t(284) = 1.43, *p* = .153 (2-tailed). I found no group differences in event centrality

between those who reported ethnicity (*M* = 62.29, *SD* = 18.97) and those who did not (*M*

= 64.70, *SD* = 20.07), t(284) =.39, *p* = .694 (2-tailed), nor group differences in core belief

disruption between those who reported ethnicity (*M* = 23.22, *SD* = 10.91) and those who

did not (*M* = 26.70, *SD* = 5.42), t(282) = 1.89, *p* = .083 (2-tailed).

Additionally, I conducted an independent t-test between those who reported

education level (*n* = 281) and those who did not (*n* = 5). I found no group differences in

PTG between those who reported education level (*M* = 50.00, *SD* = 20.08) and those who

did not (*M* = 59.60, *SD* = 34.59), t(284) = .62, *p* = .569 (2-tailed), nor group differences

in event centrality between those who reported education level (*M* = 62.31, *SD* = 18.81)

and those who did not (*M* = 66.00, *SD* = 29.31), t(284) =.43, *p* = .667 (2-tailed). I found

no group differences in core belief disruption between those who reported education level

(*M* = 23.28, *SD* = 10.77) and those who did not (*M* = 27.00, *SD* = 11.89), t(284) = .76, *p*

= .297 (2-tailed).

Further, I conducted an independent t-test between those who reported religious

affiliation (*n* = 281) and those who did not (*n* = 5). My findings yielded no group

differences in PTG between those who reported religious affiliation (*M* = 49.93, *SD* =

20.07) and those who did not (*M* = 63.20, *SD* = 33.22), t(284) = 1.45, *p* = .149 (2-tailed).

I found no group differences in event centrality between those who reported religious

affiliation (*M* = 62.26, *SD* = 19.02) and those who did not (*M* = 68.80, *SD* = 16.57),

t(284) = .76, *p* = .446 (2-tailed). Nor did I find group differences in core belief disruption

between those who reported religious affiliation (*M* = 23.30, *SD* = 10.79) and those who

did not (*M* = 25.80, *SD* = 11.08), t(284) = .51, *p* = .608 (2-tailed).

I conducted an independent t-test between those who reported age (*n* = 279) and

those who did not (*n* = 7). I found no group differences in PTG between those who

reported age (*M* = 50.08, *SD* = 20.21) and those who did not (*M* = 53.71, *SD* = 27.50),

t(284) = .46, *p* = .641 (2-tailed), nor group differences in event centrality between those

who reported age (*M* = 62.33, *SD* = 19.01) and those who did not (*M* = 64.14, *SD* =

18.85), t(284) = .25, *p* = .804 (2-tailed). My findings yielded no group differences in core

belief disruption between those who reported age (*M* = 23.20, *SD* = 10.75) and those who

did not (*M* = 29.00, *SD* = 11.49), t(284) = 1.41, *p* = .160 (2-tailed).

Finally, I conducted an independent t-test between those who reported means of

recruitment (*n* = 284) and those who did not (*n* = 2). I did find group differences in PTG

between those who reported means of recruitment (*M* = 49.88, *SD* = 20.15) and those

who did not (*M* = 90.00, *SD* = 8.49), t(284) = 2.81, *p* = .005 (2-tailed). The effect size

was calculated as a small effect (η^2 = .027). I found no group differences in event

centrality between those who reported means of recruitment (*M* = 62.25, *SD* = 18.95) and

those who did not (*M* = 80.50, *SD* = 19.09), t(284) = 1.36, *p* = .176 (2-tailed). I found no

group differences in core belief disruption between those who reported means of

recruitment ($M = 23.30$, $SD = 10.80$) and those who did not ($M = 29.50$, $SD = 6.36$),

t(284) = .81, p = .419 (2-tailed).

Non-significant results of t-test comparisons of the dependent variables between those who responded to each demographic question and those who did not indicate that missing data are likely random, while differences in dependent variable scores indicates data missing at random (Allison, 2009). Pairwise deletion would be appropriate, but none of the analyzed variables for the research questions had missing data, therefore it was not necessary to make adjustments to the data.

Demographic Description. Researchers examined PTG at various times since the difficult life experience of the participants occurred (e.g., Frazier, Conlon, & Glaser, 2001; Johnson & Boals, 2014). In the current study, I analyzed differences in PTG, event centrality, and core belief disruption based on time since traumatic event. I asked participants to signify whether their difficult life experiences occurred less than two weeks ago, between two weeks ago and eight weeks ago, between eight weeks ago and six months ago, or between six months ago and twelve months ago. Most participants reported that their experience occurred between six months ago and twelve months ago (n = 167), followed by a report of the experience occurring between eight weeks ago and six months ago (n = 75). Wilson Van Voorhis and Morgan (2007) recommended a minimum of seven participants per cell for measuring group differences, with cell sizes of 30 for 80% power. As a result, I combined the two smallest groups, between two weeks ago and eight weeks ago (n = 38) and less than two weeks ago (n = 6) into a single group, less than eight weeks ago (n = 44), to increase the power of between groups analyses. This process yielded three groups for research question two instead of four groups.

The participant population primarily identified as Caucasian ($n = 192$), with the remainder of the participants ($n = 94$) identifying as (a) African or African-American ($n = 31$), (b) Asian ($n = 30$), (c) Latino ($n = 10$), (d) European ($n = 3$), (e) Middle Eastern ($n = 2$), and (f) biracial ($n = 8$). Ten participants gave no response. Approximately two thirds of participants were female ($n = 175$), approximately one third male ($n = 107$), while four participants gave no response for ethnicity. While the vast majority of participants have completed an undergraduate degree ($n = 264$), participants had diverse educational backgrounds (see Table 4.2).

Table 4.2

Frequency of Participant's Highest Level of Education Completed

Level of Education	Frequency
High School	4
Some Undergraduate Courses	8
Two-Year Degree	5
Undergraduate Degree	48
Some Graduate Courses	112
Master's Degree	89
Doctoral Degree	15
No Response	5

Preliminary Analysis

In this section, I discuss parametric techniques that are used to make group comparisons and the general assumptions upon which they rely (Pallant, 2010). First, the dependent variables in all between groups comparisons in this study were measured on a continuous scale. Second, parametric techniques rely on random sampling. In this study I used a convenience sample from the community, which may violate the required assumption of random sampling for these analyses. Third, participant data must be independent from one another. I primarily recruited participants individually from a wide

variety of recruitment sources, thus the participants appear to meet the assumption of independent observations of data. Although I recruited some participants in groups, their experiences were individual, and there is no evidence of participants communicating about the survey beforehand. Additionally, I checked the variables for normality and outliers. No data were missing from items contributing to variables. Following an examination of each dependent variable is a discussion of other factors that were given preliminary analysis. Table 4.3 shows descriptive statistics for posttraumatic growth, event centrality, and core belief disruption.

Table 4.3

Descriptive Statistics for Dependent Variables

Measure	Mean	SD	N
PTGI	50.16	20.36	286
CES	62.38	18.98	286
CBI	23.35	10.78	286

Note: PTGI = Posttraumatic Growth Inventory; CES = Centrality of Event Scale; CBI = Core Beliefs Inventory.

Posttraumatic Growth

In this study, posttraumatic growth is measured with the Posttraumatic Growth Inventory (PTGI). According to Tedeschi and Calhoun (1996), the PTGI has good internal consistency ($\alpha = .90$). In the current study, the Cronbach alpha coefficient was .93. I checked PTGI scores for normality. PTGI scores were normally distributed. A histogram and Q-Q plots show normal distribution. Skewness (.002) and kurtosis (-.62) are within acceptable limits. The Kolmogorov-Smirnov statistic indicated a violation of normality (.07, $p = .005$). However, this is a common result in samples larger than 200 that indicates the acceptability of proceeding in this study (Pallant, 2010). No outliers were indicated.

Event Centrality

In this study, event centrality is measured with the Centrality of Events Scale (CES). According to Berntsen and Rubin (2006) the CES has high reliability ($\alpha = .94$). In the current study, the Cronbach alpha coefficient was .95.

CES scores were normally distributed. A histogram and Q-Q plots show normal distribution. Skewness (-.22) and kurtosis (-.66) are within acceptable limits. Kolmogorov-Smirnov statistic indicated a violation of normality (.06, $p = .037$). Again, this is a common result in samples larger than 200 (Pallant, 2010). No outliers were indicated.

Core Belief Disruption

In this study, core belief disruption is measured with the Core Beliefs Inventory. According to Cann et al. (2010), the CBI has demonstrated good reliability across three studies with alpha coefficients between 0.82 and 0.89. In the current study, the Cronbach alpha coefficient was .89.

CBI scores were normally distributed. A histogram and Q-Q plots show normal distribution. Skewness (-.17) and kurtosis (-.78) are within acceptable limits. Kolmogorov-Smirnov statistic indicated a violation of normality (.06, $p = .014$). Again, this is a common result in samples larger than 200 (Pallant, 2010). No outliers were indicated.

Data Analysis Results

Research Question 1

Research question one asks: Do individuals who experience life difficulties as a central life event and experience core belief disruption experience more PTG than those who do not experience life difficulties as a central life event or core belief disruption?

For research question 1, I used both event centrality and core belief disruption as dichotomous variables, with the upper quartile scores representing the presence of event centrality and the presence of core belief disruption. This was based on the use of upper quartile scores on the CES as a cutoff for comparing PTGI scores in previous research (Johnson and Boals, 2015). Johnson and Boals (2015) compared correlations between PTG and other measures of personality change among those who reported high event centrality with the same correlations among those who reported low event centrality. In this study, CES scores of 75 and lower ("low event centrality") represent the lower three quartiles scores ($n = 209$), and scores of 76 and higher ("high event centrality") represent the upper quartile scores ($n = 77$). CBI scores of 31 and lower ("low core belief disruption") represent the lower three quartile scores ($n = 212$), and scores of 32 or higher ("high core belief disruption") represent the upper quartile scores ($n = 74$).

I conducted a two-way, between-groups analysis of variance to examine mean differences in PTG, as measured by the PTGI, between participants with high event centrality and participants with low event centrality, as measured by the CES, and between participants with high core belief disruption and participants with low core belief disruption, as measured by the CBI. Levene's Test, which checks for equal or similar variances between groups, suggested that a violation of the assumption of homogeneity

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of variance of the dependent variable across groups is present, $F(3, 282) = 3.37$, $p = .02$.

Therefore, a more stringent level of significance of $p < .01$ was assumed for evaluating

the results (Pallant, 2010). I checked for an interaction effect between event centrality

and core belief disruption, which would suggest that event centrality and core belief

disruption were dependent upon each other in the effect they produce on PTG, but found

no significant interaction effect, $F(1, 282) = 1.48$, $p = .23$.

Upon analysis, I found a statistically significant main effect for core belief

disruption, $F(1, 282) = 13.71$, $p < .001$, with a small to moderate effect size (partial $\eta^2 = $

.05). I also found a statistically significant main effect for event centrality, $F(1, 282) = $

53.38, $p < .001$, with a large effect size (partial $\eta^2 = .16$). Descriptive statistics for these

data analyses are found in Table 4.4. I conducted a post hoc power analysis in G*Power

for differences in PTG based on core belief disruption. Given an effect size $f = .23$

(computed in G*Power from partial $\eta^2 = .05$), $\alpha = .01$, and 286 participants, the analysis

of the differences in PTG based on core belief disruption had a power of .90.

Additionally, I conducted a post hoc power analysis in G*Power for differences in PTG

based on event centrality. Given an effect size $f = .23$ (computed in G*Power from partial

$\eta^2 = .16$), $\alpha = .01$, and 286 participants, the analysis of the differences in PTG based on

event centrality had a power of .99.

Based on the above analyses, I rejected the null hypothesis that no differences in PTG

exist between participants that experienced high event centrality and participants that

experienced low event centrality. I also rejected the null hypothesis that no differences in

PTG exist between participants who experienced high core belief disruption and

participants who experienced low core belief disruption. The degree of event centrality

reported by participants had a large effect on reported PTG, while the degree of core

belief disruption reported by participants had a moderate effect on reported PTG.

Table 4.4

Descriptive Statistics for PTGI Based on Upper Quartile Split of CES and CBI

Split	PTGI		
	Mean	SD	N
Upper ¼ CES	63.91	18.03	74
Lower ¾ CES	45.37	18.92	212
Upper ¼ CBI	67.45	13.95	77
Lower ¾ CBI	43.79	18.58	209
Upper ¼ CES and Upper ¼ CBI	70.20	14.67	44
Lower ¾ CES and Lower ¾ CBI	41.97	17.98	179

Note: PTGI = Posttraumatic Growth Inventory; CES = Centrality of Event Scale; CBI = Core Beliefs Inventory.

Research Question 2

Research question two asks: Are there differences in core belief disruption, event

centrality, and posttraumatic growth based on time since traumatic event?

Event centrality, as measured by the CES, core belief disruption, as measured by

the CBI, and posttraumatic growth, as measured by the PTGI, were continuous dependent

variables for this research question. Time since traumatic event was a dichotomous

variable, with scores recorded in four categories: less than two weeks, between two

weeks and eight weeks, between eight weeks and six months, and between six months

and twelve months. There were not enough cases for analysis (Wilson Van Voorhis and

Morgan; 2007) in the "less than two weeks" category ($n = 6$), so "less than two weeks"

and "between two weeks and eight weeks" were combined to a single new category: "less

than eight weeks."

I conducted preliminary assumption testing to check for normality, linearity,

univariate and multivariate outliers, homogeneity of variance-covariance matrices, and

multicollinearity. I discussed normality and univariate outliers above. Using Mahalanobis distances, I found no multivariate outliers. By examining scatterplots of the dependent variables, I found no obvious cases of nonlinearity. Box's test of equality of covariance matrices indicated no violation of the assumption of homogeneity of variance-covariance matrices ($p = .81$), which is a check for the assumption of equal or similar variances among groups. Pearson's r indicated no issues of mulicollinearity, as the dependent variables were moderately correlated, as noted above. No violations of assumptions were found.

Table 4.5

Descriptive Statistics for PTGI, CES, and CBI Based on Time since Traumatic Event

Time since Trauma		PTGI		CES		CBI	
	N	Mean	SD	Mean	SD	Mean	SD
< 8 Weeks	44	47.25	20.25	56.73	19.00	20.36	11.33
8 Weeks – 6 Months	75	47.55	19.81	59.69	17.25	22.45	10.41
6 – 12 Months	167	52.11	20.53	65.07	19.31	24.53	10.67

Note: PTGI = Posttraumatic Growth Inventory; CES = Centrality of Event Scale; CBI = Core Beliefs Inventory.

I performed a one-way between-groups multivariate analysis of variance to examine differences in posttraumatic growth, core belief disruption, and event centrality based on time since trauma. There were no significant differences based on time since trauma, $F(2, 283) = 1.68$, $p = .12$; Wilks' Lambda = .97. I accepted the null hypothesis that there are no differences in PTG and event centrality, based on time since difficult life experience. I confirmed my prediction that there would be no change in core belief disruption. Even though I found no significant differences in posttraumatic growth, core belief disruption and event centrality based on time since event, there was a general

pattern of increase in scores over time. Table 4.5 contains descriptive statistics that demonstrate this trend.

Summary

In this study I examined differences in PTG for individuals who experience high event centrality and high core belief disruption, and the effect of time on PTG, event centrality, and core belief disruption. Analyses found that individuals who experienced high event centrality and high core belief disruption were more likely to experience higher levels of posttraumatic growth. I found no differences in PTG, event centrality, or core belief disruption based on time since difficult life experience.

CHAPTER 5 APPLICATION

This study explored differences in Posttraumatic Growth (PTG) between individuals who reported high event centrality and low event centrality, and between individuals who reported high core belief disruption and low core belief disruption. In this study I also explored differences in PTG, event centrality, and core belief disruption based on time since difficult life experience. Two-hundred eighty four participants completed the Posttraumatic Growth Inventory (PTGI), the Centrality of Event Scale (CES), and the Core Beliefs Inventory (CBI) via online or paper survey. Two-hundred sixty-nine of those participants also submitted complete demographic information. The purpose of this study was to (a) determine if there is a significant difference in PTG between group means of those with upper quartile CES scores and those with lower three-quarters CES scores, (b) determine if there is a significant difference in PTG between group means of those with upper quartile CBI scores and those with lower three-quarters CBI scores, and (c) determine if there is a significant differences in PTG, event centrality, and core belief disruption based on time since the difficult life experience. I asked participants to describe their most difficult life experience, rate the severity of that life experience, and indicate other related and demographic information, such as the most difficult life experience they have had and whether or not they were receiving mental health treatment for the life difficulty at the time of the survey. Table 5.1 lists the type and number of difficult life experiences reported. I provide a brief description of the

results of the study, as well as study limitations, and implications for practice and research in this chapter.

Table 5.1

Type and Rate of Difficult Life Experiences Reported

Type	N
Death of Loved One	36
Injury/Illness of Loved One	36
Life Transition	45
Loss	18
Personal Injury/Illness	51
Relational Difficulties	61
School Related	16
Work Related	29
Other	33

Note: Total does not add to the number of participants. 39 participants reported complex issues with multiple types of difficult life experiences.

Discussion of Findings

This section contains a discussion of the findings of this study. First, I examine demographic factors that relate to the study outcomes. Next, I discuss the results of each research question. I follow that discussion with a review of the limitations of the study, and conclude with implications for practice and research.

Demographic Factors

Social science research largely depends on the ease of access to undergraduate students as research participants, leading to what may be skewed perspectives and poor generalizability of social science research results (Heppner & Heppner, 2004). PTG research has much the same problem, depending largely on easily accessible undergraduate student populations, particularly first year psychology students (e.g., Boals, Steward, & Schuettler, 2010; Boals & Schuettler, 2011; Schuettler & Boals, 2011; Barton, Boals, & Knowles, 2013; Lancaster, Kloep, Rodriguez, & Weston, 2013;

Groleau, Calhoun, Cann, & Tedeschi, 2013; Bernard, Whittles, Kertz, & Burke, 2015; Johnson & Boals, 2015; Cann et al., 2010; LoSavio et al., 2011; Triplett et al., 2012; Groleau et al., 2013; Lindstrom et al., 2013; Su & Chen, 2015; Taku et al., 2015). This could present a problem for PTG research, as lower levels of PTG may be associated with both higher levels of education (Ullman, 2014) and older age (Tedeschi & Calhoun, 2004). The current study was influenced by two previous studies (Boals, Steward, & Schuettler, 2010; Johnson and Boals (2015) that both examined differences in PTG between those who reported high levels of event centrality and those who reported lower levels of event centrality. High event centrality was based on upper quartile CES scores and low event centrality was based on lower three-quartile CES scores. Both of those studies recruited undergraduate students.

In the current study, participants reported their highest level of education completed. Whereas previous research largely has homogeneous participant populations in terms of level of education (i.e., undergraduate students), this study's participant population is heterogeneous in terms of level of education, ranging from participants who have not completed high school to participants who have completed a doctoral degree. However, the majority of participant had completed some graduate level courses. Given the dearth of previous PTG research with highly educated participants, areas of consistency between this study and previous research could indicate the generalizability of similar PTG research findings to populations with broad educational ranges.

Of the participating population in the current study, approximately 61.6% were female ($n = 175$) and 37.4% were male ($n = 107$), with 1.4% giving no response ($n = 4$).

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Both men and women were well represented, increasing the generalizability of similar results to men and women.

A majority of the participants were white (67.6%, $n = 195$), with African American (10.6%, $n = 30$), Asian (10.6%, $n = 30$), Latino (3.5%, $n = 8$), and biracial (3.5%, $n = 8$) minorities included. According to the Census bureau, as of 2015 the US population was 61.6% white only, 13.3% African American only, 5.6% Asian only, 17.6% Latino or Hispanic only, and 2.6% biracial. While Latinos are underrepresented in this study, the racial makeup of this study's sample is heterogeneous, which may improve generalizability of the results.

Differences in Posttraumatic Growth Based on Event Centrality

Research question one examined mean differences in PTG among those who reported high and low event centrality and core belief disruption. Hypothesis 1a predicted that participants who reported higher event centrality would experience greater levels of PTG. Event centrality represents the degree to which an event, positive or negative, becomes central to the identity of the individual who experienced it. Calhoun and Tedeschi (2006) have hypothesized that events that disrupt the individual's personal narrative are likely to produce growth. Event centrality is a construct that is a function of narrative disruption, which may not have a linear correlation to PTG, but rather may have a threshold effect (Calhoun & Tedeschi, 2006), meaning that once individuals experience trauma to the degree that it becomes a central life event, PTG is more likely to occur. In this study, event centrality, as measured by the Centrality of Event Scale (CES), was transformed into a dichotomous variable by distinguishing high event centrality (cases that fell in the upper quartile of scores on the CES) from low event centrality (cases that

fell in the lower three quartiles scores on the CES). At least two other studies have used the CES in this way (Boals, Steward, & Schuettler, 2010; Johnson & Boals, 2015). Boals, Steward, and Schuettler (2010) compared correlations between PTG and "variables of interest" (e.g., depression, anxiety, and positive affect) among those who reported low event centrality with those same correlations among those who reported high event centrality. They found that correlations were stronger in the group with high event centrality. Johnson and Boals (2015) examined relationships between PTG and quantifiable change areas before and after trauma, finding that the group with high event centrality had stronger correlations between PTG and quantifiable change areas than the group reporting low event centrality. The current study compared mean differences in PTG based on high or low event centrality, and found results that were consistent with Boals, Steward, and Schuettler (2010) and Johnson and Boals (2015). My research also expanded on previous research, as both studies recruited exclusively from undergraduate students, while my research recruited from a community population that was more highly educated. Additionally, neither of the previous studies explored mean differences in PTG scores based on event centrality. This study found that event centrality had a significant effect on PTG scores, with a large effect size (partial $\eta^2 = .16$). The results of this study support the idea that event centrality may indeed represent a construct upon which there is an important threshold score – when individuals reach a score beyond this threshold on the CES, the likelihood of that individual experiencing PTG is much more likely (Calhoun & Tedeschi, 2006).

Barton, Boals, and Knowles (2013), in a study with undergraduate psychology students and women seeking treatment at a community health clinic, found event

centrality be a predictive factor for PTG. My research supports the findings of Barton, Boals, and Knowles (2013), with a community sample made up of individuals with higher degrees of education and individuals who were not seeking mental health treatment. In the study conducted by Barton, Boals, and Knowles (2013), comparisons between participants with high and low event centrality were not examined due to an insufficient number of participants who reported low CES. My research did not differentiate between treatment seeking and non-treatment seeking participants when looking at differences in PTG or event centrality.

Differences in Posttraumatic Growth Based on Core Belief Disruption

Research question one examined mean differences in PTG among those who reported high and low event centrality and core belief disruption. Hypothesis 1b predicted that participants who reported higher core belief disruption would experience greater levels of PTG. Core belief disruption and event centrality are related but non-equivalent constructs (Boals, Steward, & Scheuttler, 2010) that are predictive of PTG (Groleau, Calhoun, Cann, & Tedeschi, 2013). As noted above, the conditions that make PTG likely to occur include the disruption of one's personal life narrative when experiencing a difficult life event (Calhoun & Tedeschi, 2006). Like with event centrality, my research examined differences in PTG between those who experienced high core belief disruption and those who experienced low core belief disruption. Boals, Steward, & Schuettler (2010) proposed that core belief disruption could potentially be used as a means of predicting greater PTG, just as they found to be true for event centrality. In my research, differences in PTG based on high and low core belief disruption were discovered, however, I found a smaller effect size was found (partial $\eta^2 = .05$) than when differences

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in PTG were compared based on high and low event centrality. As discussed above, Tedeschi and Calhoun indicated that there may be a threshold point in event centrality beyond which great rates of PTG could be expected (Calhoun & Tedeschi, 2006). My results indicate that event centrality may be a better candidate than core belief disruption as this threshold construct.

LoSavio et al., (2011) compared differences in PTG between individuals who reported core belief disruption of a "very small degree" or greater and individuals who did not report core belief disruption over the course of seven days, splitting participants into groups who did experience core belief disruption and those who did not experience core belief disruption. LoSavio et al. found that those who reported core belief disruption experienced greater levels of PTG. My findings are related to, but distinct from, the findings of LaSavio et al., and expand upon their work. In my research, the comparison between high core belief disruption and low core belief disruption resulted in greater levels of PTG among those who reported high belief disruption. While LaSovio et al. (2011) determined that even small amounts of core belief disruption can impact PTG for those who are experiencing mild, daily life stressors, my study focused on single events. PTG is more likely to be experienced as a result of daily stressor or single difficult events when core belief disruption is present. Additionally, Cann et al. (2010b) reported a strong positive correlation between core belief disruption and PTG, but limited their participants to individuals who reported having "traumatic or highly stressful events," while the reported stressfulness of the event at the time that it took place was not significantly related to PTG. The findings of Cann et al. indicate that the disruption of core beliefs rather than the severity or stressfulness of the event itself is likely to be relevant for the

development of PTG. My research findings confirmed the relationship between core belief disruption and PTG, but included as participants individuals who had milder experiences.

In the only known study that examined both core belief disruption and event centrality as they related to PTG, core belief disruption was found to be a stronger predictor for PTG than event centrality (Groleau, Calhoun, Cann, & Tedeschi, 2013). Yet, my research results found that there was a greater effect size in differences in PTG based on high event centrality than that based on high core belief disruption.

Differences Based on Time since Event

In research question two I examined differences in PTG, event centrality, and core belief disruption based on the elapsed time since the difficult life experience. Researchers found evidence of posttraumatic growth in as little as two weeks following a traumatic incident (Frazier, Conlon, & Glaser, 2001), but most research that examines changes in PTG over time observes long-term changes in growth more than 1 year following traumatic events (e.g., Cann, Calhoun, Tedeschi, & Solomon, 2010; Zhou & Wu, 2015; Zhou, Wu, & Chen, 2015; Blix, Birkeland, Hansen, and Heir, 2015). I limited my study to events reported within one year prior to completion of the survey in an effort to examine short-term differences in PTG. In my study, I found no significant differences in levels of PTG, event centrality, or core belief disruption among a community sample at three time intervals post-experience within one year of the participants' difficult life experiences.

Change in Posttraumatic Growth. Research focusing on change in PTG results in mixed findings. Longitudinal research has primarily focused on means comparison of

pre-and post-incident data, which is helpful for examining the prevalence and degree of PTG, but is not helpful in examining the process of PTG development unless multiple post-incident measures are taken. For example, Blix, Birkeland, Hansen, and Heir (2015) found stability in levels of event centrality and PTG at 1 year and 2 years post-event in survivors of a bombing in Oslo, and Zhou and Wu (2015) also found stability in PTG at 3 ½, 4 ½, and 5 ½ years after an earthquake in 217 primary and secondary school children. My research is consistent with the results of previous studies that focused on PTG at longer periods of time following traumatic experience, providing supporting evidence that PTG may be stable across times shorter than one year following difficult experiences. However, in a longitudinal study with leukemia patients, Danhauer et al. (2013) found mean PTG scores were significantly different across time for the 37 patients who completed the survey at all three times post-incident. The results presented by Danhauer et al. provide reason to believe that PTG may develop over time in some cases, but are inconsistent with my results. These inconsistencies fuel existing questions about (a) factors that contribute to the developmental process of PTG and (b) current models of PTG that conceptualize PTG as true growth. Lindstrom et al. (2013) conducted a regression analysis in which rumination close to the traumatic event and rumination at a later time were predictive factors, which are results that could be interpreted as indicative of a developmental process for PTG. However, Frazier, Conlon, & Glaser (2001) found posttraumatic change in as little as two week following sexual assault in survivors, which indicates a very quick process of growth development. The primary contribution of my research is to confirm that understanding PTG development is not as straightforward as simply tracking changes at various times in the post-traumatic process, but rather requires

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closer examination of specific factors that contribute to the developmental process.

Additionally, this research confirms the need for a more nuanced understanding of

growth that distinguishes between coping processes that arise quickly and true growth

that takes longer to develop.

Change in Event Centrality. Very little research has been conducted on change

in event centrality in PTG research. Most research involving event centrality focuses on

event centrality as a predictive factor for PTG, or on the relationship between PTG and

event centrality. In one example, Blix, Birkeland, Hansen, and Heir (2015) measured

PTG and event centrality, finding that levels of PTG and event centrality were stable 1

year post-event and 2-years post-event. My research confirms these results on a shorter

time scale, with no significant differences in event centrality found based on time since

traumatic experience within a year after difficult life experiences. However, if events that

have high event centrality have an organizational role in the building of one's sense of

self (Boals et al., 2010), then a reasonable conclusion to draw is that event centrality

develops in the aftermath of difficult life experiences, rather than occurring quickly or

immediately following the difficult experience. Based on my findings, it is possible that

measures of event centrality are measures of the point and degree of disruption of the

current view of self, rather than a point in the development of identity organization. Lack

of research prevents the establishment of firm conclusions in this area.

Change in Core Belief Disruption. There is little research that attempts to

examine the development of core belief challenge in relationship to PTG. The World

Assumption Scale (WAS; Janoff-Bulman, 1989) was designed to measure three core

worldview assumptions: the individual's belief in the benevolence of the world, the

individual's belief about meaning in life, and the individual's belief of his or her own self-worth (Janoff-Bulman, 1992). These three areas of examination are precursors to the Core Beliefs Inventory used to measure core belief disruption. Among individuals diagnosed with cancer, WAS scores did not significantly change over the course of the five month time span between measures (Carboon, Anderson, Pollard, Szer & Seymour, 2005). Although my research examined core belief disruption as measured by the CBI, the results were consistent with previous findings. In forming my hypotheses for this study, I predicted that core belief disruption would not change over time based on my theory of PTG development – a prediction borne out in my results. I conclude this section with a discussion of how my findings related to that developmental model.

Model Prediction. I based my second research question on the following theory of PTG development. When people experience difficult or traumatic life experience, they often also experience a disruption in their view of themselves or their world. This disruption was measured via the construct of core belief disruption, which was predicted to be present and remain stable across time. As individuals process their experiences, they come to reorganize their sense of self and the world around the difficult life experience, which in turn produces growth. Thus, I predicted that event centrality and PTG would occur at higher levels at later times following the event. The findings of my research were not consistent with my predictions based on this model of PTG.

<center>**Limitations of the Study**</center>

This research had several limitations, which are described as follows. Limitations included limited variability among reported religious affiliation and educational range in

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the sample, the potential for sample bias and confounding variables, and the cross sectional design of the study.

Threats to Validity

Several *potential* threats to the validity of this study are present. I informed participants at the outset of the survey that this research explores how difficult life experiences can affect growth. It is possible that participants who took the survey had the expectation that the researcher was looking for growth, thus influencing the reported rate of PTG due to the expectations of the research.

Selection bias may also be present. It is possible that potential participants who I recruited via email did not participate because they did not think that a difficult life experience that they had in the past twelve months was significant enough to warrant taking the survey. I attempted to avoid this kind of selection bias by requesting participants who had experienced major or minor life difficulties in my recruiting materials and in my presentations to groups.

It is also possible that confounding factors were present in other constructs that remained unmeasured or unanalyzed. The presence of mental health treatment is a factor in PTG development (Calhoun & Tedeschi, 2013), and the presence of a more serious life difficulty that was experienced prior to the one reported in this study could have influenced levels of PTG, event centrality, or core belief disruption. Previous serious life events could have built resilience, leading to lower levels of PTG, less event centrality, and less core belief disruption.

Sample Limitations

I attempted to recruit participants from the community that reflected a population different than that typically used in social science and PTG research, namely, undergraduate students. In this study, however, the majority of participants were highly educated, with the vast majority having at least an undergraduate degree, and a significant portion of the sample population having earned a graduate degree. This limits the results of the study such that they may not apply to populations that are less educated, particularly those who do not have any college experience.

Additionally, nearly all of the participants listed some sect of Christianity as their religion. This presents skewed data in that these results may not be generalizable to populations that are not Christian. Non-Christian populations were neither intentionally excluded, nor actively recruited. Given that the participant populations were recruited from a religious institution at various campuses on the east coast, church attendees in the US southeast, and mental health clients in the US southeast, this is not a surprising outcome. According to the Pew Research Center, the Christian faith is the dominant faith in the US south, with 76% of the population reporting Christianity as their faith tradition, with non-Christian faiths representing 4% of the population, and no religious affiliation representing 19% of the population (2015). It is unsurprising, therefore, that the majority of participants who are recruited from this geographical region and from these institutions would be Christian.

Measurement Limitations

Many researchers have called for an increase in longitudinal studies in PTG research (e.g., Frazier et al., 2009; Jayawickreme & Blackie, 2014; Frazier et al., 2014;

Damian & Roberts, 2014). Cross-sectional research is only able to capture data points at a given moment in time, whereas longitudinal research is able to track individual changes and analyze them systematically, which is a preferable method for observing change. This research was limited by its cross-sectional design. However, given the mixed results of studies that have looked at PTG change and development, and the lack of research examining change in event centrality and core belief disruption, this study was an attempt to create a straightforward research design that would represent first steps toward examining change in these constructs. The nature of the subject makes it difficult to design studies that can get baseline measurement in PTG, event centrality, and core belief disruption followed by longitudinal measurements of those constructs. This represents a limitation of the study, and an ongoing limitation of the field as well.

Implications for Practice

This research has several implications for practice. Tedeschi and Calhoun indicated that there may be a threshold point in event centrality beyond which great rates of PTG could be expected (Calhoun & Tedeschi, 2006). In clinical cases with client who have experienced difficult life events, counselors can use the Centrality of Events Scale to assess for the degree of event centrality clients have experienced. This may be a way to ascertain a greater degree of likelihood that a client will experience PTG, or degree to which the counselor may expect the client to experience PTG. This can be used in place of simply giving the client the Posttraumatic Growth Inventory, as there may be cases in which overtly suggesting that the client should experience growth, or asking the client directly about growth experiences, could be inappropriate or harmful to the client (Calhoun & Tedeschi, 2013). To a lesser degree, the Core Beliefs Inventory could be

used in much the same way, but the CES seems more likely to be a better instrument for such an evaluation based on the results of this study. Informal assessment of event centrality or core belief disruption through interview questions may also be a useful way to assess for a client's readiness to discuss PTG without overtly suggesting that the client should be having a growth experience.

Additionally, since there were no significant differences in PTG, event centrality, or core belief disruption across time, counselors can begin to look for markers of growth or potential for growth immediately following the client's difficult life experience. This is not to suggest that clinicians should immediately begin to work with clients for PTG development, as establishing therapeutic alliance and working to alleviate PTSD symptoms are recommended first steps before focusing on client growth following trauma (Calhoun & Tedeschi, 2013). However, it does indicate that clinicians can begin looking for markers of growth or growth potential upon intake and proceeding through in the course of therapy. Specific markers for growth potential can be inferred from client statements or clinician questions related to material found in the CBI or CES, such as client talk about how an event has shaped how thinking about identity, client talk about important life themes that are associated with the difficult life event, or client talk about how the event has change the way the world is understood. Counselors should not, however, look for or assume a developmental process while helping clients with posttraumatic growth. I predicted that core belief disruption should occur at the beginning of the process of PTG development, and event centrality would occur later in the developmental process. That prediction lacked foundation in my research results, indicating that counselors should not assume that pattern of development while working

with clients on PTG development. Once the potential for growth has been identified, clinicians should focus on treating the negative impact of trauma for the purpose of helping clients return to functional living, followed by exploring the potential for growth and positive change once the client has stabilized enough to engage in the growth process.

Implications for Research

Several implications for future research arise from the mixed results of this study. My research found a difference in PTG between those who experienced high versus low event centrality, and between those who experienced high versus low core belief disruption. I used an upper quartile cutoff to distinguish high event centrality from low event centrality based on previous research (Boals, Steward, & Schuettler, 2010; Johnson & Boals, 2015). However, this may not be representative of the best cutoff point for distinguishing between high and low event centrality or high and low core belief disruption in terms of how each of these constructs predicts for PTG. Future research, or additional analysis of my research findings, could utilize discriminant analysis to determine a cutoff score for each instrument that would be a better predictor of PTG. Further, my research study did not examine the relationship between high event centrality and high core belief disruption. More research is needed to determine whether those who experience high core belief disruption also experience high event centrality at a significant rate, and whether the combination of high core belief disruption and high event centrality impacts the rate of PTG. As an additional complication, researchers have suggested that a curvilinear relationship may be a more accurate descriptor of the relationship between PTG and event centrality (Hallam & Morris, 2014, Zebrack et al.,

2015). My study did not explore the possibility of a curvilinear relationship between PTG and event centrality or PTG and core belief disruption. However, if a curvilinear relationship better fits the data, then a range of scores rather than cutoff scores for event centrality and core belief disruption may be better predictors of PTG. More research is necessary to determine this.

Lancaster, Kloep, Rodriguez, and Weston (2013) examined event centrality as a predictor for the five domains of PTG (appreciation for life, relationships with other, new opportunities, personal strength, and spiritual growth). I did not examine these differences in this study, but given that PTG was significantly higher in individuals who experienced high event centrality, one possible avenue of further study would be to examine whether this difference holds true for the domains of growth as well as for overall PTG. Additionally, it would be helpful to know if there are correlations between the type of life difficulty experienced and rates of PTG in the various domains of growth. For example, life difficulties that are relationally oriented (e.g., divorce, loss of a loved one) may predict for higher rates of PTG among those who experience high event centrality and high core belief disruption in the domain of relations with others.

My research predicted that core belief disruption would not change as a function of time, but that event centrality and PTG would change. The results were that none of the three dependent variables demonstrated significant change based on time since difficult life experience, which appears to conflict with the theory of PTG as personality change. However, as demonstrated in the data analysis, there was a general, albeit insignificant, pattern of increased PTG, CES, and CBI as time since trauma increased. This could indicate that there is a tendency for PTG, CES, and CBI to increase over time,

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which would be supportive evidence of a theory of PTG as personality change. This data could indicate that there is warrant for further study in this area.

Johnson & Boals (2015) speculated that among those who report low CES scores, PTG may indicate a coping process rather than actual growth. The findings of this study could be consistent with the theory that low PTG scores indicate a coping process rather than true growth, particularly since there was no significant difference in PTG or event centrality based on time since life difficulty. This highlights the need for research that can confirm or disconfirm theories of PTG, namely, whether PTG is actual growth represented by personality change, the function of a coping process, or some combination of the two. Additionally, a study by Lindstrom et al. (2013) that examined rumination that occurred soon after a traumatic event and rumination that occurred later determined that rumination at both points were significant predictors of PTG. Research such as that done by Lindstrom et al. could be supportive of a developmental model of PTG. More research into how rumination factors into the developmental process in relationship to core belief disruption and event centrality would help understand these relationships and provide confirmation or disconfirmation of a developmental model of PTG.

Implications for Counselor Education

Therapy for the treatment of trauma is an area of practice that requires specialized training in a variety of techniques and an array of skills (Van Der Kolk, 2014). However, most trauma research focuses on the negative effects of trauma (Calhoun & Tedeschi, 2006) and most treatment of trauma focuses on mollifying those negative effects (Van Der Kolk, 2014). Treatment of trauma would take a great stride forward simply with the inclusion of education and training of basic information about PTG, and its contributing

factors, such as event centrality, core belief disruption, and meaning making, as a

standard component of trauma training. While this is not an implication that is based

specifically on the findings of my research, evidence supports high rates of experiencing

of potentially traumatic events (Bonanno, 2004; Simiola, Neilson, Thompson, & Cook,

2015), and that PTG is a common phenomenon in the aftermath of trauma (Calhoun &

Tedeschi, 2013). Additionally, my research provides evidence that PTG is more likely to

happen when event centrality is present, regardless of whether the event fits the

diagnostic criteria for PTSD. My research supports the notion that people may experience

difficult life situations and when they seek help, will be candidates to experience PTG,

even if they do not experience symptoms of PTSD. Counselor educators should be aware

of the differences between PTG, resilience, PTSD, and other related constructs so as to

better train counselors to identify candidates for PTG. Also, awareness of these

differences – of how traumatic and difficult events promote PTG and of predictive factors

for PTG – will enable counselor educators to train clinicians to differentiate best practice

for treatment and create specific treatment plans for the needs of their clients based on

whether a client needs recovery from trauma, supportive therapy, or engagement with

growth-oriented therapy.

Considering the nuance and complexity of PTG research and practice, counselor

educators should familiarize themselves not only with the basic components of PTG

theory, but also with the instruments currently used to measure constructs related to PTG.

In an above section, I advised clinicians to look for markers in client talk that may

indicate a readiness for growth. In that same vein of thought, counselor educators should

familiarize themselves particularly with the PTGI, the CES, and the CBI in order to better

equip clinicians to use these instruments in work with clients who have had traumatic experiences. Counselor educators will then be able to help clinicians identify the verbal markers that are indicative of readiness for growth.

Finally, counselor educators are often in the position to make decisions about individuals who want to enter the field of counseling. In many cases these potential students are motivated to enter the field of counseling due to their own life difficulties and the help that they have received along the way (Barnett, 2007; K. Evans, personal communication, January 9, 2017). Additional research into the area of posttraumatic growth among potential counselors-in-training, counselors-in-training, and novice professionals could help counselor educators better understand how past trauma may have created positive growth for counselors-in-training, and how posttraumatic growth effects the training process.

Conclusion

Posttraumatic growth is an increasingly studied and reported research topic, and may be an important component in the treatment of traumatic or extreme life difficulties. My research is consistent with the view that high event centrality and high core belief disruption can predict for greater levels of PTG, and justify more research into the nature of the relationships between these three constructs. My research also calls into question the current prevailing view of PTG, namely that PTG is representative of personality change alone that occurs through a developmental process. More research is needed to adequately understand how PTG is experienced, and whether PTG represents personality change, a coping strategy, some combination of personality change and coping strategy, or some other quality of experience following significant life difficulty.

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APPENDIX A DEMOGRAPHIC INFORMATION REQUESTED

1. Age:

2. Ethnicity:

3. Gender:

4. Level of Education Completed:

    a. High School

    b. Some Undergraduate Courses

    c. Two-Year Degree

    d. Undergraduate Degree

    e. Some Graduate Courses

    f. Master's Degree

    g. Doctoral Degree

    h. None of the Above

5. Religious Affiliation:

6. How did you hear about this opportunity to participate in research?

    a. Invited via email through my school.

    b. Invited via email through my church.

    c. Met researcher in a group.

    d. Invited at a marriage retreat.

    e. Invited at location where I receive mental health services.

7. Please briefly describe the most difficult experience you have had in the previous 12 months.

8. When did the event described in question 7 occur?

    a. Less than two weeks ago

    b. Between two weeks ago and eight weeks ago

    c. Between eight weeks ago and six months ago

    d. Between six months ago and twelve months ago

9. On a scale of 1-10, with 10 being the most difficult experience you can imagine, how difficult was the experience you described in question 7?

10. Are you currently receiving mental health treatment related to the experience you described in question 7?

11. Was the event described in question 7 the most difficult experience you have ever had?

12. If not, please briefly describe the most difficult life experience you have ever had.

13. When did the event described in question 12 occur?

14. On a scale of 1-10, with 10 being the most difficult experience you can imagine, how difficult was the experience you described in question 12?

15. Are you currently receiving mental health treatment related to the experience you described in question 12?

Instructions: Please think back upon the most stressful or traumatic event you have experienced in the past twelve months and answer the following questions in an honest and sincere way, by circling a number from 1 to 5.

1. This event has become a reference point for the way I understand new experiences.

2. I automatically see connections and similarities between this event and experiences in my present life.

3. I feel that this event has become part of my identity.

4. This event can be seen as a symbol or mark of important themes in my life.

5. This event is making my life different from the life of most other people.

6. This event has become a reference point for the way I understand myself and the world.

7. I believe that people who haven't experienced this type of event think differently than I do.

8. This event tells a lot about who I am.

9. I often see connections and similarities between this event and my current relationships with other people.

10. I feel that this event has become a central part of my life story.

11. I believe that people who haven't experienced this type of event have a different way of looking upon themselves than I have.

12. This event has colored the way I think and feel about other experiences.

13. This event has become a reference point for the way I look upon my future.

14. If I were to weave a carpet of my life, this event would be in the middle with threads going out to many other experiences.

15. My life can be divided into two main chapters: one is before and one is after this event happened.

16. This event permanently changed my life.

17. I often think about the effects this event will have on my future.

18. This event was a turning point in my life.

19. If this had not happened to me, I would be a different person today.

20. When I reflect upon my future, I often think back to this event.

*Modification. Original survey instructions are as follows: Please think back upon the most stressful or traumatic event *in your life* and answer the following questions in an honest and sincere way, by circling a number from 1 to 5.

Some events that people experience are so powerful that they 'shake their world' and lead them to seriously examine core beliefs about the world, other people, themselves and their future.

Please reflect upon the most difficult experience you have had in the past 12 months and indicate the extent to which it led you to seriously examine each of the following core beliefs.

1. Because of the event, I seriously examined the degree to which I believe things that happen to people are fair.

2. Because of the event, I seriously examined the degree to which I believe things that happen to people are controllable.

3. Because of the event, I seriously examined my assumptions concerning why other people think and behave the way that they do.

4. Because of the event, I seriously examined my beliefs about my relationships with other people.

5. Because of the event, I seriously examined my beliefs about my own abilities, strengths and weaknesses.

6. Because of the event, I seriously examined my beliefs about my expectations for my future.

7. Because of the event, I seriously examined my beliefs about the meaning of my life.

8. Because of the event, I seriously examined my spiritual or religious beliefs.

9. Because of the event, I seriously examined my beliefs about my own value or worth as a person.

*Modified. Original instructions: Please reflect upon the *event about which you are reporting* and indicate the extent to which it led you to seriously examine each of the following core beliefs.

Instructions: Indicate for each statement below the degree to which this change occurred in your life as a result of the most difficult life experience you had in the previous 12 months.

1. My priorities about what is important in life.

2. An appreciation for the value of my own life.

3. I developed new interests.

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. I established a new path for my life.

8. A sense of closeness with others.

9. A willingness to express my emotions.

10. Knowing that I can handle difficulties.

11. I'm able to do better things with my life.

12. Being able to accept the way things work out.

13. Appreciating each day.

14. New opportunities are available which wouldn't have been otherwise.

15. Having compassion for others.

16. Putting an effort into my relationships.

17. I'm more likely to try to change things which need changing.

18. I have a stronger religious faith.

19. I discovered that I'm stronger than I thought I was.

20. I learned a great deal about how wonderful people are.

21. I accept needing others.

*Modified. Original instructions: 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.

UNIVERSITY OF
SOUTH CAROLINA

OFFICE OF RESEARCH COMPLIANCE

**INSTITUTIONAL REVIEW BOARD FOR HUMAN RESEARCH
APPROVAL LETTER for EXEMPT REVIEW**

This is to certify that the research proposal: **Pro00055893**

Entitled: *Posttraumatic Growth Development: Differences in Growth, Core Belief
Disruption, and Event Centrality Based on Time Since Trauma*

Submitted by:
        Principal Investigator: Christopher Cook
        College/Department: Education
                           Educational Studies / Counselor Education
                           Wardlaw, Room 226
                           Columbia, SC 29208

was reviewed in accordance with 45 CFR 46.101(b)(**2**), the referenced study received an
exemption from Human Research Subject Regulations on **5/24/2016.** No further action or
Institutional Review Board (IRB) oversight is required, as long as the project remains the
same. However, the Principal Investigator must inform the Office of Research
Compliance of any changes in procedures involving human subjects. Changes to the
current research protocol could result in a reclassification of the study and further review
by the IRB.

Because this project was determined to be exempt from further IRB oversight, consent
document(s), if applicable, are not stamped with an expiration date.

Research related records should be retained for a minimum of three (3) years after termination of the study.

The Office of Research Compliance is an administrative office that supports the University of South Carolina Institutional Review Board (USC IRB). If you have questions, contact Arlene McWhorter at arlenem@sc.edu or (803) 777-7095.

Sincerely,

Lisa M. Johnson
IRB Manager

APPENDIX F INTRODUCTION AND INFORMED CONSENT FORM

This research is being conducted by Christopher Cook, a Ph.D. candidate in Counselor Education and Supervision at the University of South Carolina, under the guidance of Dr. Ryan Carlson.

This research examines factors related to posttraumatic growth. Posttraumatic growth describes the positive benefits or changes that some people may experience following difficult life experiences. The purpose of this research is to examine differences in posttraumatic growth, core belief disruption, and event centrality at various times following difficult life experiences.

You are being asked to complete this survey because you are over the age of 18 and you have experienced a difficult life experience in the past 12 months. Participation in this research is completely voluntary, and you have the right to withdraw or discontinue participation at any time. Your participation in and information concerning this study is anonymous, and no identifying information will be asked for or collected. This survey includes demographic questions and three other short sections of questions. It should take less than 20 minutes to complete this survey. There is no compensation for participation in this research.

16. If you have questions or concerns about this research, please contact Christopher Cook at cac1@email.sc.edu, or Dr. Ryan Carlson, at rcarlson@sc.edu

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