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ANTICIPATING POSTTRAUMATIC GROWTH FROM CANCER: A PATIENT AND COLLATERAL PERSPECTIVE

by

Benjamin Ashley Tallman

An Abstract

Of a thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree in Psychological and Quantitative Foundations (Counseling Psychology) in the Graduate College of The University of Iowa

July 2011

Thesis Supervisor: Professor Elizabeth M. Altmaier

ABSTRACT

Research suggests that individuals experience Posttraumatic Growth (PTG) from chronic health conditions, such as the diagnosis and treatment of cancer. How PTG is perceived at early time points following stressful events and whether PTG reflects a coping *process* or actual *outcome* remains uncertain. Researchers have implemented research methodologies to validate reports of PTG (e.g., corroboration by partners/significant others), although most research designs are cross-sectional, which limit conclusions and subsequent implications. The current longitudinal study examined cancer patients' and significant others' perceptions of Anticipated Posttraumatic Growth (APTG), dispositional and situational coping, and PTG at three time points spanning pre-treatment to 9 months later. Participants consisted of 87 mixed-cancer patients and 55 collaterals (e.g., spouses, family members, friends, or other community members). At pre-treatment, patients and collaterals completed a modified Posttraumatic Growth Inventory (PTGI) to assess APTG. Collaterals also completed a modified PTGI for patients. Results revealed that patients and collaterals reported high levels of APTG for themselves compared to reports of PTG in the literature. Patients' APTG was significantly higher than collaterals' APTG, although patients and collaterals experienced similar levels of PTG. Overall, patients over-anticipated PTG for all growth scales, and with the exception of the PTG scale of new possibilities, collaterals under-anticipated the level of growth they reported. For corroboration of growth, collaterals were accurate in anticipating the amount of PTG patients would experience, with the exception of the PTG scale of new possibilities. For patients, dispositional planning coping moderated a relationship between PTG and APTG, and situational planning coping mediated a relationship between APTG and PTG. Results of the current study provide evidence for APTG as a possible illusory phenomena, a coping process, and an

important precursor for later PTG. Additionally, the results have important considerations for the impact of cancer on the family and for growth as an observable construct. The findings are discussed in terms of relevant theory and implications for clinicians.

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Graduate College
The University of Iowa
Iowa City, Iowa

CERTIFICATE OF APPROVAL

PH. D. THESIS

This is to certify that the Ph. D. thesis of

Benjamin Ashley Tallman

has been approved by the Examining Committee for the thesis requirement for the Doctor of Philosophy degree in Psychological and Quantitative Foundations (Counseling Psychology) at the July 2011 graduation.

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ABSTRACT

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important precursor for later PTG. Additionally, the results have important considerations for the impact of cancer on the family and for growth as an observable construct. The findings are discussed in terms of relevant theory and implications for clinicians.

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CHAPTER I

INTRODUCTION

Cancer is a serious and traumatic event that impacts millions of individuals each year. A statistic from the National Cancer Institute (2004) suggests that at any given time over 10,000,000 people in the United States have cancer. Cancer has the ability to shake one's worldview and significantly impact one's assumptions about life (Janoff-Bulman, 1992). The diagnosis and subsequent treatment of cancer can cause negative psychological and physical sequelae that can severely impact individuals' everyday lives (Gurevich, Devins, & Rodin, 2002). Specifically, cancer has the ability to negatively impact numerous aspects of the individual including physical, emotional, social, and occupational functioning (Kornblith, 1998). Research traditionally reported and investigated on the negative impact of cancer on Health-Related Quality of Life (HRQOL) and only recently have researchers begun to investigate positive growth or benefits as a result of having cancer (for a review, see Stanton, Bower, & Low, 2006). In writing about cancer-related positive growth, Cordova (2008) cited several characteristics of the cancer experience that may provide opportunities for positive growth. First, after cancer has been diagnosed, there is a threat that the cancer will always be there or that it will reoccur. Cancer patients are never really "post-trauma", and there is uncertainty whether or not cancer will strike again. With ambiguity surrounding one's future, cancer patients may begin to look at life differently and shift their day to day priorities. Second, the cancer experience can change one's life indefinitely. Individuals must change the way they live to accommodate the psychological and physical impact of cancer. As time progresses, cancer patients are forced to conceive a "new normal" regarding everyday life. Third, the cancer experience may create a situation where patients are required to rely more on significant others (e.g., partners, friends,

family members) for tangible care and emotional support. Subsequently, cancer patients may re-evaluate their relationships. Last, cancer has the ability to call into question one's mortality. As people experience an existential crisis, they may rethink their religious and spiritual beliefs and their beliefs about the world in general. In summary, cancer has the ability to provide opportunities for positive growth.

Cancer and Posttraumatic Growth

Research suggests that cancer patients have found growth or benefits from their experience. Posttraumatic Growth (PTG) is defined as a positive psychological change resulting from a traumatic life event (Tedeschi & Calhoun, 1995, 1996, 2004). A variety of cancer patients have reported PTG from their cancer experience including breast cancer (Antoni et al., 2001), prostate cancer (Thornton & Perez, 2006), colorectal cancer (Salsman, Segerstrom, Brechting, Carlson, & Andrykowski, 2008), testicular cancer (Rieker, Edbril, & Garnick, 1985), leukemia and lymphoma (Daiter, Larson, Weddington, & Ultmann, 1988), cancers requiring a bone marrow transplant (Tallman, Altmaier, & Garcia, 2007) and mixed cancers (Schulz & Mohamed, 2004). A review of the literature suggests that patients from many types of cancer have found PTG from their cancer experience.

Measurement and Prevalence of PTG

Researchers have conceptualized positive growth from traumatic life events as both unidimensional and multidimensional constructs (for reviews see Joseph & Linley, 2008b; Park & Lechner, 2006). While further research is needed to investigate the dimensionality of the PTG construct, there is some consensus in the literature that several domains of PTG exist. The most commonly used instrument designed to measure the domains of posttraumatic growth is the Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996). The PTGI is a 21 item measure

that has five scales to assess PTG: changes in interpersonal relationships, changes in life philosophy or perspective, changes in life directions, changes in one's spiritual outlook, and changes in personal strength. The PTGI has been factor analyzed and the five factor structure has been supported (Morris, Shakespeare-Finch, Rieck, & Newbury, 2005).

Researchers started to systematically examine whether reports of growth among cancer patients (e.g., Sumalla, Ochoa, Blanco, 2009; Taylor, 1983) and other trauma populations were valid by developing several self-report measures. As mentioned, the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) and the Stress-Related Growth Scale (SRGS: Park, Cohen, & Murich, 1996) were two of the first instruments developed to measure positive growth from traumatic life events. Since the development of the PTGI and SRGS, other self-report measures have been constructed to examine positive psychological changes following challenging life events (for reviews, see Joseph & Linley, 2008b; Park & Lechner, 2006; O'Rouke, Tallman, & Altmaier, 2008). Hundreds of studies have documented posttraumatic growth among numerous trauma populations (for reviews see Linley & Joseph, 2004b; Tedeschi & Calhoun, 2004). Thus, much of the research in the past 10-15 years has focused on measurement aspects of growth to determine if the construct of growth following adversity reflects actual change or perceived change (see Joseph & Linley, 2008b; Park & Lechner, 2006).

The Influence of Significant Others on PTG

Examining the influence of significant others on individuals' perceptions of PTG may help illuminate the PTG phenomenon. Social support and specific components of the interpersonal relationship between significant others (e.g., spouses, caregivers) of cancer survivors have received limited attention in the literature (Thornton & Perez, 2006; Weiss, 2002, 2004a). Research suggests that significant others of cancer patients can experience growth from

their loved ones' experience (Weiss, 2002, 2004a). What remains uncertain is the degree to which significant others may impact or influence cancer patients' perceived PTG. Additionally, significant others may also be able to provide evidence of PTG among cancer patients by corroborating reports of growth. Research examining both cancer patients and their significant others may provide useful information regarding the impact of social support and close relationships and also help substantiate or refute reports of PTG.

Time Course of PTG and Multidimensionality of the Construct

Most current theories hold that it takes individuals a significant amount of time to experience PTG (Tedeschi & Calhoun, 1995, 2004; Joseph & Linley, 2008a; Linley & Joseph, 2004a). What constitutes a "significant" amount of time remains uncertain. Methodology issues, including the use of cross-sectional research designs, have limited our understanding of the time course of PTG. In addition, only a handful of longitudinal perceptive research exists that examines posttraumatic growth among trauma and cancer populations. Most of the longitudinal studies of PTG have not measured pre-event levels of functioning which has continued to drive the uncertainty of when growth actually occurs. Some studies have reported that growth occurs in as little as two weeks after an event (e.g., Frazier, Conlon, & Glaser, 2001) while other studies report more time is needed for growth to occur (Davis, Nolen-Hoeksema, & Larson, 1998). The time course of PTG continues to elude researchers. For the time course trajectory of growth to be better understood, longitudinal prospective research designs need to be used that take into account pre-event levels of functioning, examine different perspectives of growth, and investigate growth at multiple time points following a traumatic event.

An additional element of uncertainty is conceptual. Some researchers believe reports of PTG early after traumatic events reflect more of a "coping process" (Zoellner & Maercker,

2006). Other researchers believe reports of PTG later after events are more reflective of perceived PTG (Tedeschi & Calhoun, 1996, 2004). The perception of growth early after a traumatic event may be an attempt to form a cognitive bias, consistent with cognitive adaptation theory (Taylor, 1983), in order to cope with the traumatic event (Helgson, Reynolds, & Tomich, 2006). However, some researchers have speculated that this cognitive bias or "positive illusion" is actually another aspect of growth and that PTG has "two faces" (Maercker & Zoellner, 2004; Zoellner & Maercker, 2006). There is some preliminary research to support the multidemsional construct of posttraumatic growth as having a more constructive side compared to an illusionary side (Zoellner, Rabe, Karl & Maercker, 2008). The distinction between growth as a *process* or *outcome* remains unanswered.

Overview of the Current Study and Limitations of the Existing Literature

Longitudinal prospective studies are needed to examine the time course trajectory of PTG. This study will examine patients and collaterals perceptions of PTG at multiple time points before and after cancer treatment. Also, this study will capitalize on a prospective longitudinal research design by examining the process of PTG across time.

There are several ways that the current study will contribute to the PTG literature. First, examining Anticipated Posttraumatic Growth (APTG) will help explain how growth is perceived at early stages of the cancer experience. To date, no researchers have attempted to examine APTG. Some research evidence suggests that retrospective measures of personal change are not accurate. That is, individuals are not consistently able to recollect their level of pre-event functioning (see Ford, Tennen, & Albert, 2008 for a discussion). Thus, measuring APTG will provide a different perspective that is future-orientated, compared to retrospective accounts of growth. The current study will add to the dearth of research examining pre-event levels of

functioning (e.g., pre-treatment) in the context of PTG research. Both PTG theory and empirical evidence is uncertain as to when individuals experience PTG (Stanton et al., 2006). Investigating the perception of APTG will help clarify the process of PTG across time.

Second, researching perceptions of growth among significant others may help contribute to our understanding of how significant others may impact the PTG process and corroborate reports of growth among cancer patients (Calhoun & Tedeschi, 2008; Fraizer & Berman, 2008; Joseph & Linley, 2008c; Ford et al., 2008; Stanton et al., 2006). Specifically, this study will examine APTG among a mixed sample of cancer patients and collaterals (e.g., partner, family members, friends). Research suggests that both cancer patients and collaterals have experienced PTG as a result of cancer (Stanton et al., 2006; Weiss, 2002, 2004a). What remains uncertain in the literature is how significant other's perceptions of PTG are related to cancer patient's perceptions of PTG.

Last, examining the relationship between PTG and coping will add to the literature regarding the time course of PTG and the *process* vs. *outcome* nature of PTG. Specifically, the proposed longitudinal perspective study will examine patient PTG and coping at three time points during the cancer experience. APTG may provide clarity regarding the multidimensional aspect of growth: does growth have an actual and illusionary side (Calhoun & Tedeschi, 2008; Joseph & Linley, 2008c)? Additionally, researchers have called for more sophisticated research models that take into account mediation and moderation to clarify the relationship between PTG and personal characteristics (e.g., demographics) and psychosocial variables (e.g., coping; Fraizer & Berman, 2008; Joseph & Linley, 2008c). The current study will utilize moderation and mediation models to examine research questions.

Research Questions

A primary aim of this study was to examine the relationship between patient and collateral APTG and mean differences between APTG scales. Similarly, the relationship between patient and collateral PTG and mean differences between PTG scales were examined. Third, the relationship between APTG and PTG scales were examined, as well as mean differences between APTG and PTG. The corroboration of growth was also investigated. Specifically, the relationship between collaterals' APTG for patients and patients' PTG for themselves and mean differences between collaterals' APTG for patients and patients' PTG for themselves was investigated. Last, patient coping (dispositional or situational) was be examined as a possible mediator or moderator of the relationship between APTG and PTG.

Definitions of Terms

Posttraumatic Growth

Posttraumatic growth (PTG) is the most common term used in the literature to define the positive growth phenomena from traumatic life events. PTG is a positive psychological change resulting from highly challenging life circumstances (Tedeschi & Calhoun, 1995, 1996, 2004). Other terms such as stress-related growth (Park et al., 1996) or adversarial growth (Linley & Joseph, 2004a) appear to describe stressful events or events less than traumatic events. Consistent with Tedeschi and Calhoun's (1995, 1996, 2004) theory of PTG, this researcher believes that for a qualitative change to occur, an individual must have gone through some traumatic experience as opposed to a stressful experience. The term "finding-benefit" or "benefit-finding" has also been used interchangeably with PTG (Tennen & Afflect, 2002). "Benefit" terms are often used in health-related populations to describe positive psychological

changes as a result of adversity (e.g., Antoni et al., 2001; Carver & Antoni, 2004; Katz, Flasher, Cacciapaglia, & Nelson, 2001; Tomich & Helgeson, 2002; 2004). For the current study, perceived PTG or perceived benefits will be used interchangeably as it is very difficult to determine if growth reported by individuals reflects actual change or perceived change. Additionally, PTG will be conceptualized as a multidimensional construct.

Anticipated Posttraumatic Growth (APTG)

Anticipated posttraumatic growth refers to one's perceptions of experiencing PTG in the future as a result of the cancer experience.

Posttraumatic Stress Disorder/Posttraumatic Stress Symptoms

Posttraumatic Stress Disorder, or PTSD, is an anxiety disorder where individuals develop symptoms of avoidance, increased arousal, and often reexperience the traumatic event. Research suggests that PTSD frequently co-exists with PTG in the aftermath of traumatic events such as cancer (for a review see Cordova, 2008). Posttraumatic Stress Symptoms (PTSS) are symptoms, as stated above, related to traumatic or stressful events.

Coping

Coping has been defined as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p. 141, Lazarus & Folkman, 1984).

Quality of Life

Health Related Quality of Life (HRQOL) has been extensively researched among cancer populations. Health Related Quality of Life is commonly referenced as a multidimensional construct consisting of physical well-being, emotional well-being, social well-being, and

functional well-being (e.g., see the Functional Assessment of Chronic Illness Therapy [FACIT] measurement system; Cella, 1997).

Collaterals

For the current study, collaterals were identified by cancer patients as friends, family members, or loved ones. Collaterals, therefore, are individuals who play an integral role in the lives of cancer patients.

CHAPTER II

LITERATURE REVIEW

It has long been known that individuals have experienced positive growth in the face of adversity. Finding "something positive" in the aftermath of adversity has been a hallmark trait of many cultures and religions (Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 1995, 1996, 2004). The ancient Greeks, Hebrews, and Christians, as well as other religious ideologies including Hinduism, Buddhism, and Islam, have attempted to integrate the notion of suffering into their beliefs and worldviews (Tedeschi & Calhoun, 1995). In the past century, the writings of Victor Frankl (1959) on the Holocaust examined suffering and attempted to make sense of life from an existential perspective. Thus, the theme of suffering and hardship and the individual's quest to understand adversity is nothing new. On the other hand, it has only been in the last twenty years that researchers have systematically examined posttraumatic growth (PTG) following traumatic life events or within the context of cancer, using stringent research methodologies. Over this time, the use of both qualitative and quantitative research methods to study PTG has proliferated.

This review of the literature begins by examining theoretical perspectives of PTG including both process and outcome models of growth. Second, definitions, concepts, and areas of PTG are reviewed. Specific examples of areas of PTG are provided. Third, research is reviewed examining trauma populations in general, and cancer populations specifically, that have experienced PTG. The review includes research examining cancer as a traumatic life event and the negative sequale associated with a cancer diagnosis and treatment. An overview of demographic, psychosocial, and medical variables related to PTG is provided. The literature review also examines the time course of PTG including the distinction between PTG early and

later after a traumatic event. Thus, the review focus on the limited number of longitudinal studies that have examined PTG. The review concludes with research on significant others who have been impacted by traumatic events and their perceived PTG.

Theoretical Perspectives of PTG: A Process, Outcome, or Both?

There have been numerous models or theories that have attempted to explain factors which contribute to personal growth or finding benefit. The basis, or theoretical underpinnings, for many of these theories stem from stress and coping research models (e.g., Lazarus & Folkman, 1984). Researchers have debated whether PTG is an *outcome*, *process*, or both, by using different theoretical models. Theories or models of PTG have been categorized in three ways: PTG as a coping style (e.g., process); a legitimate form of growth (e.g., PTG, finding benefit), or a form of defensive denial (e.g., positive illusions; Lerner & Gignac, 1992; Maercker & Zoellner, 2004).

In the following section the most cited outcome models in the literature are reviewed followed by a discussion of PTG as a *process* or coping mechanism. Theories on PTG as a defensive construct, or as positive illusions, are also reviewed. A synthesis of the models is presented along with the models' strengths and limitations. A more detailed description of the PTG models can be found in a chapter by O'Leary, Alday, and Ickovis (1998) and an article by Zoellner and Maercker (2006).

Outcome Models of PTG

One of the first models to examine the aftermath of traumatic events and outcomes was the Schaefer and Moos (1992) model of life crisis and personal growth. Their model posits that both environment and personal system factors impact life crises and the aftermath of trauma. Factors related to the event may influence appraisal and coping responses, which in turn may

impact positive outcomes of the life transition (Schaefer & Moos, 1992). All of the components in their model are linked by feedback loops, which have the potential to influence one another. Their model takes into account such individual characteristics as sociodemographic, self-efficacy, reliance, motivation, health status, and prior crisis experience. Environmental factors include social support (e.g., from family, friends, and co-workers) and socioeconomic factors (e.g., finances, community, and living situation). Factors related to the event, including the severity, duration, timing of the event, and whether the event affects an individual or group of people are also relevant to their model.

Schaefer and Moos (1992) hypothesized that three primary outcomes can result from a traumatic event: increases in social resources (e.g., better relationships with friends and family members), increases in personal resources (e.g., more cognitive differentiation, assertiveness, self-understanding, empathy, altruism, and maturity); and the development of and increases in coping skills (e.g., ability to think through problems, seek help when needed, and regulate affect (Schaefer & Moos, 1992). Additionally, coping styles and responses are believed to assume a critical role in outcomes including appraisal-focused coping, problem-focused coping, and emotion-focused coping. Appraisal coping is defined as interpreting and attempting to understand a situation. Problem-focused coping is defined as actively engaging in coping strategies, such as positively reappraising the crisis, seeking support, and taking action to solve problems. Emotion-focused coping relates to managing one's feelings, expressing anger, and acceptance of the situation. Coping style appears to play an important role in experiencing PTG, as well as positive and negative health outcomes in general.

Janoff-Bulman's (1992) theory of growth emphasizes assumptions about the world and how traumatic events can "shatter" such assumptions. The three fundamental assumptions

proposed by Janoff-Bulman include: the world is benevolent; the world is meaningful; and the self is worthy. Such assumptions provide individuals with a sense of security and safety. Along with assumptions, schemas provide a structured way to organize experiences and assumptions (Fiske, 2004; Janoff-Bulman, 2006). Janoff-Bulman (2006) makes a distinction between schemas and assumptions. Schemas are narrower in scope and are incrementally influenced by daily interactions with the world. On the other hand, assumptions are broader and encompass schemas, and can be challenged by significant life crises (Janoff-Bulman, 2006).

Janoff-Bulman (1992, 2006) suggests that before experiencing a traumatic or life changing event, the world is considered a safe and just place. Traumatic events call into question one's assumptive world and threaten the sense of meaning in life, including self concept, comprehensibility, and meaningfulness of one's assumptive world. Following a traumatic event it is hypothesized that instead of assuming the world is predictive and controllable, the world becomes dangerous, unsafe, and unpredictable. One's inner world becomes fragile and writ with uncertainty leading to feelings of vulnerability. Following traumatic events, subsequently, individuals attempt to rebuild their assumptions and their shattered beliefs about the world. The reconstructed assumptions may be different than their pre-event assumptions about the world. Through processes such as coping and social support, it is further hypothesized that individuals rebuild and reconstruct their assumptions to adjust to life post-trauma (Janoff-Bulman, 1992, 2006).

The O'Leary and Ickovis (1995) model of discontinuous change and thriving theory purports to have three outcomes from stressful life events: thriving, recovery, and survival. Individuals who reach recovery return to homeostasis or a baseline level of functioning and those who survive never regain their previous level of functioning. Thriving is analogous to PTG: it is

not simply a form of resilience or addressing the challenge of a distressing event but it is moving above and beyond one's level of pre-event functioning (O'Leary & Ickovis, 1995; O'Leary et al., 1998). Additionally, thriving is hypothesized to be behavioral, cognitive, or affective. Thriving theory suggests that individuals must take on adversity and confront it in an active way, even though such confrontation may not be within one's awareness (O'Leary et al., 1998). Similar to the Schafer and Moos (1992) theory, thriving theory stresses the importance of the availability of individual and social resources to enhance the likelihood that growth will occur.

Aldwin (1994) has examined PTG as an outcome from a "transformation coping" perspective. Aldwin suggests that negative stress may serve a role for and be a necessary component of personal development. In her original model, coping served several functions leading to three different possible outcomes. Transformation positive coping is hypothesized to lead to a higher level of functioning or growth whereas transformation negative coping leads to a reduction of functioning and negative outcomes. Homeostatic coping leads to a return to a baseline level of functioning. In transformation coping change could be quite small or quite large, such as rejecting a social network of friends in an attempt to remove oneself from detrimental situations (e.g., binge drinking; O'Leary, et al., 1998).

Aldwin (1994) discussed personal variables and resources believed to be related to the outcomes in the transformation coping model. Factors such as intelligence, flexibility, determination, and willingness to take personal risks may increase the likelihood that one will experience positive outcomes as a result of the negative life event. Personality characteristics such as hardiness (e.g., Kobasa, 1979) and sense of coherence (e.g., Antonovsky, 1987) may influence one's life and be positively related to growth. Last, Aldwin reported that those who are optimistic often use problem-focused coping strategies that may lead to growth. Recently,

however, Aldwin (2007) noted that the term “transformation coping” has not been accepted in the academic community. She reported preferring the term “stress-related growth”, a term coined by Park et al. (1996) to denote the process of change following adversity.

Stress-related growth (SRG) refers to positive growth stemming from everyday stress, as well as traumatic events. While there is not a model for stress-related growth, Park et al. (1996) indicate that SRGS is directly related to the work of Schaefer and Moos (1992); research reviewed earlier in this chapter. Additionally, Aldwin (2007) noted several reasons why SRG better reflects the change that occurs after challenging life events, compared to terms such as PTG (Aldwin, 2007). First, it is believed that not all growth is transformative; some individuals may achieve gradual increases in process such as competence coping skills, empathy, compassion, and wisdom over time. Second, individuals do not need highly challenging life events for growth to occur: growth can occur from everyday events. Third, growth can occur vicariously (e.g., helping others in crisis). Last, some studies that purport to measure PTG actually measure everyday chronic stressors. Thus, some researchers believe that stress-related growth is a much broader term, encompassing traumatic events and every day stressful events.

The most popular and well accepted growth following adversity outcome model comes from Tedeschi and Calhoun (1995, 1996, 2004; Calhoun & Tedeschi, 2006; Tedeschi, Park, & Calhoun, 1998). Researchers consistently refer to Tedeschi and Cahoun’s Posttraumatic Growth model as an outcome model. However, they acknowledge that PTG is also a *process* that takes place (Tedeschi, Shakespeare-Finch, & Friedman 2008; Tedeschi & Calhoun, 1996). Similar to other growth models (e.g., Janoff-Bulman, 1992) they theorize that a traumatic event must be “seismic” or have the ability to shake or destroy one’s assumptive world. Emphasis in the PTG theory is placed on rumination, or cognitive engagement. Tedeschi and Calhoun use Martin and

Tesser's (1996) definition of rumination in that repeated thinking, including reminiscing and problem solving, is not necessarily intrusive in trying to make sense of the event. In the immediate aftermath of the event, one's beliefs and goals change and individuals attempt to manage emotional distress. Individuals participate in a ruminative process (e.g., cognitive engagement) that at first is mostly automatic and intrusive. As time progresses, rumination continues in an attempt to reduce emotional distress. New goals and assumptions about life are beginning to be processed. Later, growth takes place by active rumination, which is more deliberate. Schemas become challenged and one takes on a new life narrative. Additionally, PTG is viewed as a multidimensional construct that takes into account changes in life goals and beliefs, the development of life narratives, and enhancement of wisdom. In this model other variables such as personal resources, coping processes, and social support are believed to influence PTG.

Other PTG models or theories have attempted to take into account both positive and negative outcomes associated with traumatic life events. Joseph and Linley (2005, 2006, 2008a) have conceptualized PTG based on their Organismic Valuing Theory (OVT). Their theory is underscored within a positive psychology framework and assumes that individuals are inherently motivated to achieve growth. Organismic Valuing Theory focuses on the integration between appraisal processes and personality/assumptive world. Organismic Valuing Theory assumes that individuals, following traumatic events, move through a series of appraisals, emotional states, coping styles, to either *assimilate* or *accommodate* trauma related information. The theory suggests there are three means by which individuals process and cognitively interpret information. First, individuals who assimilate the trauma related information may use maladaptive coping strategies, such as self-blame, to maintain a presence in their current

assumptive world. These individuals return to pre-levels of event functioning. They develop stringent defense mechanisms that may make them more vulnerable to future stressful or traumatic events. Second, individuals who are able to accommodate trauma related information, or change their worldviews, can either achieve positive or negative value direction. Those who positively accommodate may use adaptive coping strategies, by appraising and accepting the new trauma information. Positive accommodation may lead to PTG (e.g., increased personal strength, change in life perspective, improved interpersonal relationships with others). Experiences that are accommodated in a negative direction, by use of maladaptive coping strategies, lead to negative outcomes and increased psychopathology (e.g., depression, helplessness).

Organismic Valuing Theory also stresses the importance of supportive others and social support in the aftermath of trauma. Specifically, the process of assimilation and accommodation are influenced by the individuals in one's environment. Outcomes are theorized to be contingent upon the degree in which individuals are open to changing their pre-existing schemas about life (Joseph & Linley, 2008a).

To summarize, PTG *outcome* models reflect several common themes, including the notion that in order for PTG to be perceived an event must reach a severe level, enough to challenge one's assumptions about life. Hypothesized factors that need to be present for growth to occur include an ability for individuals to appraise the event and participate in a form of coping (e.g., active coping). Based on coping style, as well as personal (e.g., open to experience) and environmental resources (e.g., social support), individuals are believed to perceive PTG. There also appears to be a cognitive processing component, or rumination, that is necessary for growth to take place.

There are criticisms of the outcome models and theories of growth, including the lack of articulation regarding specific process or mechanisms that account for growth. Most models or theories do not explicitly address that PTG may be used as a coping strategy. Most models note that it takes time for growth to occur. Furthermore, in the immediate aftermath of the event, most individuals have not had sufficient time to cope with the trauma, reduce emotional distress, or cognitively process (e.g., ruminate over what has taken place) the event for perceived growth to occur. With that said, researchers have not well-articulated or empirically supported the processes that take place in the immediate aftermath of a traumatic event. Thus, outcome models do not satisfactorily address the time-course trajectory of when growth can occur.

Process Models of PTG

Posttraumatic Growth has been conceptualized through *process* models (e.g., benefit-finding, Affleck & Tennon, 1996; Tennen & Affleck, 2002). Such models focus on PTG as a form of coping or mechanism to achieve PTG as an outcome. Given the considerable amount of overlap between PTG process models and PTG outcome models, researchers have often failed to make the distinction between models in the literature. The following section reviews the most cited process models in the literature. These studies are outlined from a review of process models by Zoellner and Maercker (2006).

To understand PTG as a *process*, it is important to examine how individuals appraise traumatic life events. Appraisal of the traumatic event is an important aspect of the post-event process. Lazarus and Folkman (1984) differentiate between both primary and secondary appraisals. Primary appraisal refers to the evaluation of the personal significance of a person-environment transaction (Lazarus & Folkman, 1984). Under most circumstances, life events can be appraised and assimilated into one's global worldview. As stated previously, traumatic events

often call one's worldview into question and lead one to believe they are not in control of fate (Janoff-Bulman, 1992). Secondary appraisal refers to a person's evaluation of an event in terms of what can be done (i.e., coping). Secondary appraisals include evaluations about expectations for coping with the event and possible outcomes (Lazarus & Folkman, 1984). The uses of both primary and secondary appraisals are important in the aftermath of trauma and can influence how one copes with the event, and subsequently perceives PTG.

Posttraumatic Growth has been conceptualized within the framework of global and situational meaning (Park & Folkman, 1997). Global meaning refers to a more general level of meaning in one's life including basic goals and fundamental assumptions, beliefs, and expectations about the world. Global meaning has the potential to influence peoples' understanding of the past and future, influence individual expectations of the future, and play an important part in perception of situational meaning. Global meaning, thus, is similar to what has previously been referred to as an assumptive world (Janoff-Bulman, 1989; Parkes, 1975, 1993). Global meaning encompasses beliefs about the world (e.g., the world is a good, just, and fair place; Janoff-Bulman, 1992), and beliefs about self (e.g., self worth and self control; Taylor, 1983; Janoff-Bulman, 1992). Situational meaning refers to "the interaction of a person's global beliefs and goals and the circumstances of a particular person-environment transaction" (Park & Folkman, 1997; p. 121).

Based on stress and coping theory, situational meaning takes into account the appraisal of the person-environment interaction, which influences how the individual copes with stressful experiences (Lazarus & Folkman, 1984). Situational meaning has three major components: appraisal of meaning, search for meaning, and meaning as an outcome. Appraisal of meaning refers to the initial assessment of how the interaction between the person and environment relates

to the person. Search for meaning is a coping process by which individuals actively engage in appraisal and seek meaning. A distinction is made between meaning as an outcome (e.g., meaning that the person perceives in the aftermath of the event) and meaning as a process.

According to Park and Folkman (1997), in the context of their meaning-making coping model, individuals cope successfully with a stressful life event by either changing the appraised meaning of the situation to assimilate into their preexisting global meaning or changing their beliefs or goals to accommodate the event (e.g., Janoff-Bulman, 1992; Park & Folkman, 1997). Within the context of their model, PTG and benefit-finding occur through cognitive reappraisal strategies such as compensatory self-enhancement, downward comparisons, and the development of a different perspective on the situation. Meaning-making, or PTG, occurs during the coping process when individuals reduce discrepancies between situational and global meaning, thus perceiving new growth and changing global meaning. Areas of growth would fall within the global meaning framework. For example, benefits in the personal strength domain would fall under the category of assimilation, or changing the situational meaning to accommodate the global meaning. Conversely, changes in the growth area of life perspectives would require one to change global meaning to incorporate a new global meaning (Park & Folkman, 1997).

Posttraumatic Growth has been empirically examined in the context of making meaning of the event. Davis and et al. (1998), in their research on the loss of a loved one, have examined two possible construals of finding meaning: the need to make sense of the loss and the desire of finding benefit in one's experience with the loss. Researchers studying bereavement have examined how individuals coped with their loss by attempting to make sense of it (e.g., Janoff-Bulman, 1992; Janoff-Bulman & Frieze, 1983; Parkes & Weiss, 1983). Examples are attributing the loss to God, taking personal responsibility for the loss, or attributing the loss to the person's

lifestyle or behaviors (e.g., smoking led to cancer; Davis et al., 1998). The second construal of finding meaning is finding-benefit which is consistent with finding positive growth from traumatic life events (Tedeschi & Calhoun, 1995, 2004).

Results from Davis et al. (1998) suggest that the two construals of meaning, finding-benefit and making sense of loss, could be differentiated by several characteristics including focus, antecedents, and relationship to psychological adjustment (Davis et al., 1998). Individuals who tried to make sense of their loss did so by viewing the loss as predictable or a natural condition, or considering that death was comprehensible within the context of religious or spiritual beliefs. Individuals who reported benefits indicated they had learned something important from the loss, about themselves, about others, or about the meaning of life. Results suggest that making sense of loss and benefit-finding independently play important roles in the adjustment process following a challenging life event.

Tennen & Affleck (2002; Affleck & Tennon, 1996) have made the distinction between benefit-finding and benefit-reminding. Benefit-finding is similar to PTG in that after traumatic events, one's assumptive world is no longer the same and individuals have experienced a threat to their beliefs of mastery, meaning, and self-worth (Affleck & Tennon, 1996; Janoff-Bulman, 1992; Taylor, 1983). Benefit-reminding is conceptualized more as a process and can be viewed as an active coping strategy, or an attempt to manage stressors in one's life (Lazarus & Folkman, 1984; Carver, Scheier, & Weintraub, 1989). Tennon and Affleck (2002) suggest that searching for evidence of benefits can act as intentional coping, and taking time to remind oneself of benefits is also a form of coping. Even though benefits may be found in the aftermath of crisis, it does not always mean they will be used to cope with the experience (Tennon & Affleck, 2002).

In summary, benefit-finding and benefit-reminding may be conceptualized as two different processes, with the latter reflecting an effortful way to cope with adversity.

Research suggests that PTG can be perceived as an outcome and used as a coping strategy. However, whether such perceived growth is actual growth compared to a self-enhancement process to deal with the trauma remains uncertain. Posttraumatic Growth, therefore, has been conceptualized as an “illusory phenomenon” (Taylor, 1983; Maercker & Zoellner, 2004; Zoellner & Maercker, 2006). Cognitive adaptation theory (Taylor, 1983) posits that when individuals experience challenging life events, they respond in cognitively adaptive ways to help them return to or exceed their previous level of psychological functioning. Under this theory individuals search for meaning in an effort to gain mastery and enhance the self. In the context of PTG, self enhancement occurs by individuals’ construing personal benefit from their experience. This way of viewing the experience can be deemed “illusionary” because there is no factual basis for positive cognitions.

Whether PTG reflects actual growth or an illusion is very challenging to distinguish and some researchers have incorporated both an adaptive and maladaptive side into their PTG model. The Janus-Face model (Maercker & Zoellner, 2004; Zoellner & Maercker, 2006) considers PTG from two sides: a constructive side representing veridical growth and a deceptive, illusory side that is conceptualized as a coping process. According to the Janus-Face model, individuals who continue to experience distress following trauma may perceive they have benefited from the experience as a self palliative coping mechanism to counter-balance their emotions. Such growth is believed to be illusory. For the trauma survivors who have coped with the trauma, and have experienced a decrease in emotional distress, their growth may represent more positive adaptation, or perceived growth as an outcome. The illusory side of growth may be short lived

where the constructive side may be related more to positive adjustment. Research supports the illusory side of growth notion since numerous cross-sectional studies have failed to find a relationship between PTG and adjustment (e.g., distress). Longitudinal studies suggest a relationship between increased levels of growth and decreased levels of adjustment (e.g., depression) over time (e.g., Frazier et al., 2001; Davis et al., 1998; Tallman et al., 2007). Researchers have yet to define if growth is an adaptive or maladaptive process.

Furthermore, the two components of growth have been conceptualized into what Hobfoll et al. (2007) labeled *action growth.* Action growth refers to "whereby an individual actualizes their benefit-finding cognitions—or reifies their illusions through action" (p. 360). In examining whether or not growth is adaptive, it has been suggested that PTG may be a cognitive process used as a coping mechanism which may or may not lead to positive outcomes (Hobfoll et al., 2007; Taylor, 1983). Hobfoll et al. (2007) suggests that cognitive processing alone, without action growth, will not lead to positive outcomes (e.g., benefits and costs, Cheng, Wong, & Tsang, 2006; Hobfoll et al., 2007). For future research, it may be beneficial to examine the more active component of growth in regards to the relationship between PTG and outcomes.

In summary, PTG research acknowledges growth is conceptualized from a number of different perspectives which may represent different processes and outcomes. In examining the conceptualization of PTG, Tennen and Affleck (2002) note that benefit-finding may reflect "selective evaluation, a coping strategy, a personality characteristic, a reflection of verifiable change or growth, an explanation of one's temperament, a manifestation of an implicit theory or change, or a temporal comparison" (p. 594). Similarities between outcome and growth models stress the importance of personal and environmental resources, such as coping strategies and supportive others. Models have also begun to incorporate both positive and negative outcomes

(e.g., OVT; Joseph & Linley, 2005, 2008a) to encompass all components of PTG, which had been lacking in previous PTG theories and models.

There are several factors or processes that remain unclear in both *process* and *outcome* theories of PTG. First, uncertainty remains whether PTG reflects a unidimensional or multidimensional construct (Joseph & Linley, 2008b). Most models or theories suggest growth as a global construct with areas of growth not explicitly addressed. Thus, researchers need to employ factor analytic methods to examine the dimensionality of PTG. Second, PTG models are unclear at what point after trauma individuals perceive benefits, including at very early time points. This ambiguity is further evidenced by a lack of empirical studies examining PTG at early time points. While the majority of the theoretical research is in agreement that it takes months or even years for PTG to take place, empirical support is lacking. Thus the time frame between PTG as a coping strategy early in the aftermath of a trauma and PTG as an outcome long after the traumatic event remains uncertain. With longitudinal perspective research designs and creative research methodologies, researchers can begin to understand the complex processes of PTG over time.

Review of Definitions, Concepts, and Domains of PTG

Definitions of PTG

There have been numerous definitions reported in the literature to describe the phenomenon of finding-benefit or PTG from a traumatic event. Posttraumatic growth, defined by Tedeschi and Calhoun (1995, 1996, 2004; Tedeschi et al., 1998), is a positive psychological change as a result of a highly challenging life circumstance. PTG has been conceptualized as experiencing a change or growth above and beyond pre-event functioning; thus, PTG is not just returning to a baseline level of functioning. Other researchers have termed the same phenomenon

thriving (O'Leary & Ickovics, 1995), positive changes in outlook (Joseph, Williams, & Yule, 1993), benefit-finding (Affleck & Tennen, 1996; Antoni et al., 2001; Carver & Antoni, 2004; Katz et al., 2001; Tomich & Helgeson, 2002, 2004), adversarial growth (Linley & Joseph, 2004a), stress-related growth (Park et al., 1996), heightened existential awareness (Yalom & Liberman, 1991), quantum change (Miller & C'deBaca, 1994), positive by-products (McMillen & Cook, 2003), and perceived benefits (McMillen, Zuravin, & Rideout, 1995). Researchers have also conceptualized the PTG construct as individuals' attempts to create "positive illusions" in dealing with challenging life events (Taylor & Brown, 1988). While there have been numerous terms to define the positive growth following challenging life events, no universal term exists.

The various terms used are likely a function of theory and researchers' subjective accounts of growth. For example, as stated, stress-related growth is a broader term compared to PTG, and thus may encompass a wider spectrum of stressful events. Researchers use different terms for growth when investigating different populations. Benefit-finding is the preferred term used among researchers investigating medical populations such as cancer patients (e.g., Antoni et al., 2001; Sears, Stanton, & Danoff-Burg, 2003) whereas PTG has been used with numerous trauma populations. It has been suggested that benefit-finding is qualitatively different than the term PTG because benefit-finding emphasizes health benefits and PTG does not (Tedeschi et al., 2008). Tedeschi & Calhoun's (1995, 1996, 2004) term *Posttraumatic Growth* continues to be the most commonly cited and well-received growth term by the majority of positive growth researchers.

Areas of PTG

Cancer patients have reported PTG in a number of areas in their life including changes in interpersonal relationships with family and friends, changes in religious or spiritual beliefs,

different life perspectives, priorities, philosophies, changes in personal strength and being more self-confident, greater ability to express oneself and relate to others, and changes in healthy behaviors (Cordova, Cunningham, Carlson, & Andrykowski, 2001; Fromm, Andrykowski, & Hunt, 1996; Sears et al., 2003; Thornton, 2002; Tomich & Helgeson, 2002, 2004; Widows, Jacobsen, Booth-Jones, & Fields, 2005). Such growth areas may reflect the measurement techniques used to assess growth (Tallman, Shaw, Schultz, & Altmaier). For example, an opened-ended growth question may yield a greater number of possible domains compared to a standardized measure. In research examining finding-benefits from cancer, bone marrow transplant (BMT) patients were asked an open-ended question whether or not they had derived any benefits from their transplant experience (Tallman et al., 2007). Patient responses were transcribed and presented to 4 trained raters. Raters were advanced doctoral students familiar with finding benefit areas and the PTG literature. Patient responses were assigned to PTG areas when three raters agreed; on items in which two agreed, items were rerated until consensus was reached. Six areas of growth emerged: life perspectives, interpersonal relationships, increased perception of self (e.g., personal strength), new directions, spiritual or religious, and health (Afflect & Tennen, 1996; Sears et al., 2003; Tallman et al., 2007; Tedeschi & Calhoun, 1996). Examples of finding-benefit responses for specific areas are presented.

Cancer patients often reported a *change in life priorities* or perspective after experiencing traumatic events. Priorities about life are sometimes shifted from monetary means (e.g., expensive car, large house) to enjoying things that one would usually take for granted, such as enjoying a beautiful sunset. In the BMT data set one participant reported, “You slow down and appreciate what you have; nothing like having something taken away from you to make you realize what you have.” Another patient noted, “Your quality of life changes and you don’t

worry so much about the little things. You realize how fragile life is." Another patient stated, "It [cancer] gives you a sense of starting over and a new chance at life."

A large percentage of participants reported experiencing *changes in their interpersonal relationships* including sensitivity to others, closeness with others, and an increased ability to express their feelings. Cancer patients indicated that they became closer to their spouse and rekindled relationships with people they have lost touch with following their cancer experience. Cancer patients also reported gaining a sense of closeness with others. As one participant reported about his or her cancer experience "I learned how important family and friends are." Another participant reported on the cancer experience as "it showed me who were my friends and who are not."

Cancer patients have frequently cited becoming *personally stronger* because of the difficulties and challenges associated with cancer. They commonly report they can now handle anything because of their experience. As one participant acknowledged, "I found an inner strength that I didn't know I had." Another cancer patient stated, "Because of my experience I am more aware of things and I'm a better person. I think differently, I'm more opened-minded and considerate."

The cancer experience can alter individuals' lives and they can choose a *new life direction*. As one cancer patient energetically indicated "It [cancer] made me get going on my future!" While another patient reported, "I changed my career to something I really wanted to do."

Often times when individuals experience traumatic life events, such as cancer, they experience changes in their religiosity or spirituality, including becoming closer with God or having an increased spiritual or religious faith. For example, one participant stated "I believe

God allowed me to have leukemia for a reason and he will show me the way." Another participant reported, "I had a very profound spiritual transformation and I no longer have a fear of death".

Individuals also reported *perceived health* benefits as a result of their cancer experience including, "I've learned to be my own doctor, to advocate for my own medical needs." and "I learned about medicine, self-care, and how to ask questions to doctors." In summary, cancer patients reported PTG in a number of different areas.

Overall, there is not universal agreement regarding the number of specific PTG areas. However, three broad areas of growth, including changes in perception of self, changes in interpersonal relationships, and changes in life perspective or philosophy, are agreed upon in the literature (Tedeschi & Calhoun, 1995, 2004). Larger areas of growth, such as changes in life perspective, have subsumed other areas including changes in religiosity or spirituality. Thus, while most researchers agree that growth does occur, uncertainty remains surrounding areas of PTG and the type of growth perceived from different traumatic events.

The lack of consensus of growth areas can be traced to the debate of whether PTG reflects a unidimensional or multidimensional construct. Evidence for the mulitidimensionaly of PTG stems from research examining the factor structure of the PTGI. Researchers have found both five factor (Maercker & Langner, 2001; Morris et al., 2005) and three factor (Powell, Rosner, Butollo, Tedeschi, & Calhoun, 2003) solutions for the PTGI using principal component analysis (PCA) with varimax rotation. Joseph and Linley (2008b) noted several reasons why caution should be taken regarding evidence of PTGI multidimensionality. First, most factor analytic studies have used college student populations. Results need to be replicated with other populations who have experienced significant traumas. Second, the PTGI was designed to

measure three main areas of growth, and not the five factor areas. Third, they suggest not to over-generalize PTGI multidimensionality evidence since results may not accurately represent the entire construct of growth. Joseph and Linley (2008b) further state that it may be beneficial to develop a common definition of growth that would address future PTG construct measurement and methodology issues.

Traumatic Events Leading to PTG

Before reviewing the literature on PTG and cancer patients, it is important to direct attention toward other trauma populations that have experienced PTG. Individuals have reported PTG from events directly impacting the individual, events impacting loved ones, large scale events, natural disasters, and health issues. Individuals have experienced PTG from events that have directly impacted the individual including accident/assault (Snape, 1997), sexual assault (Frazier et al., 2001), child sexual abuse (McMillen et al., 1995), rape (Thompson, 2000), military combat (Fontana & Rosenheck, 1998), and war refugees (Ai, Tice, Whitsett, Ishisaka, & Chim (2007). Individuals have reported PTG from events that have happened to a loved one including having a child with leukemia (Best, Streisand, Catania, & Kazak, 2001), bereavement of a child (Polatinksy & Esprey, 2000), Down syndrome of a child (King, Scollon, Ramsey, & Williams, 2000), and bereavement (Davis et al., 1998). Large scale events such as a ship sinking (Joseph et al., 1993), plane crash and mass shooting (McMillen, Smith, & Fisher, 1997), Oklahoma City bombing (Pargament, Smith, Koenig, & Perez, 1998), the bombing of Dresden, Germany, (Maercker & Herrle, 2003), and the terrorists attacks on 9/11 (Ai, Cascio, Santangelo, & Evans-Campbell, 2005; Davis & Macdonald, 2004; DeRoma et al., 2003; Woike & Matic, 2004) have been catalysts for individuals to perceive PTG. Individuals have also reported PTG from natural disasters such as tornados (McMillen et al., 1997), floods (Dolinska, 2003), and

earthquakes (Karanci & Acarturk, 2005). Last, a large body of literature has emerged documenting PTG among individuals who have been impacted by adverse health conditions such as spinal cord injury (McMillen & Cook, 2003), rheumatoid arthritis (Tennen, Affleck, Urrows, Higgins, & Mendola, 1992), heart attack (Affleck, Tennen, Croog, & Levine, 1987), and HIV/AIDS (Seigel, Schrimshaw, & Pretter, 2005).

It is important to note that while individuals have perceived growth from traumatic life events, there is often significant hardship and negative adaptation associated with such events. For example, trauma has been conceptualized in the context of cancer. Cancer has the ability to negatively impact numerous aspects of the individual including physical, emotional, social, and occupational functioning (Kornblith, 1998). Research suggests that cancer patients experience concurrent negative sequelae associated with their cancer. A proliferation of research in recent years has documented symptoms of posttraumatic stress disorder (PTSD) among individuals who have been diagnosed and treated for cancer (for reviews see Gurevich et al., 2002; Kangas, Henry, & Bryant, 2002; Neel, 2000). PTSD is a clinical anxiety disorder that occurs following intense traumatic events (American Psychiatric Association, 2000). Posttraumatic Stress Symptoms (PTSS) have been associated with higher rates of depression, anxiety, and lower Quality of Life (QOL) among cancer patients (Morrill et al., 2008; Cordova et al., 1995; Salsman et al., 2008). Cancer patients experience symptoms of PTSD including fear, anxiety, and helplessness which manifest in nightmares about reoccurrence and constant worry (Bush, 2009).

Although experiencing deleterious consequences, cancer patients also report PTG from their cancer experience. Studies investigating prostate cancer (Thornton & Perez, 2006), colorectal cancer (Salsman et al., 2008), testicular cancer (Rieker et al., 1985), leukemia and lymphoma (Daiter et al., 1988), malignant melanoma (Dirksen, 1995), breast cancer (Bellizzi &

Blank, 2006; Cordova et al., 2001; Sears et al., 2003), and mixed cancers (Schultz & Mohamed, 2004) have noted individuals experienced positive growth from their cancer experience. In a cross-sectional study of breast cancer patients, Cordova et al. (2001) examined PTGI scores to an age and education matched group of healthy controls. Their findings indicated that breast cancer patients showed significantly greater levels of PTG compared to the healthy controls, as measured by the PTGI. Specifically, breast cancer patients showed significantly higher levels of PTG in the areas of relating to others, spiritual change, and appreciation of life.

Cancer patients who received a bone marrow transplant have also perceived growth from their experience (Curbow, Legro, Baker, Wingard, & Somerfield, 1993; Fromm et al., 1996; Tallman et al., 2007, 2010; Widows et al., 2005). In a study of BMT patients PTG was measured by the PTGI approximately 2 years post-BMT (Widows et al., 2005). The five most commonly cited growth items were “An appreciation for the value of my own life” (92%), “My priorities about what is important in life” (90%), “Appreciating each day” (90%), “I learned a great deal about how wonderful people are” (86%), and “Knowing I can count on people in times of trouble” (85%) (Widows et al., 2005). The least frequently endorsed items included “New opportunities are available that wouldn’t have been otherwise” and “I developed new interests” (44%). A review of the literature suggests that patients with different types of cancer have found PTG from their cancer experience.

Overview of Variables Related to PTG

Numerous variables have been linked to PTG. In this section demographic variables such as age, ethnicity, gender, and socioeconomic status will be reviewed. Psychosocial variables, such as social support and coping, will be considered. Also, medical variables including

perceived stressfulness of cancer, disease severity, cancer treatment, passage of time from the event, diagnosis and treatment of cancer, and their relationship with PTG will be examined.

Demographic Variables and PTG

Within the broader literature, the relationship between age and PTG is mixed, although, some studies have found a negative relationship between age and PTG (Davis et al., 1998; Evers et al., 2001; Polatinsky & Esprey, 2000). A review of the cancer literature suggests an unclear relationship between age and PTG (Stanton et al., 2006). Some studies have reported a negative relationship between PTG and age (Bellizzi, 2004; Klauer, Ferring, & Filipp, 1998; Widows et al., 2005). Lechner et al. (2003) investigated the relationship between sociodemographic variables and benefit finding. Among the 83 men and women with mixed cancers, younger age was found to be significantly related to greater benefit-finding scores. In a sample of breast cancer patients, as age decreased also found to be linked to higher levels of meaning (Bower et al., 2005).

Two studies reported a positive relationship between age and PTG, with older individuals citing increased levels of growth. A study of BMT patients (Tallman et al., 2007) indicated a positive relationship between age and PTG, although the mean age was quite young for the 55 patients in the study (M =34.95, SD= 10.39). Another study found a positive association between age and PTG among women with mixed cancers, whose ages ranged from 40-79 (Kurtz, Wyatt, & Kurtz, 1995). It should be noted that while two studies found a positive relationship between age and levels of growth, cancer patients mean ages were approximately 50 years.

The results of the negative relationship between age and PTG might partly be explained by the notion that chronic disease is more normative for older adults, while the diagnosis and treatment of cancer for young people may be more threatening and distressing (Klauer et al.,

1998; Salmon, Manzi, & Valori, 1996). It has also been theorized that younger people may have greater openness to learning and change (Tedeschi & Calhoun, 2004). Older individuals have already gone through difficult experiences and achieved life lessons, including acceptance of their place in life and other existential concerns that could buffer them from experiencing PTG (Linley & Joseph, 2004b Tedeshi & Calhoun, 2004).

Socioeconomic Status (SES), in PTG studies, is usually operationalized as level of income, education, a composite index of income, or employment status (Stanton et al., 2006). In non-cancer populations, higher education has been linked to increased levels of PTG (Fontana & Rosenheck, 1998; Updegraff, Taylor, Kerneny, & Wyatt, 2002). Cancer populations have demonstrated a positive relationship between SES and PTG (Bower et al., 2005; Cordova et al., 2001; Sears et al., 2003). Carpenter, Brockopp, and Andrykowski (1999) examined breast cancer survivors who experienced positive transformation, minimal transformation, or “feeling stuck.” Positive transformation is analogous to PTG in that participants noted changes in relationships and changes in self. The minimal transformation group consisted of breast cancer survivors who may have experienced increased self-awareness but did not experience changes in self (e.g., PTG). The third group, “feeling stuck”, consisted of breast cancer survivors who were unable to change because of perceived barriers. Results indicated that the positive transformation group was more likely to have a higher income than the other two groups. Research also suggests a negative relationship between SES and PTG (Urcuyo, Boyers, Carver, & Antoni, 2005; Widows et al., 2005). Tomich and Helgeson (2004) examined benefit-finding among 364 women diagnosed with breast cancer. Their results, on the other hand, revealed that lower SES was related to more benefits from the cancer experience.

Results of the divergent findings might be explained by cancer type, as most studies with significant positive relationship findings were of one cancer type (e.g., breast) while mixed cancer samples have shown non-significant findings (Stanton et al., 2006). Results suggest that higher SES breast cancer patients who have completed their breast cancer treatment may be more likely to experience PTG. Higher SES individuals may have access to more resources and thus are able to process their experience with others (Hobfoll, 1989). Although, as previously reviewed, lower SES has been related to increased levels of PTG. Factors such as ethnicity (e.g., African American, Hispanic) and religion may help to explain the relationship between lower SES and increased PTG (Tomich & Helgeson, 2004). Overall, the relationship between SES and PTG remains unclear, although characteristics such as ethnicity and availability of resources may account for some of the significant findings.

The majority of research studies indicate a non-significant relationship between gender and PTG (Stanton et al., 2006). A few studies have reported that women experience more growth compared to men (Park et al., 1996; Tedeschi & Calhoun, 1996). Weiss (2002) found that breast cancer patients reported more benefits from their experience than their husbands did. Theory would support this evidence in that individuals who are directly impacted by the trauma perceive higher levels of PTG compared to those who are indirectly impacted by trauma (Tedeschi & Calhoun, 1996). After reviewing the literature, Stanton et al. (2006) noted that males and females do not differ regarding the amount of growth perceived. Further, the lack of gender differences and PTG is consistent across research methodologies (e.g., measuring PTG with a standardized measure or open-ended question), and demographic variables such as race, gender, and ethnicity.

The relationship between minority status and ethnicity has been examined in a review of the cancer PTG literature (Stanton et al., 2006). Some studies have noted a relationship between

minority status and PTG (Bower et al., 2005; Tomich & Helgeson, 2004; Urcuyo et al., 2005). Bower et al. (2005) examined a sample of breast cancer survivors and found African American women reported significantly higher levels of meaning compared to Caucasian women. Most studies indicating a relationship between ethnicity and PTG have consisted of breast cancer patients, with African American or Hispanic populations reporting the highest levels of growth (Stanton et al., 2006). Reasons for the findings may be that ethnic minority women are impacted to a greater degree compared to Caucasian women. Greater impact (e.g., stressfulness of cancer, severity, perceived threat) has been linked to greater levels of PTG (Cordova et al., 2001; Sears et al., 2003; Andrykowski et al., 1996). Furthermore, ethnic minority women are usually diagnosed with cancer at an earlier age and are more likely to have a mastectomy and chemotherapy compared to Caucasian women (Stanton et al., 2006). Last, the relationship between ethnicity and PTG may be due to ethnic minority women participating in religious coping, which may facilitate the growth process (e.g., Stanton et al., 2006; Urcuyo et al., 2005).

Coping and PTG

Coping has been extensively researched among medical populations and cancer patients. Coping has been defined as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p. 141, Lazarus & Folkman, 1984). Researchers have extensively examined coping in the aftermath of a traumatic event. Theories related to growth following adversity typically incorporate some component of coping or coping style within them (e.g., Janoff-Bulman, 1992; Joseph & Linley, 2005; Tedeschi & Calhoun, 1995, 2004). Stress and coping theory (e.g., Lazarus & Folkman, 1984) plays an important role in PTG theory. Furthermore, the distinction between PTG as a *process* compared to an *outcome* has clouded the relationship

between PTG and coping. The relationship between different type of coping strategies (e.g., active coping vs. avoidant coping) and PTG as a coping mechanism needs further examination.

Research suggests that coping style is related to PTG. Reviews of the PTG literature indicate that problem-focused coping, acceptance, positive reinterpretation, and positive religious coping are associated with increased levels of PTG (Linley & Joseph, 2004b; Park & Cohen, 1993; Park et al., 1996; Sears et al., 2003). Emotion-focused coping (e.g., emotional social support) has also been positively linked to PTG (Manne et al., 2004; Maercker & Langner, 2001). Emotional focused coping may open opportunities for individuals to express and process concerns with others, which has been linked to higher reports of PTG (Cordova et al., 2001). Along with the coping styles mentioned above, a recent meta-analysis of 77 growth studies found that benefit-finding was related to acceptance, positive reappraisal, and denial coping (Helgeson et al., 2006).

Religious and spiritual coping have been linked to increased levels of PTG (Pargament, Koenig, & Perez, 2000; Proffitt, Cann, Calhoun, & Tedeschi, 2007). In a sample of individuals impacted by the Oklahoma City bombing positive religious coping was related to increased levels of Stress-Related Growth (Pargament et al., 1998). However, this relationship appears to be stronger for positive religious coping (e.g., secure relationship with God; sense of spiritual connectedness with others) and PTG compared to negative religious coping (e.g., less secure relationship with God; tenuous and ominous views of the world) and PTG (Pargament et al., 1998). Researchers have called for the development of more advanced measurement techniques to examine the relationship between religious coping and PTG (Hill & Pargament, 2003; Shaw, Joseph, & Linley, 2005; O’Rouke et al., 2008).

In a review of the literature on cancer patients and coping, Stanton et al. (2006) noted that PTG was positively related to approach oriented coping strategies such as active coping (Urcuyo et al., 2005), planning (Urcuyo et al., 2005), and problem-focused coping (Collins, Taylor, & Skokan, 1990; Sears et al., 2003; Widows et al., 2005). Active coping is the process of taking an active role in removing the stressor or minimizing the stressors effects (Carver et al., 1989). Planning coping refers to thinking about the stressor and subsequently coming up with a plan on how to deal with it (Carver et al., 1989). Problem focused coping involves identifying a problem stressor and taking deliberate steps to address the stressor (Lazarus & Folkman, 1984). Consistent with the broader PTG literature base, positive reappraisal coping has a significant relationship with PTG among cancer populations (Collins et al., 1990; Sears et al., 2003; Thornton & Perez, 2006; Urcuyo et al., 2005). Positive reappraisal coping is a type of emotion focused coping targeted at the use of benefits as an intentional coping strategy (Carver et al., 1989; Sears et al., 2003). Widows et al. (2005) found that positive reappraisal coping, as measured by the Coping Response Inventory, was positively related to PTG among a sample of BMT patients. Acceptance coping, along with coping by either emotional expression or seeking social support, has also been related to increased levels of PTG (Antoni et al., 2001; Schultz & Mohamed, 2004; Thornton & Perez, 2006). In examining predictors of benefit-finding among 230 breast cancer survivors, Urcuyo et al. (2005) found that acceptance coping was positively related to benefit-finding. Acceptance coping is based on the assumption that individuals who accept the reality of a stressful situation will be actively engaged in dealing with the stressor (Carver et al., 1989). In summary, adaptive coping such as problem-focused or active coping strategies have been linked to increased levels of PTG.

Coping is a multi-dimensional construct as evidences by individuals' use of many different types of coping strategies (Carver et al., 1989). The use of maladaptive coping strategies has also been related to PTG (Armeli, Gunthert, & Cohen, 2001; Maercker, Harrle, & Grimm, 1999 as cited in Zoellner & Maercker, 2006). Maercker and Zoellner (2004; Zoellner et al., 2008) suggest that PTG may be predicted by two different types of coping strategies: a constructive side (e.g., positive reappraisal, active mastery, problem-focused coping) and a distractive, palliative side (e.g., denial, emotion-focused coping). Evidence supporting the differential prediction of PTG from coping style comes from a study of university alumni and college students who reported their most stressful event in the past two years (Armeli et al., 2001). Results suggest that some dimensions of PTG (e.g., heightened self-understanding) were predicted to a greater degree by maladaptive coping strategies compared to adaptive coping strategies. An illustration of this relationship may be an individual who initially reacts with anger or disengagement (e.g., maladaptive coping) to a stressor and then gains self-insight into his or her way of interacting with others in a more mature manner. Therefore, while some individuals may have a greater affinity toward certain types of coping styles (e.g. adaptive coping), research suggests that adaptive and maladaptive coping styles are linked to PTG.

Research also suggests relationships between avoidant coping strategies and PTG among cancer populations. Higher levels of PTG have been associated with the use of more maladaptive coping style including escape/avoidant coping, and distraction coping (Collins et al., 1990). In a longitudinal study of bone marrow transplant (BMT) patients avoidance coping, as measured by The Coping Response Inventory, was positively related to PTG (Widows et al, 2005). Additionally, the avoidance-based coping strategy of seeking alternative rewards was significantly related to greater growth. Seeking alternative rewards refers to becoming involved

in alternative activities to create new sources of satisfaction (Kohn, Mertens, & Weisner, 2002). Research suggests that PTG may be related to both adaptive and maladaptive coping strategies, providing preliminary evidence to support a model of growth representing a constructive side and a distractive, palliative side (e.g., Janus-Face model; Zoellner & Maercker, 2006). Additionally, to understand better how coping relates to PTG among cancer patients, it is necessary to measure coping styles at various time points starting immediately after a trauma. Measuring coping style at different time points after a traumatic event, and examining both adaptive and maladaptive coping strategies (e.g., approach vs. avoidance coping) would provide an improved understanding of the complex relationships between coping and PTG.

Social Support and PTG

Another component commonly cited within the PTG framework that is believed to be linked to increased levels of PTG is one's culture and social groups. Support from others after a traumatic event is hypothesized to be extremely important in the adjustment processes following trauma (e.g., Janoff-Bulman, 1992; Park & Folkman, 1997; Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 1995, 2004). Posttraumatic Growth theory suggests that individuals who are able to share experiences with others and seek tangible support may be more likely to experience PTG (Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 1996, 2004). Also, having the ability to actively seek social support from others is hypothesized to be linked to PTG and finding positive meaning (Tedeschi & Calhoun, 1996). The influence of significant others or social groups can potentially influence the growth process: specifically, disclosures related to the traumatic event and the subsequent response from significant others may impact the growth process. Having the opportunity for social support may facilitate cognitive and emotional processes hypothesized as necessary for growth to occur (Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 2004). When

individuals do not have the ability to disclose or engage in discussion regarding the event, they may feel socially constrained and thus may not experience PTG.

In writing about the influence of others, Tedeschi and Calhoun (1995, 2004; Calhoun & Tedeschi, 2006) make the distinction between “distal” and “proximate” groups. Distal groups are part of the greater culture such as countries, and proximate groups are those groups that make up small communities and social groups. An example of how distal group influences may impact individuals differently is the religious differences between the United States and Europe (Calhoun & Tedeschi, 2006). Specifically, individuals in the United States may be predisposed to view trauma from a religious perspective or positive lens in respect to Europeans. Such perspectives may have an impact on the perception of growth from a traumatic event. Proximate groups, such as primary reference groups, are groups that may have a more direct or immediate effect on the individuals. Groups such as social networks, neighbors, and clubs are examples of proximate groups. Researchers have yet to determine whether distal groups influence the growth process above and beyond that of proximate groups, or vise versa.

Empirical studies examining the relationship between PTG and social support have yielded mixed findings. A positive relationship between social support and PTG has been found among husbands of women with breast cancer (Weiss, 2004a), bereaved HIV/AIDS caregivers (Cadell, Regehr, & Hemsworth, 2003), and women living with AIDS/HIV (Seigel et al., 2005). However, overall, a review of the literature suggests a weak relationship between social support and PTG (Linley & Joseph, 2004b). Some studies have found no relationship between overall social support and growth (Cordova et al., 2001), while others have reported a positive relationship (Weiss, 2004a). In a sample of German cancer patients, Schultz and Mohamed, (2004) examined the relationship between personal and social resources, and benefit-finding.

Results of structural equation modeling revealed that, among all study variables, social support was the strongest predictor of benefit-finding. The authors noted that caution should be taken when interpreting the findings. The significant relationship may be a function of benefit-finding that occurred early after a traumatic event and as a result helped elicit supportive behaviors from others. Thus, the causality of the relationship between benefit-finding and social support remains uncertain.

Specific components of one's social context, compared to overall social support, may be linked to PTG (Stanton et al., 2006). Among cancer patients, there is limited support for the relationship between overall social support, marital support, and PTG, with the exception of two studies (Schultz and Mohamed, 2004; Weiss, 2004a). Specific components of social support, such as talking about cancer, have been linked to PTG. In a study of breast cancer survivors and their husbands, Weiss (2004a) found that overall social support was not related to PTG, but marital support and knowing someone with PTG was related to growth. Social support satisfaction, in another sample of breast cancer survivors, was not related to PTG but talking about cancer was (Cordova et al., 2001). Also important to note is the similarity between social support and actively seeking support as a coping strategy (Stanton et al., 2006).

Being exposed to a PTG model may play an important role in individuals finding growth from traumatic life events. Consistent with PTG theory (Tedeschi & Calhoun, 2004) talking about one's cancer experience may provide opportunities to engage in "cognitive, affective, and interpersonal processes that promote positive changes" (p. 182; Cordova et al, 2001). Calhoun and Tedeschi (2006) hypothesize that being around individuals who endorse beliefs of a strength-based approach to traumatic events (e.g., stronger after the traumatic event), may be more likely to find growth from their experience. Research indicates it may be better to examine

specific kinds of support and how they are related to PTG instead of the broader sense of social support (e.g., Weiss, 2004a). Types of support that could be examined include specific components of emotional and social support, contact with a PTG model, and emotional processing.

Medical Variables and PTG

Perceived stressfulness of cancer, disease severity, diagnosis and disease stage, treatment type, and time since diagnosis are the most commonly reported variables being related to PTG. The current study does not include all medical related variables, but it is still pertinent to review the literature of medical related variables as they relate to PTG.

Increased levels of PTG are thought to be related to elements of the stressfulness of the event including event severity and perceived threat from the event. Evidence to support the link between increased levels of growth and severity has been reported among various trauma populations (Linley & Joseph, 2004b; Stanton et al., 2006; Weiss, 2004a). According to PTG theory, for growth to take place the event must be severe enough to make persons question their assumptive world, thus leading to rumination about the event (Calhoun & Tedeschi, 2006; Janoff-Bulman, 1992; Tedeschi & Calhoun, 1995, 2004). Research in trauma populations suggests a positive relationship between the level of threat of the event and increased levels of PTG (e.g., Armeli et al., 2001; Fontana & Rosenheck, 1998; McMillen et al., 1997).

The relationship between increased levels of PTG and perceived threat of the event has also been reported among cancer populations (Cordova et al., 2001; Fromm et al., 1996; Widows et al., 2005). Studies have defined perceived threat as how likely one was to die from cancer (e.g., Lechner et al., 2003), and questions targeting Posttraumatic Stress Disorder (PTSD) criteria (Cordova et al., 2001; Weiss, 2004a; Widows et al., 2005). In a longitudinal study of early stage

breast cancer patients perceived threat was defined by ratings of stressfulness (Sears et al., 2003). Results of the study indicated that higher ratings of stressfulness of cancer were related to greater levels of PTG at a one year follow-up.

There is considerable variability in the methods and terms used to measure threat or severity from the cancer experience. The positive relationship between perceived stressfulness of cancer and PTG may be an artifact of the type of measurement technique used (Stanton et al., 2006). For example, the majority of studies that have used the Impact of Events scale (IES) (Horowitz, Wilner, & Alvarez, 1979) have reported non-significant findings with PTG, with the exception of one study (Manne et al., 2004). Research suggests that the IES may not be a good indicator of cancer-related posttraumatic stress symptoms (PTSS) and that care should be taken when choosing measurement tools to assess perceived threat and cancer-related stress.

Researchers have also reported a relationship between trauma or disease severity and PTG. Disease severity has been defined in a number of ways including cancer stage (Andrykowski et al., 1996), rating by an oncologist (Collins et al., 1990), or a composite index (e.g., age at BMT, disease type, disease status at BMT, and type of BMT, Fromm et al., 1996). Numerous studies in the literature have reported a relationship between increased levels of PTG and more severe disease (Andrykowski et al., 1996; Tomich & Helgeson; 2004; Urcuyo et al., 2005). In a study of Leukemia and Lymphoma patients, young adults were categorized into favorable or less-favorable prognosis groups based on their expected 5-year survival (Daiter et al., 1988). Results indicated that cancer patients in the less-favorable group prognosis reported significantly more personal and developmental growth or maturation than those individuals in the favorable prognosis group. Results of the study should be interpreted with caution as there was a relatively small sample size (n=32). Fromm et al. (1996) examined positive and negative

psychosocial sequalae of BMT patients. They found that a poorer prognosis with BMT, or those individuals who experienced a more “risky” BMT, was more predictive of positive outcomes.

PTG theory suggests that individuals who are diagnosed with a more severe disease may be more likely to experience PTG, as medical treatments may be more invasive and mortality becomes more likely (Stanton et al., 2006; Tedeschi & Calhoun, 2004). Cancer patients receiving chemotherapy (Bower et al., 2005) and an anti-hormonal drug (Urcuyo et al., 2005) were related to increased levels of PTG. In a study examining perceptions and vulnerability following breast cancer, women who had been treated with chemotherapy noted significantly higher levels of meaning compared to those patients not being treated with chemotherapy (Bower et al., 2005). In another breast cancer sample, benefit-finding was related to usage of the anti-hormonal drug Tamoxifen, although the association was not considerably strong ($r = .15$, $p < .05$). In summary, perceived threat, severity, stressfulness, and prognosis of cancer appear to be more strongly related to PTG compared to medical variables such as treatment received or medications.

Studies have examined the relationship between time since diagnosis and PTG. Studies have found that time since diagnosis was positively related to PTG (Cordova et al., 2001; Manne et al., 2004). In a sample of German cancer patients perception of change in self, or PTG, was found to be positively related to time since diagnosis (Klauer et al., 1998). Additionally, the specific area of growth that increased over time was interpersonal relationships. Time since diagnosis was significantly predictive of PTG in a sample of breast cancer survivors (Sears et al., 2003). Research also suggests a relationship between time since diagnosis and increased levels of PTG (Fromm et al., 1996; Weiss, 2004a). Among adolescent cancer survivors, PTG was inversely related to time since treatment (Barakat, Alderfer, & Kazak, 2006). One researcher suggested that time since diagnosis may be more strongly related to PTG 1-2 years after

diagnosis than several years after survivorship. After several years following a diagnosis of cancer it has been hypothesized that individuals may actually “lose” their perceived benefits (Stanton et al., 2006), although this assertion has yet to receive empirical support. The mixed findings regarding time since diagnosis and PTG has led to uncertainty regarding the trajectory of growth and the process of growth over time. A more thorough and detailed account of the literature examining the time course of PTG will be presented later in this chapter.

In summary, demographic, psychosocial (e.g., coping, social support), and medical variables have been shown to be related to PTG among trauma and cancer populations. Among demographic variables uncertainty remains regarding characteristics such as age and ethnicity and how individuals represented by these characteristics may perceive PTG. Researchers have widely documented the relationship between coping and PTG. However, because of theoretical overlap between some coping constructs (e.g., positive reappraisal coping) and PTG, the underlying relationship between these variables is unclear. The lack of clarity between coping and PTG may also result from methodological difficulties and the use of cross-sectional research designs. In regards to the influence of others, researchers have started to target different components of what Tedeschi and Calhoun (1995, 2004) have defined as distal and proximate groups. For example, researchers have investigated how specific components of social support (e.g., coming into contact with a PTG model; Weiss, 2004a) relate to PTG and how cultural differences influence the perception of PTG (Shakespeare-Finch & Copping, 2006). Numerous medical variables have also been reported in the literature as being related to PTG. One such medical variable that needs further examining is time since diagnosis or treatment and PTG. As stated, examining growth longitudinally, at numerous time points after diagnosis or treatment, may help clarify the process of growth over time.

Longitudinal PTG Research

Longitudinal Predictors of PTG

Researchers have investigated the relationship between PTG and other psychosocial variables by use of longitudinal prospective studies. There are predominately two types of research methodologies used to investigate PTG longitudinally: studies examining predictors of PTG across time and studies examining PTG predicting outcomes across time. Outcomes are commonly defined as psychological functioning, physical functioning, and HRQOL (e.g., well-being). In this section studies using the two types of longitudinal research designs will be examined. Longitudinal studies of trauma populations and cancer populations will be reviewed. The section will also summarize prospective longitudinal PTG research and highlight study limitations.

Longitudinal studies have examined predictors of PTG among various trauma populations. Park et al. (1996) examined predictors of PTG in a validation study of the Stress-Related Growth Scale (SRGS). College students were asked to identify the most negative and the most positive experiences that had occurred during the previous year. Questionnaires were administered at two time points separated by 6 months. Multiple regression analyses indicated 6 statistically significant predictors of stress-related growth, as measured by the SRGS: acceptance coping, positive reinterpretation coping, intrinsic religiousness, initial stressfulness of the event, number of positive events, and social support satisfaction. Among the predictors, coping variables accounted for the greatest amount of variance (25%) in the SRGS total score. However, it should be noted that not all variables were longitudinally predictive of the SRGS. Coping variables were assessed at the 6 month time point making them concurrently predictive of SRGS. In another prospective longitudinal study, Abraido-Lanza, Guier, and Colon (1998) examined

predictors of thriving among a sample of women suffering from chronic arthritis. Bivariate correlations showed relationships between self-efficacy, negative affect, positive affect, and thriving three years later. Social support and acceptance of one's illness were unrelated to thriving. Structural Equation Modeling (SEM) revealed that only positive affect had a direct effect on thriving three years later. In a sample of amputees, cognitive processing measured approximately 9 weeks after amputation was related to increased levels of growth at a 12 month time point (Phelps,Williams, Raichle, Turner, & Ehde, 2008). Last, predictors of adversarial growth were examined in a longitudinal study of individuals with psoriasis that spanned 4-6 months (Fortune, Richards, Griffiths, & Main, 2005). Growth was more likely for individuals with younger ages, stronger beliefs that the condition would be chronic or recurrent, and lower scores on alexithymia.

The majority of longitudinal studies have examined predictors of PTG several months or a year or two after the event. A review of the trauma literature indicated that only two studies have examined predictors of PTG longitudinally over a 10 year period. In one study PTG was examined 10 years after having a spinal cord injury (Pollard & Kennedy, 2007). PTG was regressed on coping and depression variables that were measured 12 weeks post-injury. Results indicated that mental disengagement coping, active coping, and depression at 12 weeks predicted PTG 10 years post-injury. In the other 10-year longitudinal study, predictors of PTG were examined in a sample of individuals who sustained a traumatic brain injury (TBI) (Hawley & Joseph, 2008). The first interview ranged from 2-127 months after the TBI (M=15.1, SD=22.35) and the 10-year follow up interview ranged from 9-25 years (M=11.25, SD=2.64) after the TBI. Physical and psychological well-being, measured at the first time point, were not related to PTG at the 10 year follow-up. Limitations of both longitudinal studies include the measurement of

PTG at one time point and significant study attrition. While challenging, it would be helpful to conduct study interviews across numerous time points to better understand the prediction of PTG many years after traumatic events occur.

Longitudinal predictors of PTG have been examined in cancer populations. Predictors of PTG were examined in a study of adults receiving treatment for a newly diagnosed cancer (Carboon, Anderson, Pollard, Szer, & Seymour, 2005). Predictor variables were measured during treatment (M= 37 days post-diagnosis), and PTG was measured following the completion of treatment (M= 184 days post-diagnosis). The five scales of the PTGI were regressed on assumptive world beliefs, cognitive avoidance, cognitive intrusions, sociodemographic variables, and illness-related factors. Results revealed that each PTGI scale had unique predictors, indicating conceptual differences between PTG areas. The world assumptions of justice and luck were positively predictive of PTGI subscales whereas the world assumptions of self-worth and self-control negatively predicted PTGI subscales. Additionally, world assumptions did not change over time indicating that PTG may be the result of individuals attempting to assimilate information into pre-existing schemas.

Results of studies examining longitudinal predictors of PTG should be interpreted in light of their limitations. First, in several studies the traumatic event could have happened anytime before the completion of the initial study interviews. Thus, most studies did not assess for true levels of baseline functioning. It is challenging to draw definitive conclusions regarding predictors of growth when predictors are measured at various time points after the event. Second, most studies had small sample sizes and did not conduct power analyses. Third, the results of long term studies (10+ years) could have been strengthened if researchers would have examined predictors across multiple time points throughout the duration of the study. While it is

challenging to investigate relationships between variables and PTG across multiple time points, it is essential to develop such research methodologies to understand PTG longitudinally.

PTG Predicting Outcomes Longitudinally

Research investigating trauma populations has examined the relationship between PTG and outcomes (e.g., psychological functioning, physical functioning, and HRQOL [well-being]). In a study of patients with rheumatoid arthritis the relationship between benefit-finding and adjustment outcomes one year later was examined (Danoff-Burg & Revenson, 2005). Results of regression analyses indicated that after controlling for baseline adjustment, interpersonal benefits predicted improved physical functioning; higher levels of benefits were associated with higher levels of physical functioning. In another longitudinal study Cheng et al. (2006) investigated perceived *costs* and *benefits* among a sample of individuals with severe acute respiratory syndrome (SARS). Study participants were Chinese and included individuals recovering from SARS, family members of individuals recovering from SARS, and healthy adults. Results revealed that over an 18-month time period mixed accounts of benefits and costs were related to increases in psychosocial variables (e.g., self-esteem, social). Individuals who only gave accounts of benefits had higher levels of defensiveness compared to individuals who reported both benefits and costs. Results lend evidence to support the adaptive and maladaptive roles of benefit-finding.

In a recent study of multiple sclerosis patients, the relationship between depressive symptoms, benefit-finding, optimism, and positive affect was examined (Hart, Vella, & Mohr, 2008). Patients were part of a randomized clinical trial comparing two types of telephone psychotherapies for depression. Self-report assessments were administered at baseline, during treatment (8 and 16 weeks), 6-months post-treatment, and 1-year post treatment. Results

indicated that benefit-finding significantly increased from baseline to the 1-year post treatment time point. Additionally, greater decline in depression, increased optimism, and increased positive affect following treatment predicted increased levels of benefit-finding across study time points. The relationship between depression and enhanced benefit-finding was mediated by positive affect and optimism.

Most longitudinal research investigating cancer patients also supports a positive relationship between PTG and quality of life (Stanton et al., 2006). In a longitudinal study of early stage breast cancer patients, researchers examined the relationship between benefit-finding, measured at 3, 6, and 12 month post-surgery, and well being measured 5-8 years post-surgery (Carver & Antoni, 2004). Results revealed that increased levels of benefit-finding were linked to a number of well-being measures at 5-8 years including increased quality of life, increased positive affect, decreased negative affect, and decreased levels of depression (Carver & Antoni, 2004).

Lechner, Carver, Antoni, Weaver, and Phillips (2006) reexamined the same longitudinal sample of breast cancer patients as examined by Carver and Antoni (2004) and another previous sample of breast cancer patients who had participated in a 10-week Cognitive Behavioral Stress Management program (CBSM; Antoni et al., 2001). Researchers reexamined each cohort separately using regression analyses and quadratic associations. Reexamined results for Carver and Antoni's sample indicated that the relationship between benefit-finding, measured 3 months post-surgery, had a curvilinear relationship with positive affect and quality of life at 5-8 years post-surgery. To understand the nature of the longitudinal quadratic relationships the sample was split into three benefit-finding groups: low benefit-finding related to high quality of life, high benefit-finding related to high quality of life, and moderate benefit-finding related to lower

quality of life. Results of ANOVA and follow up tests revealed that individuals in the high benefit-finding group, compared to the moderate and low benefit-finding groups, had higher levels of optimism, positive reframing coping, religious coping, and acceptance at the 5-8 year follow-up.

Breast cancer patients in the second cohort completed interviews at baseline (2 months post-surgery), 5-6 months, 8 months, 14 months post-surgery, and approximately 5 years post-surgery (Antoni et al., 2001). Reexamined results indicated that benefit finding measured at 5-6 months post-surgery had a quadratic relationship with social disruption measured at 5 years post-surgery. Benefit-finding was not related to perceived quality of life, depression, and distress at 5 years post-surgery. To further explore the quadratic effects the sample was again divided into three segments, as previously stated. Results of ANOVAs indicated that individuals in the high benefit-finding group, compared to the intermediate and low benefit-finding groups, had higher levels of positive refraining coping and religious coping at 5 years post-surgery. Researchers posited that curvilinear associations were present because some women react to cancer with high levels of distress and lower levels of benefit-finding compared to women who react to cancer with low levels of distress and high levels of benefit-finding. Study implications emphasize the importance of examining relationships with non-linear models and taking into consideration advanced statistical methods to examine complex relationships among study variables.

In another longitudinal study post-treatment colorectal cancer patients participated in an investigation examining variables such as social desirability, cognitive processing (cognitive intrusions, cognitive rehearsal) PTG, and PTSS (Salsman et al., 2008). Baseline interviews were 13 months post-diagnosis and follow up interviews were 3 months after baseline interviews. Main study findings indicated that baseline PTGI scores predicted PTGI scores 3 months later.

Other study variables (e.g., cognitive processing) did not predict PTGI scores at the 3 month follow-up. Small sample size and a relatively small time frame between assessment time points likely contributed to the null findings.

Tallman et al. (2007) examined posttraumatic growth longitudinally among a sample of bone marrow transplant patients. Finding benefit was measured at 1 and 3 years post transplant. Study interviews were conducted at baseline (pre-BMT), 1 year post-BMT, and three years post-BMT. Over 90% of the sample (n=56) indicated perceiving at least one benefit from their experience. Mediation analyses using a bootstrap method was used to compensate for smaller sample size to increase power in testing indirect effects (Efron & Tibshirani, 1993; Fritz & MacKinnon, 2007). Finding benefit, measured at 1 year post-BMT, mediated a relationship between baseline optimism and adjustment (e.g., depression, physical functioning) at three years post-BMT. Results emphasize the positive relationship between PTG and outcomes at a later time point.

Longitudinal research also indicates that PTG is related to positive outcomes (e.g., decreased distress) when benefits are sustained or increased over a period of time (Davis et al., 1998; Frazier et al., 2001). For example, Frazier et al. (2001) investigated the timing and course of PTG, and the relation between positive and negative life changes and posttraumatic stress among sexual assault survivors. Study participants who reported benefits at 2 weeks and 12 months post-assault experienced decreased levels of distress at 12 months post-assault (Frazier et al., 2001). Positive changes generally increased over time and negative changes generally decreased over time. Davis et al. (1998) examined bereaved adults during a hospice program, accounting for pre-event functioning. Interviews were conducted pre-loss, (before the death of their family member), which was an average of three months prior to loss. Interviews occurred at

1-month, 6-months, 13 months, and 18 months post-loss. Results revealed that making sense of a loss was related to less distress at the first year post-loss. Finding benefit, measured at 6 months post-loss, was associated with less distress at the 13 and 18 month time points. In another longitudinal study that examined pre-event functioning, Ickovics et al. (2006) examined sexually active adolescent girls and the relationship between PTG and emotional distress across time. Adolescent girls participated in a prospective longitudinal study on HIV/STD risk behaviors. Interviews were conducted at three time points: baseline (pre-event), 12 months, and 18 months. At 12 months participants were instructed to name their most difficult experience in the past year. The two most common traumatic events cited by participants were the death of a loved one and pregnancy/motherhood. Trauma history and PTG were only assessed at 12-months. Results indicated that by controlling for baseline levels of distress, increased PTG predicted decreased levels of emotional distress at 18 months. Additionally, a significant PTG by time interaction emerged. Adolescent girls with high levels of PTG had lower levels of distress at pre-event, with distress continuing to decline at 12 and 18 months. Adolescent girls with low PTG had high levels of pre-event distress and only experienced declines in distress at 18 months.

Research among cancer patients indicates that an increase in PTG over time is related to increased psychological functioning and well-being. In a study of German cancer patients, interviews were conducted at a baseline time point (pre-surgery), and 1 and 3 months post-surgery (Schwarzer, Luszczynska, Boehmer, Taubert, & Knoll, 2006). Benefit-finding increased over time only for those individuals who were low on benefit-finding. Cancer patients who were initially high on benefit-finding did not change across time as there was no room for increased benefits (e.g., ceiling effect). A change in benefit-finding score was computed by subtracting benefit-finding measured at 1 year from benefit-finding measured at baseline. A positive

difference referred to a gain and a negative difference referred to a loss in benefit-finding levels across the 12-month period. In three regression models, a positive change in benefit-finding predicted decreased depression and increased quality of life at one year, after controlling for age, gender, and disease-related variables. Thus, a positive change in benefit-finding was related to subjective and mental health outcomes.

While most longitudinal studies report a positive relationship between PTG and adjustment, one study found an inverse relationship. Tomich and Helgeson (2004) examined the relationship between PTG and quality of life across three time points: baseline (4 months post-diagnosis), three months after time 1, and 6 months after time 2. Results suggested that benefit-finding 4 months post diagnosis was associated with increased negative affect 6 and 9 months later. One reason for the negative association between PTG and quality of life may reflect the time points at which the interviews were conducted. Early after a traumatic event, individuals may be engaging in self-enhancing bias or defensive denial (Tomich & Helgeson, 2004). Such means of coping at an early time point after trauma may prevent more adaptive coping mechanisms to take place, thus leading to negative adjustment.

A summary of the longitudinal research, with the exception of Tomich and Helgeson (2004), provides evidence that the relationship between PTG and positive psychological adjustment and well-being may take time to unfold. However, there are relatively few studies to support this conclusion among cancer populations and longitudinal studies have limitations that need to be addressed. Most longitudinal studies did not measure pre-event functioning, or conduct assessments relatively soon after traumatic events (Ford et al., 2008). Also, when comparing longitudinal studies, the majority of the initial interviews were conducted at different time points, making it difficult to generalize findings. Because longitudinal research is often time

intensive and consumes more resources compared to cross-sectional research, the sample sizes are often small. Small sample size limits statistical power to detect significant findings. Last, until consensus in the measurement and assessment of PTG is reached, researchers will contend with interpreting research findings by using numerous methodologies and measurement techniques. Conducting interviews at a very early time point may help define the process of PTG and the relationship between PTG and other variables over time. As growth is hypothesized to be a process that unfolds over time, one can easily see the importance of continuing to conduct longitudinal research studies.

Time Course Trajectory of PTG

Time appears to play a critical role when and if growth occurs. Most PTG theories (e.g., Tedeschi & Calhoun, 1995, 2004) suggest that it takes some time for PTG to be perceived: in the immediate aftermath of trauma perceived growth likely does not reflect actual growth (Lechner, Stoelb, Antoni, & 2008). As time passes from the event rumination may become more deliberate and directed toward repairing schemata and rebuilding one's understanding of the world (Tedeschi & Calhoun, 1995, 2004). There appears to be a cognitive engagement or process component that must take place after the traumatic event for growth to occur (e.g., Linley & Joseph, 2004a; Manne et al., 2004). As time passes from the traumatic event, individuals who are able to cognitively process the event and come to terms with their changed life, may experience growth (Tedeschi & Cahoun, 1995, 2004). Therefore, theory indicates that it takes time for growth to occur following a traumatic event. (Tedeschi and Calhoun, 2004; Joseph et al., 2005; Lechner et al., 2008).

Contrary to some of the PTG models and theories, individuals have reported positive changes shortly after a traumatic event. In a longitudinal study, Frazier et al. (2001) examined

PTG and positive and negative life changes among sexual assault victims two weeks after a sexual assault. Results indicated that most survivors reported positive changes two weeks after the trauma and those positive changes increased over time up to 12 months. However, most changes in growth occurred between the 2 week and 2 month period. Positive changes cited were increased empathy, better relationships, and greater appreciation of life. Reports of growth remained consistent up to one year later. The results of the study provide contradictory support against theories purporting that positive change takes a significant amount of time to occur (Frazier et al., 2001; Calhoun & Tedeschi, 1999).

While theory suggests that it takes time for growth to occur, the time course trajectory of when individuals perceive PTG following a traumatic event remains unclear. Research suggests a wide time gap of when individuals perceive growth, ranging from 2 weeks (e.g., Frazier et al., 2001) to 10 years post-trauma (e.g., Hawley & Joseph, 2008; Pollard & Kennedy, 2007). The time course trajectory of PTG is complicated by the fact that research among cancer patients has revealed an unclear relationship between time since diagnosis and PTG: research has shown a positive relationship (Cordova et al., 2001), an inverse relationship (Weiss, 2004a), and no relationship (Widows et al., 2005). As highlighted throughout this chapter, research has yet to definitively answer the question of the timing of growth and whether PTG functions more as a *process* or *outcome* at different time points post-trauma.

Various processes may take place at different time points following traumatic events. Some researchers suggest that individuals may form a cognitive bias, consistent with cognitive adaptation theory (Taylor, 1983), to cope better with the traumatic event (Helgeson et al., 2006). Cognitive adaptation theory suggests that when people encounter a stressful or traumatic event, they distort their perceptions of the event to harmonize with their assumptions of the world.

Thus, PTG at an early stage post-trauma may be more reflective of avoidance coping or defensive denial (Maercker & Zoellner, 2004; Zoellner & Maercker, 2006), whereas PTG perceived later on in the coping process may signal actual changes in the person (Tomich & Helgeson, 2004).

Longitudinal Research of PTG as a Process vs. Outcome

A handful of empirical investigations have examined the *process* vs. *outcome* distinction of PTG longitudinally. Sears et al. (2003) longitudinally examined relationships between PTG, benefit-finding, and positive reappraisal coping. Early stage breast cancer patients completed interviews at baseline (within 20 weeks after treatment completion), 3 months, and 12 months. PTG, measured at 12 months, was assessed using the PTGI scale. Benefit-finding, measured at baseline, was assessed via an open-ended question: Have there been any benefits that have resulted from your experience with breast cancer? Responses were coded into two benefit-finding variables: the identification of benefits (BFYN; dichotomous coding) and the total number of benefits (BFTOT). Results revealed that positive reappraisal coping measured at baseline was linked to increased PTG, more positive mood, and better physical health at 12 months. The identification of benefits or the total number of benefits did not predict outcomes at 12 months. The authors concluded that the more effortful use of benefit-finding information (i.e., positive reappraisal coping) may be linked to physical and mental health outcomes compared to identifying benefits at an early time point.

Another longitudinal study of cancer patients examined predictors and mediators of benefit-finding (Luszczynska, Mohamed, & Schwarzer, 2005). Participants completed interviews measuring self-efficacy and general social support one month after cancer surgery, assimilative and accommodative coping strategies at 6 months post-surgery, and benefit-finding 1 year post-

surgery. Accommodative coping refers to adjusting to life circumstances (e.g., “I focus on learning to try to live with what my illness brings). Assimilative coping is analogous to active coping (e.g., “I concentrated my efforts on doing something about the problem”). The benefit-finding scale was used to assess PTG and consists of 4 subscales: acceptance of life imperfection, personal growth, positive changes in family relationships, and increased sensitivity toward other people. Results of the path-analysis indicated that self-efficacy was related to levels of acceptance of life imperfection, sensitivity to others, and personal growth. Received social support was related to levels of positive changes in family relationship. Assimilative coping partially mediated a relationship between self-efficacy and benefit-finding (e.g., personal growth, increased sensitivity to others); the direct effect of self-efficacy on growth remained significant. Accommodative coping fully mediated a relationship between self-efficacy and benefit-finding (acceptance of life imperfection); the direct effect of self-efficacy on growth became non-significant with accommodative coping entered into the model. Results suggest the type of coping strategies (e.g., assimilative and accommodative) used by cancer patients may differentially predict aspects of benefit-finding.

Recently, Park, Edmondson, Fenster, and Blank (2008) conducted an exploratory study testing an empirical model which distinguishes between the process of meaning-making and the outcomes of that process (meanings made). Participants had mixed cancers and completed two interviews with the first being approximately 23 months post-treatment (SD =14.5 months) and the second being one year later. Meaning-making was assessed by use of the positive reappraisal coping subscale of the COPE inventory. Meanings made were posttraumatic growth, life meaningfulness, and perceived discrepancy of cancer with just-world beliefs. PTG was assessed by use of the perceived benefits scale and life meaningfulness was assessed using the Perceived

Personal Meaning Scale. The perceived inconsistency of the cancer with one's view of a just world was assessed by a single item: "When you think of having cancer, how much does its occurrence violate your sense of the world being fair or just?"

Two path models (cross-sectional and longitudinal) examined study variables. Cross-sectional path analyses revealed that meaning-making coping was related to survivors PTG and sense of life meaningfulness but not restoration of just-world beliefs. Meaning-making coping was indirectly related to just-world beliefs through PTG and life meaningfulness. Additionally, all meaning making products were related to well-being. The authors note that cross-sectional results lend evidence to support that meaning- making coping may produce meanings made. This finding is similar to the Sears et al. (2003) study. Results of longitudinal path-analyses were similar to the cross-sectional analyses: over the course of one year meaning-making coping was related to finding meaning, and finding meaning was related to well-being.

Research studies investigating the time course of PTG and *process* vs. *outcome* distinction have limitations. Consistent with longitudinal PTG research, most studies had small samples and participants were from breast cancer or mixed cancer populations. Additionally, baseline measures were not assessed at true pre-event time points. For example, in the Sears et al. (2003) study the baseline interview was 20 weeks after treatment. Last, studies used a number of different assessment tools to measure coping, PTG, and meaning-making, which makes it challenging to compare and generalize results across studies.

While progress has been made in understanding the PTG *process* vs. *outcome* distinction, methodological issues have continued to plague PTG research. Reports of PTG have been criticized because most assessments of PTG are made retrospectively (Frazier & Kaler, 2006; McFarland & Alvaro, 2000). Research suggests that individuals are not able to accurately recall

information about themselves (see Ford et al., 2008, for discussion); thus, retrospective reports of growth may seriously impact the validity of the PTG construct. In a study by McFarland and Alvaro (2000) undergraduate students were randomly assigned to focus on a traumatic event or a mildly stressful event and rate their degree of self improvements based on personal attributes. Results revealed that individuals in the traumatic event condition reported greater self improvement compared to the mild event condition. Additionally, individuals in the traumatic condition reported greater self-improvement by derogation of their pre-event attributes. The results suggest that, consistent with cognitive adaptation theory, individuals cope with traumatic or threatening experiences by constructing self-enhancing illusions.

Temporal Comparison Theory and Research

Temporal comparison theory (Albert, 1977; Wilson & Ross, 2000) can also be used as a framework to examine perceptions of future outcomes. Similar to McFarland & Alvaro's (2000) research on past temporal comparison, the same theory can be used to make comparisons of future selves (Wilson & Ross, 2000). Temporal comparison theory stems from Festinger's (1954) seminal work on social comparison and how individuals compare themselves to similar others. Albert (1977) expanded on Festinger's work on social comparison to include the premise that individuals engage in comparison with their past and future selves (temporal comparison theory), in an attempt to evaluate their current functioning.

Research suggests that individuals make comparisons about their future selves. Bogart, Gray-Bernhardt, Catz, Hartmann, and Otto-Salaj (2002) examined individuals being treated for HIV and assessed social and temporal comparisons. One finding revealed that patients who thought about physical health tended to make downward temporal comparisons when thinking about the past (e.g., I'm better off now than I was in the past) and upward temporal comparisons

when thinking about the future (e.g., I'm hopeful about the future). Ruvolo and Markus (1992) examined college students and the relationship between performance and the representation of what one believes is possible for themselves in the future. Results indicated that individuals who imagined themselves as successful in the future preformed better than individuals who imagined themselves as unsuccessful in the future.

Research has documented individuals making future temporal comparisons when they are faced with challenging or threatening life events. Dinos, Lynons, and Finlay (2005) investigated a population of individuals with severe mental illness (e.g., schizophrenia) and examined how threatening situations might be a catalyst for constructing self-enhancing temporal comparisons. Open-ended questions were coded to reflect upward/downward past and future comparisons. Results indicated that participants had a tendency to make upward temporal comparison when thinking about the future and perceive improvement in their future selves. One participant noted, "I'm not sociable and I would like to have more female friends…it will naturally happen when I'll go to the art college anyway…I'll meet a bunch of new people" (p. 2244). Overall, study participants tended to make future comparisons about their abilities, knowledge, and personal qualities.

Anticipated PTG

A possible way to investigate the positive response bias of retrospective accounts of PTG is to examine the anticipation of future PTG by use of a prospective research design. To date, researchers have not examined anticipated posttraumatic growth (APTG) from traumatic life events, or specific events such as cancer. Additionally, investigating how individuals anticipate future PTG from their traumatic experience will contribute to PTG research in several ways. Examining APTG among cancer patients will help define the process of PTG at a very early time

point and help make the distinction between PTG as a coping *process* and PTG as an *outcome*. Investigating APTG will provide a better understanding how PTG relates to the self-enhancing phenomenon. Investigating APTG will help illuminate the distinction between perceived PTG and actual PTG.

PTG Among Significant Others

Traumatic life events, such as cancer, not only impact the physical and psychological well-being of individuals who have cancer, but also the well-being of significant others of cancer patients. Significant others include family members, partners, spouses, caregivers, close friends, and collaterals. Investigating how cancer impacts significant others may have implications for understanding how significant others in turn influence patients' physical well being, psychological well-being, and PTG.

In the following section, research will be reviewed on the impact of traumatic events, such as cancer, on significant others, and specifically how significant others have perceived PTG. Studies examining PTG among caregivers in non-cancer and cancer samples will be reviewed. A discussion of the importance of studying significant others and how individuals close to cancer patients potentially influence cancer patient reports of PTG will be provided. Research examining social support and specific components of interpersonal relationships, in relation to PTG among cancer partners and spouses will also be addressed. Last, this review will highlight research examining the corroboration of PTG by collateral sources and the importance of utilizing collateral corroborator methodologies to provide evidence for the validity of PTG.

Significant others may experience a great deal of hardship and distress during a loved one's cancer experience. Pitceathly and Maguire (2003) reviewed the literature on the psychological impact of cancer on patients' partners and relatives and found a portion of cancer

patient's caregivers (10-30%) develop severe psychopathology and high levels of emotional distress. Women caregivers, caregivers with a prior history of psychiatric morbidity, and caregivers who take a negative view of the patient's illness are more likely to experience emotional distress. Additional risk factors of psychiatric morbidity for caregivers include the illness advancing close to death, a lack of social support, and relationship difficulties with patients. Furthermore, research indicates that family members of cancer patients have experienced levels of emotional distress similar to or greater than the patient's distress (Gallagher, Parle, Cairns, 2002; Manne et al., 2004). In one study, husbands of women with breast cancer experienced significant psychosomatic complaints including increased feelings of anxiety and depression that were in ranges comparable to their wives' (Northhouse, 1995).

In a recent study Kim, Kashy, et al. (2008) examined the dyadic effects of psychological distress on QOL of couples dealing with breast or prostate cancer. Researchers were interested in (dis) similarity in psychological distress between survivors and caretakers QOL (e.g., mental and physical health). The extent that survivors/partners were (dis) similar in levels of global distress was calculated by subtracting survivor's psychological composite score from the caregiver's psychological composite scores. Three main findings emerged. First, cancer survivors and partners experienced similar levels of psychological distress, a finding that has been reported in the literature (e.g., Gallagher et al., 2002; Manne et al., 2004). Second, structural equation modeling revealed dissimilarity in psychological distress was negatively related to mental health only for wives of prostate cancer survivors. Conversely, dissimilarity in psychological distress was positively related to increased physical health among husbands of breast cancer survivors. Last, women's psychological distress predicted decreased levels of physical health, above and beyond men's psychological distress. The latter finding is noteworthy since it suggests that

partner emotionality has a significant influence on survivor physical health. The authors note limitations of the study including the cross-sectional research design and a limited sample (e.g., prostate and breast cancer spouses).

PTG of Caregivers of Cancer and Non-Cancer Patients

Research suggests that significant others have experienced PTG from a loved one's trauma or stress-related experience. Mothers caring for a child with a life altering disability have reported benefits including transformation of their sense of self-efficacy and personal ingenuity, increased connectedness with others, refined compassion, strengthened spiritual and religious beliefs, and a transformation of life assumptions (Konrad, 2006). Qualitative data in a sample of multiple sclerosis (MS) caregivers found evidence of seven benefit-finding areas: greater insights into illness and hardship, care-giving gains, personal growth, the strengthening of relationships, increased appreciation of life, health gains, and a change in life priorities and personal goals. Similarly, AIDS/HIV caregivers have reported freer emotional expression, increased understanding of others, new relationships, changes in spirituality and religiosity, changes in life perspectives, and meaning in the quality of the relationship with the HIV-positive person (Cadell, 2003, 2007; Cadell et al., 2003; Carlisle, 2000; McCausland & Pakenham, 2003). For women providing care for chronically ill children, an interaction was found between increased levels of daily positive emotion with PTGI subscales (personal strength, appreciation of life, spiritual change). For those women high on daily positive emotions, PTGI subscales were related to an adaptive daily cortisol slope (Moskowitz & Epel, 2006). Cortisol is released in response to stressors and research has shown that perceived PTG may serve to buffer the impact that stress has on the body (e.g., lower levels of cortisol; Cruess et al., 2000).

Cross-sectional and longitudinal research indicates that caregivers of adolescent cancer patients have experienced PTG related to the caretaking experience. In a cross-sectional study adolescent survivors of cancer and their parents participated in a study interview one year after treatment (Barakat et al., 2006). Participants completed questionnaires related to perceived treatment intensity, PTSS, and PTG. Approximately 90% of mothers and 80% of fathers found some benefits. Approximately half of all mothers reported at least 4 positive changes from the experience. The most commonly cited change reported by both mothers and fathers was cancer had a positive impact on how individuals think about their life (e.g., change in life perspectives). PTG was positively related to the perceptions of greater treatment intensity for fathers but not mothers. Among mothers and fathers there was no relationship between PTG and PTSS.

Best et al. (2001) examined parental adjustment (e.g., anxiety) and PTSS related to a child's leukemia in a longitudinal study. Parents participated in two study interviews one of which was during their children's treatment for cancer and the second interview was approximately 6 years later. Results indicated that anxiety experienced during treatment significantly predicted PTSS (e.g., avoidance) at the follow-up time point for mothers but not fathers. Additionally, PTG measured at the follow up time was associated with parental avoidance at the same time point.

Family members who provided care to a cancer patient have reported PTG from the cancer experience. Kim, Schultz, and Carver (2007) investigated specific benefit-finding areas among family members providing care to a relative with cancer. Approximately two thirds of the sample were female and spouses of cancer patients. Principal axis factor analysis examined the dimensionality of the 17-item benefit-finding scale (Antoni et al., 2001) and identified six benefit areas: acceptance, empathy, appreciation, family, positive self-view, and reprioritization.

Regression results revealed the benefit areas of Acceptance and Positive Self-view were related to decreased levels of depression; the benefit areas of Reprioritization and Empathy were related to increased levels of depression. Lower education was linked to overall benefit-finding and three other benefit-finding areas (Acceptance, Empathy, and Reprioritization). Overall, religious coping and social support positively predicted all benefit-finding areas.

Research indicates that caregivers face numerous challenges related to the caregiving experience and as a result of such challenges they are able to perceive PTG from their experience. However, the majority of empirical studies examining caregivers' PTG have focused on women and caregivers of adolescents. A limitation in most PTG caregiver research includes the use of cross-sectional research designs, challenging the ability to draw conclusions about caregiver PTG across time. Most studies examined some component of adjustment, including anxiety or PTSS related to the experience and found mixed relationships with PTG. The incongruent findings between PTG and adjustment may be a function of research design (e.g., Stanton et al., 2006).

PTG of Partners of Cancer Patients

Significant others of cancer patients, including spouses and partners, have perceived benefits from their spouse's cancer experience. Weiss (2002) examined PTG among women survivors of breast cancer and their husbands. Results revealed that 98% of women survivors and 88% of husbands reported significant long-lasting positive changes in their lives after the experience. Examples of positive changes cited by husbands included, "I feel more understanding and compassion for people"; "I thought I was weak but we were strong"; "We no longer take life and health for granted"; and "We are having a stronger religious faith". In a longitudinal sample of breast cancer patients, patients and partners experienced growth shortly

after diagnosis, and PTG increased during the 1 ½ year time span after diagnosis (Manne et al., 2004). Partners experienced increased PTG in the areas of personal strength and new possibilities for life. Overall, partners reported significantly lower levels of benefits compared to patients.

Several studies have investigated the relationship between psychosocial variables, well-being, and PTG among cancer caregivers. Thornton and Perez (2006) assessed for PTG among men treated for prostate cancer and their partners 1 year after surgery. Results revealed that both survivors and partners experienced similar and modest levels of PTG when compared to other populations. Levels of PTG for partners were similar to what has been previously reported in the literature (Manne et al., 2004; Weiss, 2002). Hierarchical regression analysis for partners revealed that patient employment status, less education, increased avoidance of stress symptoms, and greater positive reframing coping predicted increased levels of PTG. Additionally, in exploratory analyses researchers were interested in whether positive reframing coping and PTG were related similarly or differently to other study variables. Results indicated that caregiver positive reframing coping and PTG were not similarly related to other psychosocial study variables. This finding is consistent with the notion that positive reframing coping and PTG are similar but unique constructs (e.g., Sears et al., 2003).

In another recent study Bishop et al. (2007) examined the long term effects of hematopoitic stem-cell transplantation (HCT) among partners of long-term cancer patients compared to survivors and matched controls. Quality of life, marital adjustment, and PTG were assessed approximately 7 years after HCT. The results of the cross-sectional study highlighted the long-term significant impact the cancer experience has on partners after active caregiving has ceased. Partners had better physical functioning compared to survivors but less physical functioning compared to controls. Partners showed equal levels of mental health impairment to

survivors compared to controls. Additionally, partners were significantly worse off than survivors and controls in several QOL domains (e.g., depressive symptoms, low social support, and PTG). Partners reported less growth than survivors, and reports of partner growth were comparable to levels of growth reported by controls. Partner PTG was predicted by previous history of chronic health problems, active coping, and avoidant coping. The authors note that to understand better the temporal trajectory of didactic adjustment and QOL among partners and cancer patients, longitudinal research studies are needed. Additionally, research studies should include couples whose relationships survive and couples whose relationships do not survive.

Social support and specific components of interpersonal relationships between spouse and cancer survivor have received limited attention in the literature. In a correlational study, Weiss (2004a) examined social context and event-related correlates of PTG among husbands of breast cancer survivors. Results revealed that husbands' PTG was positively associated with perceived general social support. Husbands who felt comfortable, validated, and safe may have been open to processing their emotions and thus perceive PTG (Weiss, 2004a). The association between positive qualities of the marital relationship and PTG were also examined in the study. Regression analyses revealed that increased marital commitment, increased levels of wife's PTG, and breast cancer meeting the DSM-IV traumatic stressor criteria predicted increased levels of husband's PTG. Overall social support was not related to PTG in the regression model.

The results suggest that husbands' global perspective of how he views his wife's role in their relationship may play a more important role than the support he perceives in the relationship (Weiss, 2004a; Acitelli & Antonucci, 1994). Weiss (2004a) noted that for men, depth of commitment may play a more significant role in positive outcomes for stress in couples than overall social support. Additionally, depth of commitment for men (ie., Cutrona, 1996) may

promote a sense of coping as “part of a whole” (Weiss, 2004a, p.266), or coping for the entire relationship and not the individual. The finding of wives’ PTG positively predicted husbands’ PTG and vise versa may suggest that partner and spouse may be influencing growth perceived by one another. To summarize, components of the interpersonal relationship between spouse and survivor appear to play an important role for the process of PTG of both spouse and survivor. This notion is further supported by research documenting the relationship between PTG and increased levels of social support and emotional expression among spouses (Manne et al., 2004; Weiss, 2002).

A recent study examined how relationship qualities (e.g., attachment) and caregiving motives were related to caregiver well-being in a mixed cancer sample (Kim, Carver, Deci, Kasser, 2008). Depression, overall satisfaction with life, and benefit-finding were conceptualized constructs of well-being. Results revealed that husbands and wives found benefit from their caregiving experience, with wife caregivers finding significantly more benefits than husband caregivers. Structural equation modeling indicated for both husbands and wives attachment security (assessed with respect to the spouse) related positively to caregiving motives and finding benefit in caregiving. Specifically, attachment qualities were directly related to well-being for women whereas attachment motives for men mediated the relationship between attachment quality and well-being. The authors emphasized the overall finding that gender-specific caregiver’ characteristics and motives are important factors in determining caregiver well-being.

In another study PTG among caregivers and survivors was examined by using a dyadic research methodology. Manne et al. (2004) investigated the relationships between PTG, cognitive and emotional processing, and marital satisfaction among 162 women with breast cancer and their partners across three time points. Curve growth analysis was used to analyze the

rates of change in outcome variables over time. Researchers examined variables predicting partner PTG, patient PTG, and couple PTG. For patients, younger age, increased search of meaning and contemplation of reasons for cancer were associated with increased PTG over time. Also, there was a significant interaction between emotional processing and time, suggesting that patients who used more emotional processing experienced increased growth over time. For partners, younger age and engaging in positive reappraisal coping was associated with increased PTG over time. Also, there were two significant interactions between time by positive reappraisal, and time by emotional processing, suggesting that partners who used more positive reappraisal and emotional processing experienced increased PTG over time.

Researchers emphasized several important findings from the couples' level analyses (Manne et al., 2004). First, patients who reported high levels of contemplation about the reasons for their cancer experienced more growth than their partners. This supports the notion that some form of cognitive processing must be present for growth to occur (e.g., Tedeschi & Calhoun, 1996, 2004). Second, patients who reported less physical impairment also acknowledged more PTG than their partners. Patient and partner growth were more similar if patients reported more physical impairments. Third, results indicated that partners who were above average in using positive appraisal coping experienced similar growth to the patients over time. Last, women whose partners were above average in their emotional expressiveness reported greater levels of PTG than their partners compared with women whose partners were below average in emotional expressiveness. These results suggest that patients report more PTG when their partners discuss their own feelings. Results suggest that partners and significant others play a role in cancer patients' ability to adjust and subsequently find PTG from the survivors experience.

In conclusion, the literature review suggests that caregivers of cancer patients perceive PTG from the cancer experience. Although, the cancer experience is equally impactful on caregivers and survivors psychological well-being, caregivers usually report less PTG compared to survivors. Additionally, research suggests that the cancer experience can continue to have both a negative impact (e.g., decreased well-being) and positive impact (e.g., increased PTG) for caregivers many years after diagnosis and treatment. Specific relationship components have been reported in the literature (e.g., marital satisfaction, caregiver motives) as related to both caregiver and survivor PTG and well-being, with distinct gender differences impacting such variables. Overall, research suggests that caregivers have an influential impact on cancer survivors' psychological and physical well-being as well as their own well-being. Limitations of the research include primarily cross-sectional studies, minimal research examining partners and couples perceptions of growth (e.g., dyadic analyses), and samples involving predominantly breast cancer or prostate cancers. Future research could implement longitudinal research methodologies, use dyadic analyses, and target partners and survivors of non-gender specific cancers (Kim, Kashy, et al., 2008).

The Corroboration of Growth by a Significant Other

Examining PTG among significant others is critical for validating reports of PTG. A dearth of research exists using research designs with significant others corroborating reports of growth among trauma survivors. Such research provides validity evidence for the construct of PTG. In the following section, however, only three empirical studies to investigate the validity of the PTG construct via collateral reports were found in the literature review. The limited number of research studies and implications for future research will be addressed.

Three studies have implemented research methodologies with collateral sources providing evidence for trauma survivors' PTG. Park et al. (1996) examined the corroboration of growth among college students. Participants filled out the Stress-Related Growth Scale (SRGS) pertaining to the most stressful event they had experienced in the past 12 months. Participants then provided the name of an informant (e.g., friend or family member) and they also completed a version of the SRGS. Informants noted if their perception of students' growth was based on personal observation, statements made by students, or third party sources. Additionally, informants were asked to rate the degree of closeness (e.g., not close, close, extremely close) with the student. Results indicated non-significant mean differences between informants' reports of growth from college students' reports of growth. The correlation of SRGS scores for students and informants was of modest significance ($r= .21$, $p,<.05$). The correlation coefficient increased when a subset of informants who reported being "extremely close" with students were examined ($r= .31$, $p<.05$). The authors noted that the correlation between informants and students may have been attenuated because SRGS items tap private issues that informants may or may not be aware of.

In a study designed to assess the validity of individuals perceptions of growth Weiss (2002) examined reports of PTG among 41 women survivors of breast cancer and the corroborated PTG reports by their husbands. Wives and husbands completed the PTGI for themselves and also for their spouses. Results indicated that wives scored significantly higher on the PTGI, compared to husbands, a figure that has been reported in the literature (Manne et al., 2004; Thornton & Perez (2006). Mean PTGI scores for breast cancer survivors were not significantly different from mean PTGI scores as evaluated by husbands, and vise versa. The correlations between husbands corroboration of wives total PTGI scores was .51 and the

correlation of wives corroboration of husbands scores was .49. The magnitude of the correlation coefficient was greater for Weiss's study compared to Park et al.'s (1996) finding, which may reflect the degree of closeness between spouses of cancer patients compared to friends or family members of students.

A recent study examined the validity of self-report measures of PTG by using an observer as a corroborator (Shakespeare-Finch & Enders, 2008). Study participants were Australian undergraduate students who had experienced a traumatic event within the past five years and significant others who had known the individual before the trauma. Significant others were partners, family members, or close friends. Trauma survivors and identified significant others completed the PTGI, with significant others completing the PTGI as it related to the trauma survivor. An examination of mean total PTGI scale differences yielded non-significant findings. Although, trauma survivors mean score for the appreciation of life subscale was significantly greater than their significant others appreciation of life subscale scores. Results revealed a high and significant correlation ($r = .69$, $p < .01$) between participant PTGI scores and observer PTGI scores. Also, all PTGI subscales showed high to moderate correlations with one another. Findings suggest that significant others are able to observe and identify positive changes from individuals who had a significant trauma.

In summary, results from the limited number of corroboration studies suggest that significant others and trauma survivors do, in fact, corroborate each other's reports of PTG. Park et al. (1996) noted two factors that may influence corroboration statistics: 1) the degree of closeness between corroborator and trauma survivor and 2) the degree to which positive changes to be corroborated involved observable behaviors. Furthermore, a stronger correlation was found in Shakespeare-Finch and Ender's (2008) college student sample compared to Weiss (2002) and

Park et al.'s (1996) partner and college student samples. The range in strength of association may be due to type of traumatic experience, different socioeconomic backgrounds, and cultural differences (e.g., United States vs. Australia; Shakespeare-Finch & Enders, 2008). It should be noted that similar to trauma survivors accounts of their own perceived growth, significant others may be also engaging in self-enhancement bias for trauma survivors (Ford et al 2008; Shakespeare-Finch & Enders, 2008). Some researchers note that evidence has not been provided to conclusively state that reports of growth are illusionary (Calhoun & Tedeschi, 2008). Initial research in the corroboration of reports of growth is promising and will continue to be a research area of interest in the future.

Rationale of the Proposed Study and Contributions to the Literature

It is critical to design research studies to examine various aspects of coping and PTG across multiple time points. Park et al. (2008) recently noted "observational studies that capture people early in their cancer experience and tracking them through treatment and long into post-treatment survivorship would be invaluable in providing insight into the timing of various aspects of coping, meaning-making, and adjustment as well as the relations among them." They go on to state that "future research should go on to examine both prior and current meaning-making efforts with carefully designed measures" (p. 872). The current study will follow up on Park et al.'s (2008) recommendations and implement a research methodology to investigate cutting edge research questions.

The proposed study will contribute to the PTG literature in several ways. Measuring APTG will provide a different perspective that is future-orientated, compared to retrospective accounts of growth. Second, researching the influence of significant others may help contribute to our understanding of how significant others impact the PTG process and corroborate reports of

growth among cancer patients (Calhoun & Tedeschi, 2008; Fraizer & Berman, 2008; Ford et al., 2008; Stanton et al., 2006; Joseph & Linley, 2008c). Last, examining the relationship between PTG and coping will add to the literature regarding the time course of PTG and PTG as a *process* or *outcome*. The proposed longitudinal perspective study will examine PTG and coping at three time points during the cancer experience. Additionally, the relationship between APTG, coping, and PTG may provide clarity regarding the multidimensional aspect of growth (e.g., illusory vs adaptive; Calhoun & Tedeschi, 2008; Joseph & Linley, 2008c).

Research Questions

Specific research questions and the statistical analyses used to address each question are presented.

Patient and Collateral Anticipated Posttraumatic Growth

1a) How do patient levels of APTG compare to collaterals' APTG?

a. Statistical Analyses

i. Dependent samples t-test

ii. Effect size (*cohen's d)*

1b) What is the relationship between patient levels of APTG and collaterals' APTG?

a. Statistical Analysis

i. Correlation coefficients

1c). How do collateral levels of APTG for patients compare to collaterals' APTG?

a. Statistical Analyses

i. Dependent samples t-tests

ii. Effect size (*cohen's d*)

1d) What is the relationship between collateral levels of APTG for patients and collaterals' APTG?

a. Statistical Analysis

i. Correlation coefficient

Patient and Collateral Posttraumatic Growth

2a) How do collateral levels of PTG compare to patients' PTG?

a. Statistical Analyses

i. Dependent samples t-test

ii. Effect size (*cohen's d*)

2b) What is the relationship between collateral levels of PTG and patients' PTG?

a. Statistical Analysis

i. Correlation coefficient

Comparison of Anticipated Posttraumatic Growth and Perceived Posttraumatic Growth for Patients and Collaterals

3a) How do patient levels of APTG compare to patients' perceived PTG?

a. Statistical Analyses

i. Dependent samples t-test

ii. Effect size (*cohen's d*)

3b) What is the relationship between patients levels of APTG and patients' PTG?

a. Statistical Analysis

i. Correlation matrix

3c) How do collateral levels of APTG compare to collaterals' perceived PTG?

a. Statistical Analyses

i. Dependent samples t-test

ii. Effect size (*cohen's d*)

3d) What is the relationship between collateral levels of APTG and collaterals' PTG?

a. Statistical Analysis

i. Correlation coefficient

Corroboration of Growth: Collateral APTG for Patients and Patients PTG

4a) How do collateral levels of APTG for patients compare to patients' PTG?

a. Statistical Analyses

i. Dependent samples t-test

ii. Effect size (*cohen's d*)

4b) What is the relationship between collateral levels of APTG for patients and Patients' PTG?

a. Statistical Analysis

i. Correlation coefficient

Dispositional Coping Mediating or Moderating a Relationship between APTG and PTG

5a) To what extent does meaning-making dispositional coping (e.g., positive reinterpretation) moderate or mediate a relationship between APTG and PTG following treatment?

a. Statistical Analyses

i. Regression

5b) To what extent does maladaptive dispositional coping (e.g., denial) moderate or a mediate a relationship between APTG and PTG following treatment?

a. Statistical Analyses

i. Regression

5c) To what extent does adaptive/active dispositional coping (e.g. planning) moderate or mediate a relationship between APTG and PTG following treatment?

Situational Coping Mediating or Moderating a Relationship between APTG and PTG

6a) To what extent does meaning-making situational coping (e.g., positive reinterpretation) moderate or mediate a relationship between APTG and PTG following treatment?

a. Statistical Analyses

i. Regression

6b) To what extent does maladaptive situational coping (e.g., denial) moderate or a mediate a relationship between APTG and PTG following treatment?

a. Statistical Analyses

i. Regression

6c) To what extent does adaptive/active situational coping (e.g. planning) moderate or mediate a relationship between APTG and PTG following treatment?

CHAPTER III

METHOD

Participant Selection Criteria

All participants in the study were patients being treated at the University of Iowa Hospitals and Clinics (UIHC). There were no other participating sites or centers. Coordination of the study and data management took place at the University of Iowa. If this study competed with another psychosocial protocol conducted through the cancer center, the research team gave first choice to the other study. The research team approached subjects at a later time to discuss the possibility for a second HRQOL protocol.

In order to participate, patients needed to meet the following inclusionary criteria: between 18 and 80 years of age (the upper age limit of 80 was chosen because decreased numbers of cancer patients are treated at older ages); diagnosis of gastrointestnal cancer, acute myelogenous leukemia, or a condition that required an autologous or allogeneic bone marrow transplant (e.g., lymphoma, myeloma); and English speaking Patients received treatment at UIHC or in an outpatient facility under the care of a UIHC physician.

Exclusion criteria were under the age 18 or over the age of 80; and a life expectancy of less than two months. Physicians determined patient life expectancy criteria.

Following enrollment in the study the patient was asked to identify a collateral. Collaterals needed to be at least 18 years of age and had to play an integral part (e.g., provide support) in the cancer patient's cancer experience. Thus, collaterals were defined by patients as individuals who knew the patients well and the patients felt "close with." Collaterals included spouses, family members, friends, or other community members. There were no exclusion criteria for collaterals except age.

Procedure

Signed informed consent for enrollment in the study was obtained from eligible patients by research team members prior to the start of the study. Participants were fully informed of the purpose, potential risks, and benefits of participation. Participants had the opportunity to have questions answered to their satisfaction before signing the consent forms. The bone marrow transplant patients and acute leukemia patients were enrolled in the study by a research nurse during the introductory meeting when all research studies are presented. After participants were consented, the research nurse contacted the lead research team member to report when patients were admitted to the hospital. Gastrointestinal cancer patients were identified by a physician or nurse coordinator when they arrived in the clinic. Gastrointestinal cancer patients consented to the lead research team member or a physician during their appointments in clinic. Lymphoma patients were identified by a physician or nurse coordinator. After patients were identified for the study the nurse coordinator communicated to the lead research team member the patients' hospitalization and treatment dates. Lymphoma patients were consented by the lead research team member during the treatment dates.

Collaterals consented in person when they accompanied the patient to the hospital. If not physically present, they consented by telephone. The research team was granted a waiver of written consent for collateral subjects since consent, in some cases, was obtained over the phone. Each collateral participant was provided with a document outlining the elements of informed consent. Collateral participants had two weeks to review the document and consider their participation.

Study Time Line and Interview Procedures

Since three separate patient populations were included in the study, and each population's treatment followed a different sequence, the study was designed so that parallel time points for patient interviews applied to all three populations. Time points for interviews were baseline (prior to treatment or within a very few days of beginning treatment), Day +60, and approximately 9 months. The latter two time points were calculated from the baseline interview. Pretreatment for the BMT patients was as close to admission as possible. Pretreatment for the acute leukemia patients was at the beginning stages of chemotherapy. Pretreatment for GI and Lymphoma patients was prior to treatment or shortly thereafter by telephone.

Once participants had given consent, they completed the initial questionnaires either in person or by telephone. At baseline, collaterals completed their questionnaires in person or by telephone. Prior to telephone interviews, a packet of materials was mailed or given to participants containing color-coded response keys. As the interviewer administered the measures to participants over the telephone, participants used the response keys to facilitate their answers. The interview lasted approximately 35 to 45 minutes.

Forty-five days after baseline, a letter was mailed to participants stating that a member of the research team would be calling to schedule a second interview. Before letters were sent, a research team member contacted research nurses or physicians assistants to determine the health status of patients. During the second scheduled time point, 60 days from the baseline interview, patients identified and described a single stressful event. The patients then answered a brief series of questions regarding their coping with that event. Day + 60 interviews lasted approximately 15 minutes.

Six to seven months following the second time point, or approximately 9 months from the baseline interview, participants were contacted to complete the final interview. Before the letter was sent out, research team members again contacted research nurses or physicians assistants to determine the health status of patients. Completion of interviews lasted approximately 30 minutes. At the 8 months time point, collaterals were also contacted to complete their second interview, which lasted approximately 10-15 minutes. If participants did not answer or return calls, a phone message was left stating that the questionnaire packet would be mailed with a stamped, return envelope. Participants were asked to return the questionnaires blank, if they did not wish to continue participating in the study.

Measures

Demographic Questionnaire for Patients

At baseline, patients completed a demographic questionnaire covering medical characteristics and personal characteristics. Patients answered several medical/health questions, including if this was the first diagnosis with cancer, current diagnosis, stage of cancer, disease status, and treatments currently receiving or recently received. Patients were asked questions about age, gender, occupation, employment status, marital status, highest education degree, and racial/ethnic group.

Demographic Questionnaire for Collaterals

Collaterals completed a demographic questionnaire that consisted of questions about age, gender, occupation, employment status, marital status, highest education degree, and racial/ethnic group.

Coping

Coping was assessed with the COPE (Carver et al., 1989), a 60-item self-report questionnaire assessing a range of coping styles. The COPE was developed to measure both dispositional and situational coping. Dispositional coping instructions ask respondents *what you usually do when you experience a stressful event*. Situational coping instructions ask respondents *what you have done to deal with a recent stressful event that was directly related to your cancer treatment*. In the current study, dispositional coping was measured prior to treatment and situational coping was assessed 60 days following the baseline interview.

Individuals respond to 60 statements ranging from 1 (I usually don't do this at all) to 4 (I usually do this a lot). Examples of items include "I try to see it in a different light, to make it seem more positive" and "I talk to someone to find out more about the situation." The COPE is scored by summing individual items into 15 subscales: positive reinterpretation and growth, mental disengagement, focus on and venting of emotions, use of instrumental social support, active coping, denial, religious coping, humor, behavioral disengagement, restraint, use of emotional social support, substance use, acceptance, suppression of competing activities, and planning. A total score is not calculated.

Reliability and validity evidence has been reported for the COPE. Test-retest reliability was estimated by administering the COPE to two samples of undergraduate students. The first sample had a 6 week time period between administrations, and the second sample, an 8 week time period. Test-retest reliability coefficients for the subscales ranged from .42 to .89. Internal consistency (e.g., Cronbach's alpha) for the COPE has also been reported as ranging from .45 to .92. Evidence to support discriminant and convergent validity include the COPE subscales of active coping and planning being positively related to optimism, self-esteem, hardiness, and

Type A personality trait. COPE denial and behavioral disengagement scales were positively correlated with trait anxiety and negatively correlated with optimism, able to do something about the stressful experience, self-esteem, and hardiness (Carver et al., 1989).

For the current study three subscales were calculated: meaning-making coping (e.g., positive reinterpretation subscale), maladaptive coping (e.g., denial subscale), and active/adaptive coping (e.g., planning subscale). The scales were chosen based on previous research and evidence of their relationships with PTG (Helgeson et al., 2006; Urucyo et al., 2005).

Anticipated Posttraumatic Growth/Posttraumatic Growth Inventory (PTGI)

Both collaterals and patients completed a modified version of the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) to assess anticipated posttraumatic growth (APTG) at baseline and the PTGI to assess reported growth at the 9-month follow up. The PTGI was developed to assess positive outcomes among individuals who have experienced traumatic events. Growth is assessed on five scales: relating to others, new possibilities, personal strength, spiritual change, and appreciation of life with 21 items that refer to a variety of positive changes.

For the current study modified directions for patients and collaterals were: *Please indicate for each of the statements below the degree to which you believe this will happen to you as a result of your cancer experience.* Patients completed the APTGI before treatment. Collaterals completed a modified PTGI to reflect their perceptions of APTG for the patients. Instructions stated: *Sometimes people can experience positive changes as a result of a negative experience. Thinking ahead to [name's] treatment for cancer, to what degree do you believe any of the following will happen to him/her as a result of his/her cancer experience.*

To measure anticipated posttraumatic growth, wording on items were also changed to reflect a future orientation. Examples of modified items include “I *will* discover that I’m stronger that I thought I was” and “I *will* develop new interests”. Responses for the anticipated PTGI were responded to ranging “I *will* not experience this change as a result of my cancer” to “I *will* experience this change to a very great degree as a result of my cancer.”

The standard version of the PTGI was given at 8 months for both patients and for collaterals to assess perceived growth. Example of items include: “I discovered that I’m stronger than I thought I was” and “I developed new interests.” The response format ranged from 0 (did not experience this change as a result of my cancer) to 5 (experienced this change to a very great degree as a result of my cancer).

Reliability and validity evidence have been reported for the PTGI. In an undergraduate sample (n=604) the PTGI has shown internal consistency for the total scale (α = .90) and subscales (α ranged from .67 to .85; Tedeschi & Calhoun, 1996). Test-retest reliability for the total scale was r =.71 in a subsample of 28 individuals over a two month time period. Inter-correlations between scales ranged from .27 to .52. Construct and discriminant validity was assessed by examining correlations between the PTGI, social desirability, and personality characteristics. The relationship between PTGI subscales and social desirability, as measured by the Marlowe-Crowne Social Desirability Scale, was non-significant. Posttraumatic growth inventory subscales have been found to positively relate to optimism, religious participation, and personality variables (e.g., extraversion, openness to experience, agreeableness, and conscientiousness; Tedeschi & Calhoun, 1996). Also, research has supported the five factor structure of the PTGI (Taku, Cann, Calhoun, & Tedeschi, 2008).

Post-hoc Power Analysis

It is important to determine if the study statistics have ample power to reject null hypotheses. Power refers to the probability of rejecting the null hypothesis given that the alternate hypothesis is true (Cohen, 1988). In the current study, a power analyses was calculated for two sets of regression analyses. The first set of hypotheses was that main predictor variables (3 variables: APTGI total scale, dispositional coping, interaction between APTGI x dispositional coping) will account for a significant proportion of variance in posttraumatic growth. With an alpha level of .05, sample size of 49, and medium effect f^2=.15 (R^2=.13) the calculated power is .57. With an alpha level of .05, sample size of 49, and large effect f^2=.35 (R^2=.26) the calculated power is .93. The second set of hypotheses was that main predictor variables (3 variables: APTGI total scale, situational coping, interaction between APTGI x situational coping) will account for a significant proportion of variance in posttraumatic growth. With an alpha level of .05, sample size of 45, and medium effect f^2=.15 (R^2=.13) the calculated power is .53. With an alpha level of .05, sample size of 45, and large effect f^2=.35 (R^2=.26) the calculated power is .91.

CHAPTER IV

RESULTS

Participants

Patients

One hundred and seventeen patients were approached to participate in the study; 19 participants who met criteria declined to participate due to lack of interest. In total, 98 patients enrolled in the study. Of those patients enrolled, 11 did not complete baseline interviews: two patients refused participation after enrollment; five patients were too ill/or could not be scheduled; two patients did not receive treatment; and two participants' data were unusable. The final patient sample consisted of 87 participants at baseline.

At the 60 day time point, 71 patient participants (81.6%) completed interviews. The primary reason for study attrition was inability to contact participants (9.2%), followed by deceased (3%), too ill to participate (3%), and refused participation (2%).

At the 8 month time point, 49 patient participants completed interviews (56.3%). The primary reason for study attrition was inability to contact participants (18.4%), followed by deceased (12.6 %), patient too ill to participate (6.9%), and refused participation (5.7%).

Collaterals

Of identified collaterals, not all completed baseline interviews for several reasons: one refused participation; fourteen could not be contacted; fifteen patients refused to give contact information for collaterals; and one collateral did not participate because of the patient's status (e.g., patient was deceased before collateral interview). In total 55 collaterals completed baseline interviews.

At the 9 month follow up time point, 31 collaterals completed interviews (56.4%). Attrition was primarily due to inability to contact participants (21.8%) and refused participation (5.5%). Also, if patients were too ill to participate (16.4%), collaterals were not contacted for follow up interviews.

The sample (patients and collaterals) contained more females (58.5%) than males (41.5%), 83 and 59 respectively. Collaterals were grouped into one of three categories: spouse/significant other (67.3%), family member (e.g., sibling, parent; 23.6%) and friend (9.1%). Mean age was 50.37 years old (SD = 13.66). The sample was predominately Caucasian (96.6%) followed by Hispanic (2.1%) and African American (1.4%). Education was diverse, with 32.4% of participants having a high school degree, 30.3% attending community college/some college, 26.1% having a college degree, 9.2% having graduate or professional degree, and 2% education below high school. A large proportion of the sample was married (76.1%), followed by single (11.3%), separated/divorced/widowed (10.6%) and other (2.1%). Approximately half of the participants were employed either part-time (48.6%) or full time (13.4%). Participants identified several religious affiliations including Protestant (40.8), Catholic (22.5%), no affiliation (17.6%), Christian (8.5%), spiritual (4.2%), and other (5.6%). All demographic data for patients and collaterals are presented in Table 1.

The patient sample was heterogeneous regarding diagnoses: 32.2% were diagnosed with lymphoma, 28.7% with leukemia, 19.5% with multiple myeloma, 17.2% with gastrointestinal cancers (GI), and 2.3% with other types of cancer. Approximately 65% of the sample received a bone marrow transplant with the remainder of the patients receiving chemotherapy (24.1%), surgery (2.3%), or radiation (8.0%).

Because of the heterogeneous cancer sample, a universal disease status for stage variable was not appropriate. Disease status variables were calculated separately for the BMT patients and GI patients. For the BMT patients, four disease status categories were calculated: chemosensitive disease under good control (29.9%); chemosensitive but clinically persistent disease (28.7%); persistent disease showing some chemoresistance (8.0%); and sensitivity to chemotherapy cannot be determined (1.1%). For the GI cancers, two groups were created based on intent to treat: adjuvant treatment group with possibility of cure and advanced cancer group with no cure (e.g., palliative care). A second stage variable was created for GI patients to further differentiate the various stages: metastatic; locally advanced; and localized. The average time since diagnosis was 325 days with a standard deviation of 564 days. Approximately 25% of the sample had a time since diagnosis of 33 days or less, 50% of the sample was 150 days or less, and 75% of the sample was 389 days or less. Descriptive data for disease and medical variables are presented in Table 2.

Statistical Analysis

All data were analyzed by the Statistical Package for the Social Sciences (SPSS) Version 15 (SPSS, 2006) Descriptive data (means and standard deviations) were used to examine scale distributions. Box plots, scatter plots, and frequency distributions were used to examine normality assumptions and outliers for demographic, medical/disease, and primary study variables. Individual item means were imputed for scale items when less than 10% of cases were missing. Upon review of bivariate scatter plots variables appeared to be linearly related. It is important note that the number of participants included for statistical analyses varied due to attrition across study time points.

Variable raw scores were transformed into z scores to examine for outliers. A score was considered an outlier if its corresponding z-score was greater than +/- 3. When outliers were present the data were checked to determine if participants were part of another population. Patient characteristics for outliers were similar to the sample; outlier cases appeared to be from the same population and were subsequently retained for statistical analyses. Skewness and kurtosis ratios revealed that some variables exceeded the +/- 2 (z-score) cut-point. K-S tests for APTG scales were significant (all *p's* < .001), suggesting the presence of non-normal distributions. For APTG variables negative skew was present.

When variable distributions are non-normal or outliers are present, a common approach is to apply various transformations (e.g., Log_{10}, square root) to the data. Transformations have been criticized for a number of reasons, including that they often fail to restore normality and homoscedasticity, they do not adequately address outliers, they reduce power, they rearrange the original order of means, and the transformed data become cumbersome and difficult to interpret (Erceg-Hurn & Mirosevich, 2008). Modern robust statistical techniques provide better coverage compared to classic parametric methods (see Erceg-Hurn & Mirosevich, 2008; Wilcox & Keselman, 2003).

Winsorizing is an approach that takes the extreme scores from the tails of the distribution and recodes them (Staudte & Sheather, 1990; Wilcox & Keselman, 2003) to a score that is less extreme. For the current study the upper and lower bounds of Tukey's hinges were used to create a hinge spread based on the interquartile range. The 25th percentile was subtracted from the 75th percentile and multiplied by 1.5. This value was added to the upper hinge spread and subtracted from the lower hinge spread to create the upper and lower bounds, respectively. The most extreme scores in the tails of the distribution were recoded to the next lowest or highest bound.

After data were winsorized skewness and kurtotisis ratios decreased, although some ratios were still above the +/- 2 z-score ratio. Analyses were conducted with the entire data set and the data using winsorized means and standard deviations. Differences in statistical results between winsorized data and the non-transformed data were minimal; therefore, only non-transformed data are presented.

Before analyses were conducted mean differences were examined for baseline variables for participants who completed baseline and 8 month interviews compared to participants who completed only baseline interviews. No mean differences for patients or collaterals were present on baseline variables for participants who completed both interviews (all *p's*>.05).

Additionally, internal consistency reliabilities (e.g., cronbach's alpha) for Anticipated Posttraumatic Growth/Posttraumatic Growth Inventory scales ranged from .73 to .97. Reliability coefficients for coping scales ranged from .60 to .75; these coefficients are similar to coefficients reported in the literature (Carver, 1997; Carver et al., 1989; Manne et al., 2004). Reliability coefficients for all study variables are presented in Table 3.

Descriptive Information for Study Variables

Patient APTG scores in the current study were higher compared to cancer populations reported in the literature (APTGI total mean= 74.42; SD = 22.05). In a mixed sample of cancer patients who received a BMT the mean PTGI total score was 64.67 (SD = 21.3; Widows et al., 2005). The mean APTG total score in the current study is also higher compared to breast cancer (M=64.1; SD = 24.8; Cordova et al., 2001) and prostate cancer (M = 46.4; SD= 25.6; Thornton & Perez, 2006) samples. In another study of 662 individuals who received a hematopietic stem-cell transplantation, patients' mean total PTGI scores (M= 66.3; SD = 21.1; Andrykowski et al., 2005) were also lower than the current study.

Collateral mean APTG total scores for self (M= 64.67; SD=23.84) were also higher compared to PTGI scores of similar samples. Husbands of female breast cancer patients (M = 47.0; SD = 22.9; Weiss, 2004a) and caregivers of chronically ill children (M = 60.04; SD = 20.66; Moskowitz & Epel, 2006) had lower PTGI scores compared to the current sample. Canadian caregivers of deceased HIV/AIDS participants (n = 126) had similar levels of PTG (M= 62.31; SD=24.64; Cadell, 2003) when compared to APTG scores.

Patient reports of PTG were consistent with levels of growth reported in the literature. The mean total PTG score of 63.87 (SD = 21.67) is comparable with the mean total PTG score in a sample of bone marrow transplant patients (M=64.67; SD = 21.3; Widows et al., 2005). Given that 65% of the sample in this study received a bone marrow transplant, this finding lends support that BMT patients experience PTG from the cancer experience. The mean total PTG for the current study is similar to breast cancer samples (e.g., Cordova et al., 2001; Weiss, 2002; Sears et al., 2003) and higher than a sample of prostate cancer survivors (Thornton & Perez, 2006).

Collateral levels of growth were higher compared to similar populations. For example, husbands of female breast cancer survivors reported a mean total PTGI score of 46.00 (SD = 22.83) which is considerably lower than the mean total PTG score of 67.38 reported by collaterals in this study. This finding is also consistent with another study of husbands of breast cancer survivors who had lower levels of total PTGI scores across three time points (Manne et al., 2004). Spouses of myocardial infarction patients also experienced lower levels of overall growth compared to the current sample (59.18; SD = 24.24; Senol-Durak & Ayvasik, 2010).

Means and standard deviations for coping variables were similar to levels of coping reported in the literature, and specifically among breast cancer samples. Item means and standard

deviations for coping scales are commonly reported in the literature: scale means for coping scales in the current study were converted to item-means for normative comparison. Among breast cancer patients the item-mean for dispositional positive reinterpretation coping was 3.36 (SD = .62; Sears et al., 2003) which is comparable to positive reinterpretation coping in this study (M = 3.13; SD = .54). In another study of breast cancer patients situational positive reinterpretation coping was also comparable (M=2.9; SD = .72; Manne et al., 2004) to coping in the current study (M=2.9; SD = .66). Situational denial and planning coping were assessed pre-surgery in a sample of breast cancer patients (Carver et al., 1993). Denial coping (M=1.88; SD = 1.07) and planning coping (M = 2.75; SD=1.10) were modestly consistent to levels of denial coping (M = 1.37; SD = .50) and planning coping (M = 2.92; SD = .62) in the current study.

Comparison of Patient and Collateral Samples

Mean differences between patient and collateral samples were examined by using a chi-square test. A significant association emerged for participant type with employment status (employment vs. non employment), $X^2(1) = 12.64$, $p<.001$. The odds of a collateral being employed was divided by the odds of a patient being employed to obtain a ratio. The odds of being employed were 4.11 times higher if participants were collaterals compared to patients. There were no significant associations for participant type for marital status, education level, and religious affiliation (all *p's* for $X^2 >.05$). The association of gender (male vs. female) with participant status was also examined using chi-square test. For gender there was a significant association with type of study participant (patient vs. collateral), $X^2(1) = 23.447$, $p<.001$. The odds of a collateral being female were divided by the odds of a patient being female to obtain a ratio. The odds of a study participant being a collateral were 6.90 times higher if participants were female compared to male. Collateral type was examined by independent samples t-tests.

Results suggest a significant effect for collateral type on collateral APTG interpersonal relationships for self, $t(53) = 2.07$, $p<.05$: spouses/significant others anticipated more growth in interpersonal relationships compared to friends/family members.

Demographic Variables

The effect of patient demographic variables on APTG and PTG was examined by t-tests, analysis of variance (ANOVA), and chi-square tests. For significant ANOVAs, Tukeys post-hoc test was used for follow-up. A significant association was present for gender and employment status. The odds of being employed were 2.20 times greater if participants were female compared to male. There were no gender associations with marital status, education, and religious affiliation (all p's for X^2 >.05).

A significant effect emerged for religious affiliation on APTG spiritual change at baseline, $F(5, 81) = 6.56$, $p<.001$. Participants with no spiritual affiliation had lower levels of APTG spiritual change compared to participants who were Protestant, Catholic, or Christian. Age was not related to APTG or PTG variables (p's>.05). There was no effect of marital status, educational level, or employment status on patient APTG or PTG.

For collaterals, there was a significant effect for education on collateral APTG total for patients, $F(3, 50) = 3.12$, $p<.05$, APTG relationships with others $F(3, 50) = 3.01$, $p<.05$, and APTG personal strength, $F (3, 50) = 3.56$, $p< .05$. Tukey's post-hoc tests revealed collaterals with a high school degree reported higher levels APTG for patients compared to those collaterals with a college degree ($p< .05$). The effect of education was also present for collateral APTG for themselves for new possibilities, $F(3, 50) = 3.28$, $p<.05$, and personal strength $F(3, 50) = 3.05$, $p<.05$, although post-hot tests were non-significant (p's>.05). There was an effect for education on PTGI total, $F(3, 27) = 3.56$, $p<.05$, and PTG relationships with others, $F(3, 27) = 4.68$, $p<.01$.

Post-hoc tests showed higher levels of PTG for participants with a high school degree compared to participants with a graduate/professional degree or some college (p's<.05). Collaterals who were spouses/significant others reported higher levels of APTG new relationships compared to collaterals who were friends/family members, $t(53) = 2.07$, $p<.05$. For collaterals, there was no effect of age, gender, marital status, employment status (employed vs. non-employed), or religious affiliation on study variables.

Medical/Disease Variables

The effect of medical/disease variables on study variables was examined by t-tests and ANOVA's. A significant effect of GI group status was present for APTG spiritual change, $t(20) = -2.38$, $p<.05$, with the adjuvant treatment/curable group reporting lower levels of APTG spiritual change compared to the metastatic/incurable group. There was no effect for diagnoses, previous diagnoses of cancer, and type of treatment on study variables (all p's>.05). There was also no effect for BMT disease status or GI disease stage on study variables, or mean differences for patients who received or did not receive a BMT (all p's>.05)

The mean time since diagnoses was 325 days with a standard deviation of 564 days. Because of the high standard deviation, box plots and z-scores z (+/-1) were used to set an 805 day cut-point to examine the effect of outliers on study variables. Six participants were identified as outliers. After removing 6 participants, the mean time since diagnosis was 200 days with a standard deviation of 195 days. The effect of time since diagnosis on study variables was examined by t-test using 805 days as a cut-point. Because there was no effect of time since diagnosis for APTG or PTG, all participants were included in subsequent analyses.

Analysis of Mean Differences between Patient and Collateral APTG

In the first set of analyses mean differences between study variables were examined by paired-samples t-tests. A Bonferroni correction was used for each set of analyses due to multiple t-tests and the increased chance for Type I error, (.05/6= .008). Effect sizes (*cohen's d*) were calculated to examine the magnitude of the mean differences. Effects of .2, .5, and .8 are small, medium and large effects, respectively (Cohen, 1988). Secondly, relationships between APTG and PTG scales were examined by Pearson-product moment correlations.

Two criteria were used to determine if patients or collaterals were more accurate in anticipating the growth they would experience. First, accuracy would be achieved if mean differences were non-significant between APTG and PTG scores, yielding small effect sizes. Additionally, accuracy was further achieved by examining the amount of shared variance between APTG and PTG scores.

The first set of research questions examined mean differences in, and the relationship between, patient levels of APTG and collateral APTG. T-tests indicated higher levels of APTG for patients compared to APTG for collaterals on several scales: total $t(54) = 3.06$, $p<.008$, $d = .52$; new possibilities, $t(54) = 2.79$, $p<.008$, $d = .47$; relationships with others, $t(54) = 3.18$, $p<.008$, $d = .55$; personal strength, $t(54) = 2.60$, $p<.01$, $d = .41$; and appreciation of life, $t(54) = 2.67$, $p<.01$, $d = .44$. Overall, with the exception of a few significant relationships, collateral and patient APTG scores were predominately independent of one another and unrelated. Collateral APTG appreciation of life was related to patient APTG appreciation of life. See Table 4 for correlation coefficients, mean differences, and effect sizes.

The next research question examined mean differences in, and the relationship between, collateral's APTG for patients and collaterals' APTG for self. Again, mean differences were

examined by paired-sample t-tests and relationships were achieved by correlation coefficients. Collaterals anticipated similar levels of growth for patients compared to anticipated levels of growth for self. There were no statistically significant mean differences between collateral APTG for patients and collateral APTG for themselves (all p's> .05; *d's* ranged from .03-.15). All relationships for collateral's APTG for patients and collateral's APTG for themselves were significant (all p's <.01). Shared variance between collateral's APTG for patients and collateral APTG for self ranged from .17 to .59. See Table 5 for correlation coefficients, mean differences, and effect sizes.

Patient and Collateral PTG

The second set of research questions examined mean differences in, and the relationship between, patient and collateral PTG. Overall, patient and collateral levels of PTG were similar; there were no significant differences between matched patient-collateral pairs (all p's >.05, *d's* ranged from .14 to .27) for PTG at 9 months.

Several relationships emerged between collateral PTG and patient PTG. Collateral PTG total and relationships with others were positively related to their respective patient scale, accounting for .15 and .17 percent shared variance, respectively. See Table 6 for correlation coefficients, mean differences, and effect sizes.

Comparison of APTG and PTG for Patients and Collaterals

The third set of research questions examined mean differences in, and the relationship between, APTG and PTG for patients and collaterals. Results suggest that patients over-anticipated PTG in all areas of growth. Results of paired-samples t-tests for patients revealed levels of APTG were significantly higher for several scales compared to PTG at 8 months: total scale, $t(48) = 2.29$, $p<.05$, $d = .37$; new possibilities, $t(48) = 4.97$, $p<.008$, $d = 68$; and spiritual

change $t(48) = 2.11$, $p<.05$, $d = .32$. Significant relationships emerged for APTG total new possibilities, interpersonal relationships, personal strength, appreciation of life, and spiritual change, with their respective PTG scale at 9 months. Additionally, with the exception of spiritual change, APTG scales were predominantly correlated with PTG scales. Shared variance between APTG and PTG ranged from .08 to .31. See Table 7 for correlation coefficients, mean differences, and effect sizes.

Mean differences in, and the relationship between, APTG and PTG for collaterals were examined by paired-samples t-test and correlation coefficients. With the exception of new possibilities, collaterals under-anticipated the level of growth they believed they would experience. Results for paired-samples t-tests for collaterals revealed higher levels for APTG new possibilities compared to PTG new possibilities, $t(30) = 2.86$, $p<.008$, $d = .46$. All anticipated growth scales were significantly correlated with their respected PTG scale at 8 months: total, new possibilities, relationships with others, personal strength, appreciation of life, and spiritual change. Shared proportion of variance between APTG and PTG ranged from .14 to .53. See Table 8 for correlation coefficients, mean differences, and effect sizes.

Corroboration of Growth

The fourth set of research questions examined the corroboration of collateral APTG for patients and patient reports of PTG. This was accomplished by examining mean differences in, and the relationship between, collateral APTG for patients and patient PTG. As previously stated, accuracy in corroboration of patient reports of growth by collaterals was assessed by two methods. First, accuracy would be achieved if collateral reports of growth for patients were similar to patient reports of growth for self. Accuracy would be greatest when non-significant differences were present between collateral and patient scores resulting in small effect sizes.

Second, accuracy would be achieved by examining the amount of shared variance between collateral and patient scores.

Mean differences in, and the relationship between, collateral APTG for patients and patients' PTG was examined. With the exception of new possibilities, collaterals were accurate in anticipating the amount of PTG patients would experience. Paired-sample t-tests revealed APTG new possibilities was higher than patient PTG new possibilities, $t(33) = 2.03$, $p<.05$, $d = .42$. All other mean differences were non-significant ($p>.05$) with effect sizes ranging from .02 to .11. Anticipated posttraumatic growth for patient by collateral and patient PTG was largely unrelated. Only collateral APTG personal strength was positively related to patient PTG personal strength. See Table 9 for correlation coefficients, mean differences, and effect sizes.

Moderating Effect of Dispositional and Situational Coping

The fifth set of research questions examined coping (dispositional and situational) as moderating or mediating the relationships between APTG and PTG. Regression analyses, including SPSS macros, were used to examine longitudinal relationships between APTG and PTG for patients. In the first set of regressions, APTG total was entered in the first block, one of three dispositional coping subscales (positive reinterpretation, denial, planning) in the second block, and an interaction term between APTG and dispositional coping in the third block. In the second set of regressions, APTG total was entered in the first block, situational coping in the second block, and the interaction term between APTG and situational coping in the third block. Due to the modest sample size, no control variables (e.g., demographic, medical/disease) were entered into regression models.

Before regressions were conducted, Pearson product moment correlations were calculated to examine relationships between APTG, PTG, and coping variables. Means and standard

deviations for coping variables are presented in Table 10. All significant relationships between APTG and coping were positive. The first set of correlations addressed the relationship between APTG and coping variables. Dispositional positive reinterpretation coping was related to APTG total, APTG personal strength, and APTG spiritual change. Dispositional denial coping was related to APTGI new possibilities. Dispositional planning coping was related to spiritual change. Situational positive reinterpretation coping was related to all APTG scales (all p's<.05). Situational denial coping was related to APTG new possibilities and APTG personal strength. Last, situational planning coping was related to all PTGI scales (all p's<.05). Correlations between APTG and coping variables are presented in Table 10.

The second set of correlations examined the relationship between PTG and coping variables. Again, all relationships between coping and PTG variables were positive. Dispositional positive reinterpretation coping, denial coping, and planning coping were unrelated to PTG scales (all p's >.05). Situational positive reinterpretation was related to PTG total, PTG new possibilities, PTG personal strength. Situational planning coping was related to several PTG scales: total, new possibilities, relationships with others, personal strength, and spiritual change. Correlations between PTG and coping variables are presented in Table 12.

Results for dispositional coping as a mediator between APTG and PTG revealed a significant interaction term: APTG total x dispositional planning coping accounted for a significant proportion of variance in PTG, $F(1, 45) = 5.95$, <.01). The overall model was significant, $F(3, 45) = 5.45$, $p < .01$). When a moderated effect is present, it is important to further examine the nature of the effect (Hayes & Matthes, 2009). The moderated effect was visually depicted in a graph by choosing three points on the moderated variable: at the mean, one standard deviation below the mean, and one standard deviation above the mean. This method,

commonly referred to as the *pick-a-point* approach (Rogosa, 1980), relies on picking points on the moderated variable and testing whether the independent variable is statistically different at the selected moderated points. Overall, the results suggest that increased levels of APTG were related to increased levels of PTG, with the highest levels of PTG being associated with individuals who endorsed higher levels of dispositional planning coping[1]. See Table 13 for regression coefficients and Figure 1 for a visual depiction of the interaction: ..

Interaction terms for APTG total growth x positive reinterpretation coping, $F(1, 45) = .001$, $p>.05$, and APTG total growth x denial coping $F(1, 45) =.36$, $p>.05$, did not account for a significant proportion of variance in PTG. Similarly, interaction terms for APTG x situational coping did not account for a significant proportion of variance in PTG: APTG total x positive reinterpretation coping, $F(1, 41) =.32$, $p>.05$, APTG total x denial coping, $F(1, 41) = .229$, $p>.05$, and APTG total x planning coping, $F(1, 40) =.936$, $p>.05$. Coping as a mediator between APTG and PTG was examined in regression models with non-significant interaction terms.

Mediating Effect of Dispositional and Situational Coping

When non-significant interactions and moderation were not present, secondary analyses were conducted to examine coping (dispositional and situational) as mediating the relationship between APTG and PTG. The SPSS macro developed by Preacher & Hayes (2008) was used to generate mediated, or indirect effects, and Bootstrap coefficients. Bootstrapping is a resampling method that is used to test mediated effects (Efron & Tibshirani, 1993). Bootstrapping relies on resampling from the original dataset replacing the sample with new values, based on the original sample (Hayes, 2009). This process is repeated several thousand times (e.g., 5000) with indirect effects estimated from the resampling procedure. Because of this type of resampling procedure, test statistics for indirect effects do not conform to traditional parametric test assumptions (e.g.,

normality). Simulation studies have demonstrated that bootstrapping procedures outperform traditional mediational approaches (e.g., causal steps approach, Baron & Kenny, 1986; product-of-coefficients, Sobel, 1982), resulting in higher power and lower probability for committing Type I errors (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2008). Ninety-five percent confidence intervals—percentile, bias corrected, and bias corrected accelerated—were constructed to test mediated effects (Efron & Tibshirani, 1993; Preacher & Hayes, 2008). The bias corrected and bias corrected accelerated confidence intervals have higher power for detecting significant effects compared to the percentile method (Fritz & MacKinnon, 2007). Mediation is present if 0 is not within the lower and upper confidence bounds.

The current study resampled from the original sample *k* =5000 times to test for mediated effects. Results revealed that 0 was not between the bias corrected CI (Lower CI= .0005, Upper CI= .2396) for situational planning coping mediating the relationship between APTG and PTG. However, 0 was between the percentile and bias-corrected accelerated bootstrap CI's; suggesting no mediation. The indirect effect (*ab)* of APTG on PTG through situational coping planning was also non-significant ($p>.05$). It should be noted that the test of indirect effects assumes that the sampling distribution is normal, an assumption that does not need to be met when bootstrapping (Preacher & Hayes, 2008).

Regression coefficients were also compared to examine mediation. Two regression models were used. In the first model APTG (ß =.40, $p<.05$) was a significant predictor of PTG. In the second model, PTG was significantly predicted by APTG (ß =.33, $p<.05$ and planning coping (ß =.30, $p<.05$): variables accounted for 25% variance in PTG. When planning coping was entered into the model the beta coefficient for APTG decreased from .40 to .33, suggesting

partial mediation. It should be noted mediation is a rather crude comparison of adjustment betas: given the non-significant test for indirect effects and inconsistent bootstrap CI's, the results of situational planning coping mediating the relationship between APTG and PTG should be interpreted with caution. Regression coefficients are presented in Table 14 and bootstrap confidence intervals in Table 15.

CHAPTER V

DISCUSSION

Explanation of Findings

This study had three purposes. The first purpose was to examine how posttraumatic growth (PTG) was perceived by patients at early stages of the cancer experience and the impact of early perceptions of growth on later PTG. The second purpose was to examine how significant others' (e.g., collaterals) perceptions of growth were related to patients' PTG; specifically, if collaterals were able to corroborate reports of PTG for patients. The third purpose was to examine the *process* vs. *outcome* distinction of PTG. This last purpose was accomplished by considering patient coping (dispositional and situational) as mediating or moderating the relationship between anticipated posttraumatic growth (APTG) and PTG. This chapter will compare findings from the current study to results reported in the literature. Also, several theoretical constructs will be used to facilitate interpretation of the results. This study was exploratory in nature and the first to document APTG among a trauma or chronic illness population. Therefore, specific hypotheses related to research questions were not made.

Patient and Collateral APTG

Patients level of anticipated growth was higher than growth reported by several samples, including mixed cancer patients receiving HSTC and BMT treatments (Andrykowski, et al., 2005; Widows et al., 2005) breast cancer patients (Cordova et al., 2001), and prostate cancer patients (Thornton & Perez, 2006). Similarly, collaterals also anticipated high levels of growth compared to reports of perceived growth by husbands of breast cancer patients (Weiss, 2004a), caregivers of chronically ill children (Moskowitz & Epel, 2006), and caregivers of HIV/AIDS patients (Cadell, 2003). This is the first study to document that both patients and collaterals

anticipate growth from the cancer experience, and their expectations are similar or higher compared to reports of PTG in the literature.

Patient APTG was compared to collateral APTG, and patients generally expected higher growth for themselves than collaterals expected for themselves. The only growth scale for patients and collaterals that was not statistically significant was spirituality/religiosity. Also, reports of patient and collateral growth for self were largely unrelated, suggesting that reports of APTG were independent. Personal strength was the only significantly related APTG scale for collaterals and patients.

The perceived threat of the event, or event severity, may assist in understanding high levels of patient APTG. Posttraumatic growth theory suggests that for growth to occur an event must be "seismic," to shatter one's assumptions about life (Janoff-Bulman, 1992; Tedeschi & Calhoun, 1996, 2004). Event severity, or perceived threat of the event, has been linked to increased levels of PTG among cancer populations (Stanton et al., 2006). Much research has documented the negative sequelae associated with the cancer experience (Gurevich et al., 2002), including the negative impact a bone marrow transplant may have on quality of life (Andrykowski et al., 2005). Patients may have anticipated higher levels of growth because they perceived that the cancer experience was going to impact them to a greater degree compared to collaterals. Conversely, collaterals may have anticipated lower levels of APTG because the event impacted them indirectly.

Patient and Collateral PTG

Patient levels of PTG were comparable to reports of perceived PTG among similar populations (e.g., Widows et al., 2005), while collateral levels of growth were higher compared

to similar populations (Manne et al., 2004; Senol-Durak & Ayvasik, 2010). Additionally, collaterals perceived similar and slightly higher levels of PTG compared to patients in this study.

Results of the current study were compared to studies which have examined PTG from a patient and partner perspective (Manne et al., 2004; Moore et al., 2010; Thornton & Perez, 2006; Weiss, 2002). These studies have similar conclusions: cancer patients experience either more or similar levels of growth compared to partners. Studies examining breast cancer patients and their partners (Manne et al., 2004; Weiss, 2002) have found that breast cancer patients report higher levels of growth compared to partners. For example, Manne et al. (2004) examined PTG among breast cancer patients and their partners at three different time points: baseline (post-surgery), 9 months, and 18 months. At all time points patients experienced higher levels of growth compared to partner reports of growth.

A finding more consistent with the current study comes from a sample of prostate cancer survivors and their partners. Prostate cancer survivors and their partners reported similar levels of growth, and reports of growth were modestly related (Thornton & Perez, 2006). Levels of growth for patients and spouses were lower compared to patients and collaterals in the current study. Also, patient and collateral growth scores were related to one another for total PTG, and the scales of new relationships, and appreciation of life. Similarly, no mean differences were present on PTG variables for a sample of hepatobiliary carcinoma patients and their caregivers (Moore et al., 2010). In the current study collateral and patient PTG were related for total growth and the growth scale of new relationships, a finding similar to previous research (Thronton & Perez, 2006). The current study adds to the growing evidence that partners and cancer patients report growth from the cancer experience, and that reports of growth between partners are related.

There are several possible explanations for why collaterals in this study experienced similar levels of PTG compared to patients. Research suggests that partners and family members of cancer patients experience stress and are negatively impacted by the cancer experience (Kim, Kashy, et al., 2008; Kim & Given, 2008; Pitceathly & Maguire, 2003), which can lead to increased levels of depression (Kim, Duberstein, Sorensen, & Larson, 2005). It is possible this same stress was the likely impetus for collaterals to perceive high levels of PTG in this study.

The assessment method may have also led to lower levels of PTG for patients compared to collaterals. Research suggests that type of assessment method may lead to different levels of PTG (Hefferon, Grealy, & Mutrie, 2009; Tallman et al., 2010). For example, during an interview in the current study, several patients noted already experiencing high levels of growth or reaching a plateau for some growth scales. A ceiling effect for patients may have been present in that they did not anticipate or perceive growth because they had already experienced growth. Therefore, APTG and PTG for patients may actually be underreported. It is plausible this type of measurement error also took place for collaterals; although no anecdotal accounts of collaterals already being high in growth scales emerged during research interviews.

Examining PTG from a Family Systems Perspective

Researchers have almost exclusively examined trauma from an individualistic perspective, and to date no empirical study has investigated PTG from an entirely family-systems perspective (Berger & Weiss, 2009). Spawning from the positive psychology movement (e.g., Seligman, & Csikszentmihalyi, 2000), family systems researchers have experienced a perspective shift from examining family trauma from a dysfunctional/pathological model to an adaptive/strength based model (Berger & Weiss, 2009). For example, Walsh (2003) conceptualized a resilience framework to address adversity in the family from a clinical practice

perspective. It may be advantageous to examine the findings of the current study from a systemic framework, to better understand how the cancer experience not only impacts the individual, but also the family as a whole.

Berger and Weiss (2009) provide a theoretical framework, stemming from individual PTG theory, to examine growth from a family systems perspective. They identified 6 components of PTG that can be generalized to a family systems perspective: *pre-trauma characteristics*, *stressor event characteristics*, *challenges*, *rumination*, *social context*, and *PTG*. Such a perspective can help explain how the cancer experience shaped collaterals perceptions of APTG and PTG in this study.

Pre-trauma characteristics, such as family dispositional factors and family resources are hypothesized to be related to growth. Examples of dispositional factors include family boundaries, parental alliance, and collaborative problem solving. Family resources include educational attainment, income, and religiosity/spirituality (Berger & Weiss 2009). Religiosity/spirituality and education were two family resources that had an effect on collateral APTG in the current study. Researchers have increasingly examined the relationship between PTG and spirituality from empirical and theoretical perspectives (Askay & Magyar-Russell, 2009; O'Rouke et al., 2008; Schultz, Tallman, & Altmaier, 2010). In the current study individuals who reported no spiritual affiliation reported lower levels of APTG spiritual change. This finding seems intuitive, and may have implications for health outcomes. For example, religiosity/spirituality may have a buffering effect on mental health and a positive relationship with increased quality of life (Miller, McConnell, & Klinger, 2007).

Another family resource, education, had an effect on APTG in this study. Specifically, collaterals who were less educated (e.g., high school degree) compared to more educated (e.g.,

college/professional degree) reported higher levels of APTG for patients and themselves. The relationship among education, which has been commonly operationalized as socio-economic status (SES) (e.g., income or education), and PTG has inconsistent findings in the literature (Stanton et al., 2006). However, a link between perceived PTG and education has been demonstrated for partners of prostate cancer patients. Partners who were less educated reported higher levels of growth compared to patients who were more educated (Thornton & Perez, 2006).

Traumatic or stressful events, or *stressor event characteristics,* not only impact the individual, but also the family as a whole (Jordon, 2004). The family system is influenced in a number of ways including the disruption of family, which may impact the manner in which family members interact with one another, perform tasks, make decisions, and engage in problem solving (Berger & Weiss, 2009). Collaterals in the current study were not directly diagnosed or treated for cancer. However, they were very much a part of the family system that may have been disrupted by the cancer experience. A specific example of this disruption comes from an anecdotal account of a patient and partner discussing their financial instability caused by the cancer experience. During an interview, a patient and partner described financial difficulties they faced since both were unable to work, as a consequence of the cancer treatment. The lack of a steady income placed significant strain on their ability to pay monthly bills, and subsequently led to self-reported stress and hardship.

From a systems perspective, traumatic events impose a diverse set of *challenges* on the family and the family's way of life may substantially shift from previous levels of functioning. These challenges can impact family roles/beliefs/traditions, intimate interpersonal relationships, family narrative/story, and communication between family members (Berger & Weiss, 2009).

Traumatic events, and the challenges resulting from such events, can lead to partners experiencing lower marital satisfaction and lower family cohesion (Nelson & Wampler, 2000). Spouses, partners, and significant others in the current study shared an integral aspect of the cancer experience. It is hypothesized that through this shared experience with patients, collaterals anticipated PTG and subsequently reported PTG from the experience.

Degree of intimacy may have impacted relationship dynamics and influenced the family system. Approximately 67% of the sample in the current study were spouses/partners/significant others. Collaterals who were spouses/significant others, compared to collaterals who were friends/family members, reported anticipating higher levels of PTG for themselves in the area of interpersonal relationships. Spouses/significant others may have anticipated higher levels of PTG for the interpersonal relationships scale because of their degree of intimacy with patients. A similar finding has been reported in the patient/partner PTG literature (Weiss, 2002).

Family *rumination*, or family cognitive processing, is another component identified by Berger and Weiss (2009) that can assist in interpreting the findings from the current study. Rumination within the context of the family can be described as four specific types: meaning-making, problem solving, reminiscing, and anticipating (Berger & Weiss, 2009; Martin & Tesser, 1996; Tedeschi & Calhoun, 2004). The most germane type of family rumination for the current study is anticipating expectations for the future. This is the first study to empirically examine anticipating growth as a specific family rumination component among patient and collateral dyads. Both collaterals and patients in the current study endorsed high levels of APTG compared to PTG reported in the literature. These findings lend support to APTG as a possible important early ruminative process that is related to later reports of PTG.

Social context may have important implication for PTG theory and how growth is perceived at early time points following stressful life events. Researchers have written about the importance of underlying social fabric, societal values, and personal social support as important factors related to PTG (Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 1996, 2004). Social context can be broken down into “distal” and “proximate” groups. Distal and proximate characteristics have the potential to impact the family social environment in four ways: how community influences mold perceptions about what constitutes a traumatic or stressful event; how cultural beliefs impact family perspectives and how families subsequently interpret traumatic events; how norms within a social environment provide guidelines for managing stressors and implementing family coping skills; and how community resources (e.g., social services) and family social support provides a framework where growth can be facilitated (Berger & Weiss, 2009). Contextual influences likely played a role in how collaterals anticipated benefits for themselves and patients. However, the extent to which these contextual influences shaped collaterals perceptions of growth were beyond the scope of this study.

The last component noted by Berger and Weiss (2009) was *PTG* itself. Posttraumatic growth from a family systems perspective may take the form of family identity/legacy, intimate interpersonal relationships, and clearer family priorities including changes in family values and belief systems (Berger & Weiss, 2009). Most assessment instruments/methods measure growth from an individualistic and not family perspective (e.g., PTGI; Tedeschi & Calhoun, 1996). The PTG scale assessed in the current study resembling a family framework was interpersonal relationships. Example items from the PTGI interpersonal relationship scale include *putting effort into my relationships* and *a sense of closeness with others*. Research suggests components of the interpersonal relationship between spouses and cancer survivors may play an important

role in PTG development in these populations (Weiss, 2004a). Posttraumatic growth has also been linked to increased levels of social support and emotional expression among spouses of cancer patients (Manne et al., 2004; Weiss, 2002).

To summarize, participants reported moderate to high levels of APTG and PTG compared to the research literature. Research suggests that patients and collaterals can be significantly impacted by the cancer experience, resulting in increased psychopathology and reduced quality of life. However, in the face of adversity, participants anticipated growth and subsequently perceived PTG from the cancer experience. A family systems perspective can be useful in understanding how traumatic life events not only impact the individual, but also the family as a whole. Components such as social context, family values/ beliefs, and family rumination may have influenced how collaterals perceived growth from their experience. Last, the growth scale most closely related to a family systems perspective, as assessed in the current study, was interpersonal relationships.

Comparison of Patient and Collateral APTG and PTG

A main aim of this study was to examine the relationship between APTG and PTG. Specifically, how accurate were patients and collaterals in anticipating growth for themselves? Longitudinal relationships emerged between APTG and PTG, for both patients and collaterals. Specifically, bivariate correlations revealed patient APTG was significantly related to PTG total and all growth scales. Similarly, bivariate correlations indicated that collateral APTG was significantly related to PTG total and all growth scales. This is the first study to document that early perceptions of PTG were longitudinally related to PTG for cancer patients and collaterals.

While longitudinal relationships were present between APTG and PTG for study participants, the degree of accuracy for APTG differed for patients and collaterals. Patients over-

anticipated the level of PTG they would experience in all growth scales, with significant differences emerging for total growth, spiritual change, and the largest difference being in the growth area of new possibilities (*d* = .68). Collaterals also over-anticipated growth for new possibilities (*d* = .46), albeit to a lesser degree than patients.

Compared to patients, collaterals under-anticipated the growth they would later report. The PTG scale of new possibilities was the only exception where collaterals over-anticipated growth, to a significant degree. Even though collaterals slightly under-anticipated the amount of PTG they would experience, collaterals were more accurate than patients in anticipating growth for themselves. Effect sizes were larger for patient differences compared to collateral differences, meaning that patients were less accurate than collaterals in anticipating their growth. Relationships among APTG and PTG scales were also stronger for collaterals compared to patients: percent variance for collateral growth ranged from 14% to 53% whereas patient growth ranged from 8% to 30%.

Why did patients over-anticipate the level of growth they would report in the future? Several theories and empirical investigations may help to interpret the results of over-anticipation of growth. Specifically, literature on impact or prediction bias, past and future selves, and life span development perspectives are presented relevant to these findings.

Results of the current study are consistent with research examining prediction biases in estimating the impact of stressors on future health outcomes. Research suggests that medical patients overestimate the impact future events will have on their quality of life. Smith et al. (2008) examined quality of life among kidney transplant patients at pre- and post-transplant. Results indicated patients substantially over-estimated the amount of improvement they would see in their quality of life as a result of their transplant. Patients over-estimated changes related

to work and travel. These domains are similar to the PTGI scale of new possibilities: patients and collaterals experienced the largest degree of over-anticipation for this scale. Such results lend support to a prediction or impact bias when patients anticipate how a chronic illness, such as cancer, impacts future outcomes.

Similar to prediction bias, research investigating past and future selves also lends support to the findings of the current study. Social psychology research suggests that individuals compare themselves to past and future selves, in an attempt to maintain identity, control, and continuity over time (Albert, 1977; Festinger 1954). People make themselves appear better by enhancing their future selves (Wilson & Ross, 2000). Empirical research suggests that individuals depreciate past selves and inflate future selves (McFarland & Alvaro, 2000). In an empirical study, Lachman, Rocke, Rosnick, and Ryff (2008) investigated actual and perceived trajectories in change in life satisfaction in a sample of 3,793 adults. Their research model focused on how well participant perceptions of the past and future matched actual assessments made at corresponding time points. Participants below the age of 65 saw the future as more satisfying than the past and the past less satisfying than the present. Thus, younger participants anticipated greater improvements in the future than actually took place. Older adults experienced higher levels of convergence between their past and anticipated ratings, indicating that older adults are more realistic in predictions of the future. Also, participants who held more accurate ratings of themselves (past or future) experienced higher levels of adjustment.

From a life span perspective on motivation, younger adults are more orientated and motivated to move toward growth, whereas older adults are more focused on avoiding losses and adjusting to future goals (Freund, 2006; Lachman et al., 2008). Participants in the current study experienced a different stressor (e.g., cancer and subsequent treatment) compared to Lachman et

al. sample (2008), but they were within a similar age range. This perspective may have manifested itself as discrepancies (e.g., over-anticipation) between APTG and PTG. Specifically, participants may have been focused on achieving growth and avoiding the negative consequences associated with cancer, thus, anticipating high levels of PTG compared to actual perceived PTG.

The results of the current study can also be explained by cognitive adaptation theory. When individuals encounter a stressful or traumatic event (e.g., cancer), they distort their perceptions of the event to more manageable representations of their life assumptions (Taylor, 1983; Taylor & Brown, 1988). In the case of the current study, participants distorted their perception of how much growth they were going to experience from the event. Positive illusions or methods of self-enhancement may be important for individuals to persist through adversity, and may have implications for mental and physical health outcomes (Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000). While this study did not explicitly address positive adaptation or well-being as a follow-up construct, this area of research is an important one to pursue.

Examining constructs similar to PTG may also help to assist in interpreting perceptions of growth at early time points following traumatic events. It is difficult to examine predictors of PTG from a similar construct because of the paucity of research available. Some research evidence suggests that benefit-finding, a term similar to but distinct from PTG (Collins et al., 1990; Tennen & Affleck, 2002), has different predictors compared to PTG (e.g., optimism; Sears et al., 2003). Mols, Vingerhoets, Coebergh, and van de Poll-Franse, (2009) examined the relationship between benefit-finding and PTG among breast cancer patients 10 years post-treatment. Benefit-finding was defined as the acquisition of benefits from adversity and PTG as “the success with which individuals coping with the aftermath of trauma reconstruct or

strengthen their perceptions of self, others, and the meaning of events" (p. 584). Cross-sectional results indicated that benefit -finding was positively related to PTG.

Mols et al. (2009) hypothesized that benefit-finding may start immediately after traumatic events when individuals focus on finding benefits from adversity. Conversely, PTG may take years to develop through cognitive processing, such as rumination (Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 2004). Benefit-finding may be intentionally used as a coping strategy (Tennen & Affleck, 2002), by individuals taking time to remind themselves of benefits gained. APTG in the current study may be analogous to benefit-finding in that participants were consciously thinking about how their lives were going to change for the better. The Mols et al. (2009) study showed a possible link between benefit-finding and PTG, although this study was cross-sectional in nature, thus limiting the implications and conclusions to be drawn about relationship directionality between benefit-finding and PTG.

The results of the current study lend support to the assertion that early perceptions of PTG may be a means of coping with the event, also described as an illusory phenomenon (Sumalla et al., 2009). Patients over-anticipated the growth they would experience while collaterals predominantly under-anticipated the growth they would experience. Several theories may help explain why over-anticipated PTG occurred for study participants, including impact bias, social psychology theory on past and future selves, life span perspectives, and cognitive adaptation theory. A common theme through these theories is that individuals are biased when making reports of their past and current functioning. These biased reports likely reflect individuals' attempts at self-preservation, or coping, in times of stress and significant hardship. Last, the construct of benefit-finding may have important similarities to early reports of APTG, and the subsequent relationship with PTG.

Corroboration of PTG

Continued disagreement among researchers regarding PTG as an actual construct has continued to persist (e.g., Frazier et al., 2009). Different research methodologies have been developed to examine the construct of growth (See Tennen & Affleck, 2009 for a review). One such research method recommended by experts in the field is corroboration of PTG by a significant other (Calhoun & Tedeschi, 2008; Frazier & Berman, 2008; Ford et al., 2008; Stanton et al., 2006; Joseph & Linley, 2008c). Collateral levels of APTG for patients were compared to patients' PTG for self to determine corroboration of growth.

Overall, collaterals were able to modestly anticipate the levels of PTG patients would experience, thus providing evidence for corroboration. Collaterals over-anticipated growth for patients in the growth scale of new possibilities, the same growth scale in which collaterals over-anticipated growth for themselves. However, mean differences between collaterals APTG for patients and patient PTG for self for all other growth scales were non-significant, suggesting corroboration. Collateral corroboration was greatest for the PTG scales of personal strength and spiritual change, as these growth scales were significantly related.

Results of the current study can be compared to four studies which used similar research methodologies to corroborate reports of growth (Park et al., 1996; Weiss, 2002; Shakespeare-Finch & Enders, 2008; Moore et al., 2010). In a sample of college students, no mean differences between informant reports of growth and students' reports of growth were found; the correlation between informant and student scores was modest suggesting a moderate degree of corroboration. A study of cancer patients and their spouses revealed husband and breast cancer patients' reports of growth for one another were significant, suggesting the corroboration of growth by significant others (Weiss, 2002). Correlations were higher for cancer patients and

their husbands compared to the sample of college students. Shakespeare-Finch and Enders (2008) found that significant others (e.g., partners, family members, or close friends) corroborated reports of growth for college students. Correlation coefficients among significant others and college students were moderate to high. Recently, Moore et al. (2010) examined PTG among hepatobiliary carcinoma patients and their spouses. Spouses filled out a modified PTGI for patients (Tedeschi & Calhoun, 1996). Results indicated a high degree of corroboration for caregiver PTG scores for patients and patient PTG for self in several growth scales: relating to others, spiritual change, personal strength, and total growth.

Moore et al. (2010) offer several interpretations of their findings that are germane to the current study. The large degree of correlations between caregiver and patient PTG in their study may be related to relationship intimacy: most relationships were more than 30 years, and caregivers were intimately invested in patient care. Second, individuals who report high levels of PTG may be more likely to report PTG for others. Third, individuals who report PTG may be likely to form relationships with people who also experience PTG. Last, the patient or caregiver may have a reciprocal effect on one another: patients and caregivers may influence each others' levels of PTG.

Overall, the results of the current study are similar to previous literature in that collateral participants were moderately accurate in their perceptions of growth for others. Several differences and similarities were present between the current findings and findings of previous corroboration research. First, the degree to which growth variables were related to one another for significant others/caregivers and patient growth were higher for other studies compared to the current study. This suggests a larger degree of corroboration in cross-sectional research. The high levels of corroboration for cross-sectional assessments may be due to growth being more

observable for patients and significant others (Moore et al., 2010), when it is assessed at the same time point. Whereas in the current study collaterals were anticipating future growth: growth was not immediately observable and there may be a possibility of increased error in collaterals estimations. Also, the extent of relationship closeness was not examined in this study. Less intimate relationships between patients and collaterals may have decreased the accuracy of collateral reports of growth for patient, resulting in a lower degree of corroboration. A finding similar to this study was the degree to which collateral APTG for self and collateral APTG for patients was highly related. This may represent that collaterals viewed patient reports of growth through their own experiences (Moore et al., 2010). Overall, in spite of the modest degree of corroboration of growth in this study compared to previous studies, collaterals were still very accurate in predicting levels of PTG for patients. Evidence from the current study and previous research suggests that individuals are able to corroborate reports of growth retrospectively and prospectively.

Interestingly, collaterals were more accurate in anticipating PTG for patients than patients were in anticipating PTG for themselves. Effect sizes for APTG and PTG differences were larger for patients (d= .16 to .68) compared to collaterals reports of APTG for patients (d = .02-.11). As stated, the only growth scale where collaterals were not accurate was new possibilities, although this effect was relatively modest (d = .42). Also, as previously noted, collaterals were also more accurate in anticipating PTG for themselves compared to patients anticipating PTG for themselves.

Why were collaterals better able to anticipate growth for themselves and growth for patients? One possibility may be that collaterals' mortality was called into question to a lesser degree compared to patients. Collaterals were likely impacted by the cancer experience

(Pitceathly & Maguire, 2003), but they may not have had to worry about immediate survival. As previously stated, perceived threat of traumatic events has been linked to increased levels of PTG (Stanton et al., 2006). The threat of cancer may have been greater for patients than collaterals: collaterals may have been more accurate in their anticipation of PTG because the cancer did not directly impact them from a medical/health standpoint (e.g., diagnosis and treatment). Currently, there is no additional research to support this contention, as this is the first study to provide longitudinal evidence for collateral anticipation of PTG outcomes.

Another possible explanation for collaterals having more accurate expectations of patient PTG and PTG for themselves stems from research on future expectations. Research suggests that older adults discount the impact of future events. Discounting is a process by which individuals manage the threat of future stressors by engaging in anticipated goal disengagement, referred to as discounting (Cheng, Fung, & Chan, 2009). Cheng et al. (2009) hypothesized that for older adults it may not be advantageous to hold unrealistic positive expectations of the future but to hold a “not-so-bright” (p. 630) view of the future. In a sample of 200 adults age 60 or older, participants who had a more negative expectation of the future had higher levels of well-being compared to those who held an overly positive view of the future. The authors point to the fact that with more realistic or negative views of the future, older adults were better able to manage the normative losses and declines that took place.

Collaterals in the current study may have engaged in a similar discounting process. Specifically, collaterals may have been better able to anticipate the overall impact of the cancer experience, by taking into account both the positive and negative impact the cancer experience would have on them and patients. The current study did not assess participants anticipation of

negative outcomes (e.g., losses or declines) from their cancer experience and this relationship needs further clarification.

To summarize, collaterals were more accurate in anticipating their own growth compared to patients anticipating their own growth. With PTG new possibilities being the exception, collaterals under-anticipated how much growth they would experience and patients over-anticipated the growth they would experience. Regarding corroboration of growth, collaterals were accurately able to corroborate reports of growth for patients. The growth area of new possibilities was again the exception. Collaterals were also more accurate in anticipating growth for patients than patients were for anticipating growth for self. The possibility of the cancer experience having less of an impact on mortality, and the process of discounting, may have contributed to collateral accuracy in anticipating PTG.

Posttraumatic Growth: A Tail of Two Sides?

The *process* vs. *outcome* distinction of PTG has eluded researchers. Specifically, whether PTG is an actual construct or a process resembling ones' attempts in coping with a traumatic event remains unclear (Maercker & Zoellner, 2004; Sumalla et al., 2009; Zoellner & Maercker, 2006). To address these gaps in the literature, a primary aim of this study was to examine if different types of situational and dispositional coping—meaning-making (e.g., positive reinterpretation), adaptive/active (planning), and maladaptive (e.g., denial)—mediated or moderated the relationship between APTG and PTG. Results indicated that dispositional planning coping significantly moderated a relationship between APTG and PTG. The relationship between APTG and PTG was strongest for patients who endorsed the greatest levels of planning coping. Situational planning coping also mediated the relationship between APTG and PTG, although as previously stated, this result should be interpreted with caution as the

indirect effect was non-significant. While meaning-making coping and maladaptive coping have been associated with PTG (Helgeson et al., 2006; Manne et al., 2004), these coping methods did not moderate or mediate the relationship between APTG and PTG.

Both dispositional and situational planning coping had a significant effect on the relationship between APTG and PTG, although in different ways. Dispositional, or trait coping, refers to a pattern of habitual coping used across numerous situations (Carver & Scheier, 1994). Situational coping refers to coping with a particular event at a specific point in time (Lazarus & Folkman, 1984). While different from one another, research suggests that dispositional coping strategies predict situational coping strategies rather well (Ayers, Sandler, West, & Roosa, 1996; Carver & Scheier, 1994; Schoen, Tallman, & Altmaier, 2007). The findings from the current study suggest a complex relationship between dispositional coping, situational coping, and PTG variables. For definitive conclusions to be drawn regarding the moderating and mediating role of dispositional and situational planning coping, results must be replicated.

The findings suggest that PTG can be both illusory and actual. Results lend evidence to support the role of early adaptive/active coping strategies and increased levels of PTG (Urcuyo et al., 2005). To date, no research has examined coping variables as moderating or mediating the relationship between APTG and PTG. These results suggest a possible important role for a future oriented-coping process, such as anticipatory coping. Similar to but distinct from proactive coping (Aspinwall & Taylor, 1997), anticipatory coping has been defined as preparing for the deleterious consequences of impending traumatic events (Lazarus & Folkman, 1984). Anticipating positive outcomes from a traumatic event, and simultaneously engaging in an adaptive/active coping strategy, such as planning, were linked to the highest levels of PTG.

Overall, APTG coupled with an adaptive coping strategy, appears to be an important early process, or precursor, for PTG to occur at a later date.

Another way to examine the effect of planning coping on APTG and PTG is through "action" growth. Some researchers suggest that growth related cognitions must be internalized and turned into behaviors before real growth can take place (Hobfoll et al., 2007). It has been hypothesized that action growth does not necessarily ameliorate the negative sequelae following traumatic events, but is more consistent with cognitive adaptation theory (Taylor, 1983). Specifically, cognitions about PTG themes could potentially be used as coping strategies which may or may not lead to positive outcomes (Hobfoll et al., 2007). As noted, the strongest relationship between PTG and APTG was for participants with the greatest levels of planning coping. Individuals who engaged in planning coping— thinking about the stressful event and coming up with a specific plan on how to deal with it (Carver et al., 1989)—may be more likely to act on their PTG cognitions to put PTG into a plan of action, resulting in behavioral manifestations of growth. Furthermore, areas of action growth may be those most observable by others (Moore et al., 2010). For example, the areas in which collaterals had the highest degree of corroboration for patients—personal strength and spiritual change—may have been the areas most behaviorally observable (e.g., increased frequency of attending religious services).

Overall, the findings of the current study support the contention that PTG may be a multi-dimensional construct, with early anticipations of growth manifesting as an illusory process (Taylor, 1983; Zoellner & Maercker, 2006). Specifically, the longitudinal findings of the current study lend support to a process perspective of APTG at early stages of the cancer experience. Adaptive or problem-focused coping strategies, such as planning coping, played a significant role in the relationship between PTG and APTG. Anticipatory coping, a construct similar to

APTG and planning coping, may also be an important coping process to consider as a predicator of PTG. Overall, limited evidence was provided for a maladaptive side of PTG: denial coping did not moderate or mediate the relationship between APTG and PTG. Last, action growth may be an important framework to examine the relationships between APTG, PTG, and adaptive/problem-focused coping strategies.

Limitations

The results of this study should be interpreted in light of the limitations. First, there were limitations in measurement. Assessment of APTG was achieved with a modified version of the Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996). While reliability coefficients were well within an acceptable range for both APTG and PTG scales, small changes in scales could have impacted the scales' validity. The administration of similar forms of the PTGI across multiple time points could have primed participants to respond positively, possibly inflating participant scores. Additionally, response bias (e.g., social desirability bias; Krosnick, 1999) may have impacted findings as some interviews were conducted in person and some over the telephone. Research also suggests that the type of measurement method of PTG may produce differing results. Tallman et al. (2010) examined PTG using the PTGI and by open-ended question. In their study the PTGI scale of spiritual growth had the second highest scale item mean, but when assessed via open-ended question a relatively small amount of growth was reported by participants. APTG scores may have actually been under-reported. Anecdotal evidence suggests some participants already experienced PTG (e.g., ceiling effect). This may be due to participants having been diagnosed with cancer an average of 11 months post-diagnosis and already experiencing growth. Additionally, reliability coefficients for COPE subscales were

modest, but consistent with coefficients reported in the literature (Carver, 1997; Carver et al., 1989; Manne et al., 2004).

The findings of the current study may not generalize to other populations, including individuals from non-western cultures (Shakespeare-Finch & Copping, 2006; Splevins, Cohen, Bowley, Joseph, 2010). This sample was predominately Caucasian, well-educated, and from the Midwest. Additionally, a mixed cancer sample was used due to the longitudinal research design, and the anticipated number of participants needed to achieve enough power to detect significant findings.

While ample power was available to detect significant effects, and effect sizes were moderate indicating meaningful differences, control variables were not entered into primary statistical analyses because of the exploratory nature of the study and sample size. Differences in medical/disease variables were not accounted for in study analyses (disease type, disease status, disease stage, treatment, time since diagnosis), and results may have been different if the current sample was more homogeneous regarding medical/disease variables. Several variable distributions were non-normal and outliers were present, which can influence significance tests, resulting in spurious results (Erceg-Hurn & Mirosevich, 2008). A modern statistical approach was implemented (e.g., winzorizing) to address non-normality, and results did not differ compared to non-transformed data. Also, results of moderation and mediation analyses should be interpreted with caution. While several outliers were removed and significance levels remained, these results also need to be replicated with larger samples. Additionally, the impact of additional stressors or traumatic events (e.g., medical, psychosocial) were not accounted for in analyses.

Implications for Future Research

There are numerous contributions of these findings to the increasing literature on PTG. This is the first study to document APTG following a stressful experience and provides evidence for growth as a possible illusory construct. Specifically, this study adds to the dearth of research examining individuals' perceptions of PTG at an early point in the cancer experience. This study also answers the call of researchers to investigate PTG at early time points using prospective longitudinal research designs (e.g., Ford et al., 2008). Additionally, APTG was assessed pre-treatment, thus obtaining baseline levels of participants' perceptions of PTG. A second significant strength of this study was the use of a collateral/dyad research design. Relatively few studies have examined PTG from a corroboration standpoint. This study adds to the validity evidence for PTG as an actual construct that may be observable by others (Moore et al., 2010). Furthermore, previous PTG corroboration research used cross-sectional designs, whereas the current study examined corroboration longitudinally. Last, the current study adds to the research by contributing to evidence supporting APTG as an important *process* related to PTG as an *outcome*.

An important future consideration will be to examine growth from a family-systems perspective and to continue to address PTG from a cultural standpoint. The most commonly used PTG instruments—PTGI (Tedeschi & Calhoun, 1996) and SRGS (Park et al., 1996)—assess growth from an individualistic perspective. Future research should target specific aspects of family growth to include areas such as family identity/legacy, intimate interpersonal relationships, family priorities, and changes in family values/belief systems (Berger & Weiss, 2009). Assessment techniques should assess growth directly, as research indicates that individuals may not report growth if they are not explicitly asked (e.g., Hefferon et al., 2009).

Also, additional research examining cultural considerations related to PTG is needed. Specifically, an examination of differences of family members/partners from western and non-western countries will help flesh out PTG as a cross-cultural construct (Splevins et al., 2010).

The link between APTG and PTG is an important finding, but equally important is to further examine the relationship of early perceptions of PTG and later quality of life. Assessing individuals' perceptions of PTG immediately following a traumatic event (e.g., after cancer diagnosis) will provide insight into how immediate perceptions of PTG are adaptive or maladaptive. It is also important to examine not only APTG but also assess for anticipated deleterious consequences resulting from chronic illnesses (Aspinwall & Tedeschi, 2010a; Gorin, 2010). To examine these relationships, the author of this study echoes the call of other researchers to use prospective, process-oriented research designs to examine these relationships (Aspinwall & Tedeschi, 2010a). Research methods, such as the mediation and moderation analyses used in the current study (Hayes & Matthes, 2009; Preacher & Hayes, 2008), are helpful analyses to further our understanding of these relationships. Researchers should also test for non-linear relationships between PTG and other variables and design well controlled laboratory studies to examine these relationships (Carver, Lechner, & Antoni, 2009; Coyne & Tennen, 2010).

Clinical Implications

Several researchers have provided recommendations to work with individuals with chronic health stressors. Calhoun and Tedeschi (1999; Tedeschi & Calhoun, 2009) have written extensively about the role of an *expert companion*. An expert companion is a clinician who is actively engaged in assisting individuals to navigate both the negative and positive aspects of the cancer experience, including a "focus on uncovering strategies for moving beyond the stressful

aspects of disease" (p.216). Specific tasks include helping the individual manage emotional distress by showing humility and empathy, assisting in the reconsideration of beliefs and goals, and helping facilitate a change in life narrative (Calhoun & Tedeschi, 1999; Tedeschi & Calhoun, 2009).

Clinicians may have the opportunity to work with cancer patients and family members to increase positive adaptation during and following the cancer experience. Encouragement of social support during difficult times may be helpful, as research has demonstrated a link between social support and positive outcomes among cancer patients (e.g., Alferi, Carver, Antoni, Weiss, & Duran, 2001). Also, collaterals in the current study were more accurate than participants in anticipating PTG, and thus may have had a more balanced perspective of their views of cancer. Assisting patients to achieve realistic expectations regarding their experience may facilitate the adjustment process (Lechner, personal communication, as cited in Aspinwall & Tedeschi, 2010b). Although, much uncertainty remains regarding how individuals' expectations may impact adaptive or maladaptive outcomes.

Previous research suggests that interventions have been successful in eliciting benefits, as well as increasing overall health-related quality of life (Antoni, Carver, & Lechner, 2009). The majority of intervention research has examined breast cancer patients using an intervention based on a cognitive-behavioral stress management (CBSM) model. This model emphasizes several treatment modalities: promoting an increased awareness of cognitive-affective processes; changing cognitive appraisals about stressors to be more rational, balanced, and realistic; increasing emotional processing and cognitively restructuring of responses to stressors; improving relaxation skills; and increasing useful social support (Antoni et al., 2009).

Research regarding the use of CBSM programs is encouraging. These interventions have been implemented with AIDS and breast cancer patients to increase meaning from the cancer experience, reduce psychological stress, and improve physical functioning (Antoni et al., 2001; Bower & Segerstron, 2004, Cruess et al., 2000, Cruess et al., 2001; Lechner et al., 2003). Antoni et al. (2001) found that following a 10-week CBSM program, a subset of women experienced reduced depression, increased benefit-finding, and increased optimism. Research also suggests that along with adaptive psychosocial outcomes, individuals can experience increased physiological adaptation (Antoni et al., 2001; Cruess et al., 2000). Breast cancer patients completing CBSM interventions have experienced reduced coritosol levels, reduced serum testosterone levels, and improved lymphocyte proliferation (Cruess et al., 2000; Cruess et al., 2001; McGregor et al., 2004).

While evidence exists for an adaptive relationship between PTG and positive outcomes, there is still a great deal of uncertainty regarding these relationships (For a recent discussion of this issues see Miller, Sherman, & Christensen, 2010). In a review of the literature, Sumalla et al. (2009) noted the relationship between PTG and adaptive outcomes among cancer patients is clouded by several factors: multiple stressful events, perceptions of future, disease severity, and the source of the event. While results of interventions, such as the program previously mentioned show promising findings, direct interventions designed to elicit PTG should be avoided (Coyne & Tennen, 2010; Tedeschi & Calhoun, 2009; Wortman, 2004). As a clinician it is dangerous to assume that everyone is going to experience something positive from a traumatic life event, and promoting growth when it is not present may be harmful. Aspinwall and Tedeschi (2010b) eloquently advocate for the scientific process to provide further evidence for psychological intervention research by stating a need for:

> "balanced scientific investigation of the role that both positive and negative phonomena may play in etiology, progression, and management of serious illness, and for the prospective examination of the multiple respective pathways to psychological adjustment and disease outcomes in different diseases" (p. 32).

On a broader scope, researchers have noted to be cautious not to engage in a tyranny of optimism or positive thinking (Coyne & Tennen, 2010; Lechner, Tennen & Afflect, 2009; Tedeschi & Calhoun, 2009). In summary, clinical interventions related to PTG is a promising field of study, but should be conducted with the utmost scientific rigor with patients' best intentions in the forefront.

APPENDIX A

TABLES

Table A1

Patient and Collateral Demographic Characteristics

Characteristics	Patients *n* (%)	Collaterals *n* (%)	Total *n* (%)
Collateral Type			
Spouse/Significant others		37 (67.3)	37 (67.3)
Family member[a]		13 (23.6)	13 (23.6)
Friend		5 (9.1)	5 (9.1)
Gender			
Female	37 (42.5)	46 (83.6)	83 (58.5)
Male	50 (57.5)	9 (16.4)	59 (41.5)
Ethnicity			
Caucasian	84 (96.6)	53 (96.4)	137 (96.5)
African American	1 (1.1)	1 (1.8)	2 (1.4)
Hispanic	2 (2.3)	1 (1.8)	3 (2.1)
Marital Status			
Single	13 (14.9)	3 (5.5)	16 (11.3)
Married/cohabitating	63 (72.4)	45 (81.8)	108 (76.1)
Separated/Divorced/Widowed	9 (10.3)	6 (10.9)	15 (10.6)
Other	2 (2.3)	1 (1.87)	3 (2.1)
Education			
Below high school	2 (2.3)	1 (1.8)	2 (2.1)
High school	28 (32.2)	18 (32.7)	46 (32.4)
Community college/Some college	25 (28.7)	18 (32.7)	43 (30.3)
College degree	25 (28.7)	12 (21.8)	37 (26.1)
Graduate/professional degree	7 (8.0)	6 (10.9)	13 (9.2)
Employment Status			
Full time/self employed	12 (13.8)	7 (12.7)	19 (13.4)
Part-time	33 (37.9)	36 (65.5)	69 (48.6)
Disabled/not employed	21 (24.1)	3 (5.5)	24 (16.9)
Retired	21 (24.1)	7 (12.7)	28 (19.7)
Student	0 (0.0)	1 (1.8)	1 (.7)
Religious Affiliation			
Protestant	34 (39.1)	24 (43.6)	58 (40.8)
Catholic	21 (24.1)	11 (20.0)	32 (22.5)
Spiritual	3 (3.4)	3 (5.5)	6 (4.2)
Christian	9 (10.3)	3 (5.5)	12 (8.5)
Other	5 (5.7)	3 (5.5)	8 (5.6)
No affiliation	15 (17.2)	10 (18.2)	25 (17.6)

Note: Mean age=50.36; SD=13.66. [a] Family members were siblings or parents.

Table A2

Disease/Medical Characteristics

Variable	n (%)
Diagnosis	
Leukemia	25 (28.7)
Lymphomia	28 (32.2)
Gastrointestnal Cancer	15 (17.2)
Multiple myeloma	17 (19.5)
Other	2 (2.3)
Treatment Received[a]	
Bone marrow transplant	57 (65.1)
Autologous	36 (41)
Allogeneic	21 (24.1)
Chemotherapy	21 (24.1)
Surgery	2 (2.3)
Radiation	7 (8.0)
BMT disease status	
Chemosensitive disease under good control	26 (29.9)
Chemosensitive but clinically persistent disease	25 (28.7)
Persistent disease showing some chemoresistance	7 (8.0)
Sensitivity to chemotherapy cannot be determined	1 (1.1)
GI cancer Group status	
Adjuvant Group/Definitive Therapy group (ADJ)	14 (16.1)
Metastatic group/Incurable (ADV)	8 (9.2)
GI Stage status	
Metastatic	8 (9.2)
Locally advanced	8 (9.2)
Localized but not advanced	6 (6.9)
Previous diagnosis of cancer	
Yes	26 (29.9)
No	61 (70.1)

Note: GI cancer include: gallbladder, rectal, pancreas, liver, prostate, and colon. Time since diagnoses was 325 days (SD=564 days). [a]Some participants received multiple treatments; the primary treatment is listed.

Table A3

Descriptive Statistics for Study Measures

Measure	Items	Range	Patients Alpha	Collaterals Alpha	C for P Alpha
APTG					
Total scale	21	0-105	.96	.97	.95
New perspectives	5	0-25	.87	.86	.85
Relationships	7	0-35	.92	.94	.88
Personal Strength	4	0-20	.81	.90	.84
Appreciation of life	3	0-15	.80	.90	.78
Spiritual change	2	0-10	.92	.91	.87
PTG					
Total scale	21	0-105	.95	.92	
New perspectives	5	0-25	.80	.76	
Relationships	7	0-35	.92	.87	
Personal Strength	4	0-20	.82	.82	
Appreciation of life	3	0-15	.73	.79	
Spiritual change	2	0-10	.76	.88	
Dispositional coping					
Positive	4	4-16	.60		
Planning	4	4-16	.78		
Denial	4	4-16	.60		
Situational coping					
Positive	4	4-16	.68		
Planning	4	4-16	.75		
Denial	4	4-16	.62		

Note: APTG = Anticipated Posttraumatic growth. PTG = Posttraumatic Growth.
C for P = Collaterals APTG response for patients.

Table A4

Means, Standard Deviations, and Correlations for Collateral APTG and Patient APTG

	Patient APTG						Collateral APTG (n=55)		Patient APTG (n=87)		
Collateral APTG	1	2	3	4	5	6	M	SD	M	SD	*Cohen's d*
1. Total scale	.21	.11	.20	.30*	.29*	-.04	64.67	23.84	74.42	22.05	.52[a]
2. New possibilities	.24	.19	.20	.35**	.27*	-.00	13.5	5.47	16.10	5.68	.47[a]
3. Relationships	.18	.08	.20	.25	.29*	-.11	22.67	8.85	26.06	7.78	.55[a]
4. Personal Strength	.28*	.16	.28*	.33*	.31*	.05	12.24	5.03	13.93	4.44	.41**
5. Appreciation of life	.14	.06	.14	.23	.24	-.10	10.50	3.61	11.59	3.57	.44**
6. Spiritual change	.08	-.02	.04	.18	.15	.06	5.77	3.00	6.75	3.04	.32

Note: APTG = Anticipated posttraumatic growth: PTG = Posttraumatic growth. Mean differences were examined by paired-samples t-test. *p<.05; **p<.01; [a]p<.008.

Table A5

Means, Standard Deviations, and Correlations for Collateral APTG for Patients and Collateral APTG

	Collateral APTG						C APTG for P (n=55)		Collateral APTG (n= 55)		
C APTG for P	1	2	3	4	5	6	M	SD	M	SD	*Cohen's d*
1. Total scale	.75**	.77**	.72**	.61**	.69**	.57**	63.83	20.42	64.67	23.84	.04
2. New possibilities	.59**	.75**	.52**	.42**	.56**	.40**	13.13	5.36	13.50	5.47	.07
3. Relationships	.73**	.67**	.74**	.61**	.70**	.55**	22.40	7.11	22.67	8.85	.03
4. Personal Strength	.73**	.72**	.72**	.65**	.62**	.51**	12.65	4.31	12.23	5.02	.09
5. Appreciation of life	.66**	.68**	.63**	.51**	.66**	.49**	10.35	3.34	10.50	3.61	.04
6. Spiritual change	.53**	.52**	.47**	.48**	.41**	.60**	5.33	3.00	5.78	3.00	.15

Note: APTG = Anticipated posttraumatic growth: PTG = Posttraumatic growth. Mean differences were examined by paired-samples t-test. *p<.05; **p<.01; [a]p<.008.

Table A6

Means, Standard Deviations, and Correlations for Patient PTG and Collateral PTG

	Patient PTG						Collateral PTG (n=31)		Patient PTG (n=49)		
Collateral PTG	1	2	3	4	5	6	M	SD	M	SD	*Cohen's d*
1. Total scale	.39*	.20	.42*	.34	.29	.29	67.38	18.42	63.87	21.67	.27
2. New possibilities	.51**	.32	.51**	.51**	.36	.30	11.29	5.25	11.29	5.37	.19
3. Relationships	.38*	.22	.41*	.32	.26	.29	24.68	6.41	24.02	8.00	.14
4. Personal Strength	.20	.17	.23	.15	.13	.06	13.73	4.48	12.76	4.63	.34
5. Appreciation of life	.16	-.03	.22	.08	.16	.22	11.45	3.15	10.49	3.72	.27
6. Spiritual change	.28	.03	.28	.25	.27	.34	6.23	3.26	5.33	3.22	.20

Note: APTG = Anticipated posttraumatic growth: PTG = Posttraumatic growth. Mean differences were examined by paired-samples t-test. *p<.05; **p<.01; [a]p<.008.

Table A7

Means, Standard Deviations, and Correlations for Patient Baseline APTG and Patient 8 Month PTG

	Patient PTG						APTG (n=87)		PTG (n=49)		
APTG	1	2	3	4	5	6	M	SD	M	SD	*Cohen's d*
1. Total scale	.41**	.39**	.34*	.41**	.41**	.20	74.42	22.05	63.88	21.67	.37*
2. New possibilities	.51**	.55**	.42**	.50**	.44**	.25	16.10	5.68	11.29	5.37	.68[a]
3. Relationships	.34*	.28*	.29*	.38*	.36*	.11	26.06	7.78	24.02	8.00	.21
4. Personal Strength	.32*	.27	.29*	.33*	.33*	.10	13.93	4.44	12.76	4.63	.16
5. Appreciation of life	.39**	.38**	.30*	.36*	.48**	.15	11.59	3.57	10.49	3.72	.21
6. Spiritual change	.27	.27	.16	.21	.15	.42**	6.70	3.04	5.33	3.22	.32*

Note: APTG = Anticipated posttraumatic growth: PTG = Posttraumatic growth. Mean differences were examined by paired-samples t-test. *p<.05; **p<.01; [a]p<.008.

Table A8

Means, Standard Deviations, and Correlations for Collateral APTG and Collateral 8 Month PTG

	Collateral PTG						APTG (n=55)		PTG (n=31)		
APTG	1	2	3	4	5	6	M	SD	M	SD	*Cohen's d*
1. Total scale	.69**	.44*	.70**	.57**	.42*	.63**	64.67	23.8	67.38	18.42	.10
2. New possibilities	.78**	.60**	.76**	.61**	.46**	.66**	13.50	5.47	11.29	5.25	.46[a]
3. Relationships	.61**	.31	.66**	.54**	.38**	.52**	22.67	8.85	24.68	6.41	.22
4. Personal Strength	.59**	.42**	.55**	.49**	.30	.58**	12.23	5.00	13.73	4.48	.33
5. Appreciation of life	.63*	.40**	.64**	.54**	.38*	.53**	10.50	3.61	11.45	3.15	.28
6. Spiritual change	.63**	.36*	.65**	.37**	.48**	.73**	5.77	3.00	6.23	3.26	.08

Note: APTG = Anticipated posttraumatic growth: PTG = Posttraumatic growth. Mean differences were examined by paired-samples t-test. *p<.05; **p<.01; [a]p<.008.

Table A9

Means, Standard Deviations, and Correlations for Collateral APTG for Patients and Patients PTG

	Patient PTG						APTG for patients (n=55)		PTG (n= 49)		
APTG for patients	1	2	3	4	5	6	M	SD	M	SD	*Cohen's d*
1. Total scale	.26	.27	.20	.23	.10	.26	63.84	20.42	63.87	21.67	.07
2. New possibilities	.23	.29	.14	.23	.06	.22	13.11	5.36	11.29	5.37	.42*
3. Relationships	.20	.21	.17	.17	.06	.17	22.39	7.11	24.02	8.00	.08
4. Personal Strength	.39*	.35*	.34	.38*	.26	.23	12.64	4.31	12.76	4.63	.11
5. Appreciation of life	.16	.22	.15	.12	.03	.09	10.35	3.35	10.49	3.72	.02
6. Spiritual change	.17	.09	.08	.11	.06	.49**	5.33	3.00	5.33	3.22	.07

Note: APTG = Anticipated posttraumatic growth. PTG = Posttraumatic growth. Mean differences were examined by paired-samples t-test. *p<.05; **p<.01; [a]p<.008.

Table A10

Means and Standard Deviations for Dispositional and Situational Coping

	Dispositional (n=87)		Situational (n=71)		
Variable	M	SD	M	SD	*Cohen's D*
Positive reinterpretation	12.53	2.16	11.66	2.63	.36[a]
Denial	5.63	1.99	5.49	1.99	.03
Planning	12.24	2.64	11.68	2.48	.22

Note: Dispositional coping was measured at baseline; Situational coping was measured at 60 days. Mean differences were examined by paired-samples t-test.
*p<.05; **p<.01; [a]p<.008.

Table A11

Correlations between Patient APTG and Coping Scales

Scale	1	2	3	4	5	6	7	8	9	10	11	12
1. Total scale	-											
2. New possibilities	.92**	-										
3. Relationships	.96**	.83**	-									
4. Personal Strength	.91**	.76**	.87**	-								
5. Appreciation of life	.89**	.80**	.82**	.78**	-							
6. Spiritual change	.72**	.61**	.62**	.58**	.55**	-						
7. Positive coping (D)	.24*	.19	.18	.27*	.17	.33**	-					
8. Denial Coping (D)	.18	.28*	.12	.18	.15	.06	-.10	-				
9. Planning coping (D)	.18	.07	.20	.20	.12	.29**	.48**	-.20	-			
10. Positive coping (S)	.37**	.41*	.33**	.40**	.25*	.24*	.54**	.06	.07	-		
11 Denial Coping (S)	.20	.25*	.15	.27*	.16	.06	.03	.52**	-.10	.09	-	
12. Planning Coping (S)	.32**	.26*	.30*	.38**	.24*	.30*	.45*	-.08	.46**	.33**	.01	-

Note: APTG = Anticipated posttraumatic growth. D=dispositional coping. S=Situational coping.
*p<.05; **p<.01; **p<.001; [a]p<.008.

Table A12

Correlations between Patient PTG and Coping Scales

Scale	1	2	3	4	5	6	7	8	9	10	11	12
1. Total scale	-											
2. New possibilities	.87**	-										
3. Relationships	.94**	.73**	-									
4. Personal Strength	.88**	.66**	.82**	-								
5. Appreciation of life	.87**	.71**	.78**	.75**	-							
6. Spiritual change	.68**	.61**	.53**	.45**	.50**	-						
7. Positive coping (D)	.11	.16	.13	.06	.03	.04	-					
8. Denial Coping (D)	.07	.03	.08	.15	.05	-.09	-.10	-				
9. Planning coping (D)	.02	-.00	.07	-.04	-.08	.13	.48**	-.20	-			
10. Positive coping (S)	.33*	.37*	.28	.32*	.22	.19	.54**	.06	.07	-		
11 Denial Coping (S)	.01	-.15	.10	.09	.10	-.21	.03	.52**	-.10	.09	-	
12. Planning Coping (S)	38**	.34*	.38*	.28	.29	.37*	.45*	-.09	.47**	.33*	.00	-

Note: PTG = Posttraumatic growth. D=dispositional coping; S=Situational coping; samples t-test.
*p<.05; **p<.01; **p<.001; [a]p<.008.

Table A13

Interaction Effects for Planning Coping Moderating the Relationship between APTG and PTG

Variable	*B*	*SE B*	ß	*R*	R^2	ΔR^2	*F*	*(df)*
Block 1								
APTG Total	-.89	.53	-.97	.41	.17	.17	9.36	(1, 47)**
Block 2								
Planning Coping	-8.12	3.3	-1.23*	.41	.17	.00	.16	(1, 46)
Block 3								
APTG X Planning	.11	.05	1.92*	.52	.27	.10	5.9	(1, 45)*

Note: APTG = Anticipated posttraumatic growth. PTG = Posttraumatic growth.
*p<.05; **p<.01; **p<.001; [a]p<.008.

Table A14

Regression Coefficients for APTG and Coping Predicting PTG

Variable	*B*	*SE B*	ß	*R*	R^2	ΔR^2	*F*	*(df)*
Dispositional Coping								
APTG	.37	.13	.40	.41	.17	.17	9.3	(1, 47)**
Positive reinterpretation	.15	1.26	.02	.41	.17	.00	.01	(1, 46)
APTG	.37	.13	.41	.41	.17	.17	9.3	(1, 47)**
Denial	-.03	1.7	-.00	.41	.17	.00	.00	(1, 46)
APTG	-	-	-	-	-	-	-	-
Planning	-	-	-	-	-	-	-	-
Situational Coping								
APPTG	.30	.13	.33*	.40	.16	.16	8.17	(1, 43)**
Positive reinterpretation	.03	1.19	.21	.45	.20	.04	2.01	(1, 42)
APTG	.38	.13	.42**	.40	.16	.16	8.17	(1, 43)**
Denial	-1.03	1.96	-.08	.41	.17	.01	.28	(1, 42)
APTG	.30	.13	.33*	.40	.16	.16	8.17	(1, 43)**
Planning	2.7	1.21	.30*	.50	.25	.09	4.85	(1, 42)*

Note: APTG = Anticipated posttraumatic growth. PTG = Posttraumatic growth. In regression models APTG was entered in the first block and coping was entered in the second block.
*p<.05; **p<.01; **p<.001; [a]p<.008.

Table A15

Bootstrap Confidence Intervals for the Effect of APTG on PTG through Coping

	Bootstrapping					
	Percentile 95% CI		BC 95% CI		Bca 95% CI	
Coping Variables	Lower	Upper	Lower	Upper	Lower	Upper
Dispositional						
Positive reinterpretation	-.1481	.0910	-.0930	.1241	-.0750	.1960
Denial	-.0849	.0464	-.0943	.0435	-.0926	.0418
Planning	-	-	-	-	-	-
Situational						
Positive reinterpretation	-.0693	.1750	-.0183	.2381	-.0072	.2737
Denial	-.8180	.0301	-.0861	.0216	-.0757	.0375
Planning	-.0103	.1934	.0005	.2396*	-.0004	.2296

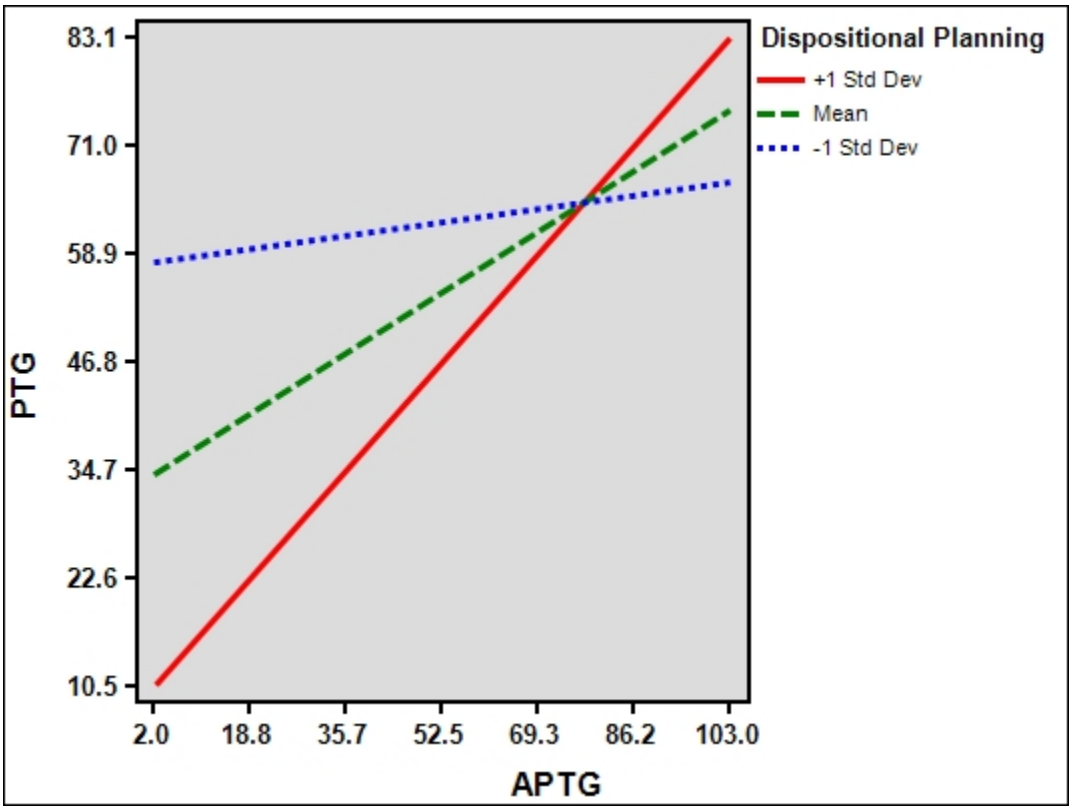
Note: Dispositional coping was measured at baseline. Situational coping was measured 60 days. BC = Bias corrected confidence interval. BCa = Bias corrected accelerated confidence interval. *Mediation is present if 0 is not between confidence intervals.

APPENDIX B

FIGURES

Figure B1

Interaction of Dispositional Planning Coping Moderating the Relationship between APTG and PTG



Note: APTG = Anticipated posttraumatic growth; PTG = Posttraumatic growth.

APPENDIX C

PATIENT CONSENT FORM

INFORMED CONSENT DOCUMENT

Project Title: **Quality of Life Among Cancer Patients: Longitudinal Study of Benefit Finding**

Research Team: Elizabeth Altmaier, Ph.D. (Principal Investigator), Roger Gingrich, Ph.D., M.D., Daniel Berg, M.D., Eva Schoen, Ph.D., Benjamin Tallman, B.A., Justin O'Rourke, M.A., Jessica Lohnberg, B.A., Robyn Hagberg, M.A., Torricia Yamada, B.A.

This consent form describes the research study to help you decide if you want to participate. This form provides important information about what you will be asked to do during the study, about the risks and benefits of the study, and about your rights as a research subject.

- If you have any questions about or do not understand something in this form, you should ask the research team for more information.
- You should discuss your participation with anyone you choose such as family or friends.
- Do not sign this form unless the study research team has answered your questions and you decide that you want to be part of this study.

WHAT IS THE PURPOSE OF THIS STUDY?

This is a research study. We are inviting you to participate in this research study because you have been recently diagnosed with cancer.

The purpose of this research study is to assess whether people who anticipate finding benefit from a traumatic experience, such as cancer diagnosis and treatment, experience significant growth or change in their lives. We will collect information about their beliefs, expectations, and mood from persons with cancer and persons close to them over a period of about eight months.

HOW MANY PEOPLE WILL PARTICIPATE?

Approximately 100 people will take part in this study at the University of Iowa.

HOW LONG WILL I BE IN THIS STUDY?

If you agree to take part in this study, your involvement will last for approximately 8 months. We will be contacting you either in person during your time at the hospital or by telephone 3 times during this period.

WHAT WILL HAPPEN DURING THIS STUDY?

If you agree to participate in this study, you will be asked a series of questions, either during your appointment at the hospital or over the phone before you begin treatment for your cancer. We will ask you questions about yourself such as your age, gender, racial/ethnic group, religious affiliation and activities, occupation, employment status, marital status, children currently living in your home, and highest educational level. We will be asking you about your quality of life, your coping styles, your physical health, and your social support. An example of a question you might be asked is whether this statement describes yourself: "I'm always optimistic about my future." This interview will last about 20 minutes. You are free to skip any questions that you prefer not to answer.

Approximately 60 days after your first interview, we will again contact you by phone or in person at the hospital to conduct a shorter interview (likely 5 minutes). We will ask if you have finished your treatment, about a recent stressful event related to your cancer treatment, and about your coping styles.

Last, we will again contact you 6 months after the second interview, or 8 months from the first interview, to ask you another set of similar questions. We will ask you how you generally feel, about things that have happened in your life, about your physical and emotional well being, about your relationship with your family, about your concerns, and about your experiences related to your having cancer. This interview will last about 20 minutes

We are also asking you to identify a family member or friend you believe will be influential in your recovery period. This person will be asked several questions about their own coping styles and whether they expect to experience any benefit from interacting with you during your treatment.

WHAT ARE THE RISKS OF THIS STUDY?

You may experience one or more of the risks indicated below from being in this study. In addition to these, there may be other unknown risks, or risks that we did not anticipate, associated with being in this study.

We will ask you questions about your cancer diagnosis and treatment. You may be uncomfortable answering these questions. You may skip any questions you do not wish to answer.

We will ask you questions about your mood and feelings such as depression. If we have concerns about your responses, we will inform you and we will contact your treating physician with the nature of those concerns. An example of those concerns would be if we believed your responses about your mood indicated you were likely to harm yourself.

The doctor who is treating you for your cancer will discuss the risks of the treatment with you. These risks will not change because you are in this study.

WHAT ARE THE BENEFITS OF THIS STUDY?

You will not benefit from being in this study. However, we hope that, in the future, other people might benefit from this study because we will identify factors that help persons cope better with their cancer treatments.

WILL IT COST ME ANYTHING TO BE IN THIS STUDY?

You will not have any costs for being in this research study. You and/or your medical/hospital insurance carrier will remain responsible for your regular medical care expenses.

WILL I BE PAID FOR PARTICIPATING?

You will not be paid for being in this research study.

WHO IS FUNDING THIS STUDY?

The University and the research team are receiving no payments from other agencies, organizations, or companies to conduct this research study.

WHAT ABOUT CONFIDENTIALITY?

We will keep your participation in this research study confidential to the extent permitted by law. However, it is possible that other people such as those indicated below may become aware of your participation in this study and may inspect and copy records pertaining to this research. Some of these records could contain information that personally identifies you.

- federal government regulatory agencies,
- auditing departments of the University of Iowa, and
- the University of Iowa Institutional Review Board (a committee that reviews and approves research studies)

To help protect your confidentiality, we will use identification numbers on all of the information we gather from you instead of your name. In addition, all of this information will be stored in locked filing cabinets in locked offices that are only accessible by members of this research team. The list linking your name and your study identification number will be stored in a secure location that is accessible only to the investigators. If we write a report or article about this study or share the study data set with others, we will do so in such a way that you cannot be directly identified.

WILL MY HEALTH INFORMATION BE USED DURING THIS STUDY?

The Federal Health Insurance Portability and Accountability Act (HIPAA) requires your health care provider to obtain your permission for the research team to access or create "protected health information" about you for purposes of this research study. Protected health information is information that personally identifies you and relates to your past, present, or future physical or mental health condition or care. We will access or create health information about you, as described in this document, for purposes of this research study. Once your health care provider has disclosed your protected health information to us, it may no longer be protected by the Federal HIPAA privacy regulations, but we will continue to protect your confidentiality as described under "Confidentiality."

We may share your health information related to this study with other parties including federal government regulatory agencies, the University of Iowa Institutional Review Boards and support staff,

You cannot participate in this study unless you permit us to use your protected health information. If you choose *not* to allow us to use your protected health information, we will discuss any non-research alternatives available to you. Your decision will not affect your right to medical care that is not research-related. Your signature on this Consent Document authorizes your health care provider to give us permission to use or create health information about you.

Although you may not be allowed to see study information until after this study is over, you may be given access to your health care records by contacting your health care provider. Your permission for us to access or create protected health information about you for purposes of this study has no expiration date. You may withdraw your permission for us to use your health information for this research study by sending a written notice to Elizabeth Altmaier, Ph.D., 361 Lindquist Center, The University of Iowa, Iowa City, IA 52242. However, we may still use your health information that was collected before withdrawing your permission. Also, if we have sent your health information to a third party, such as the study sponsor, or we have removed your identifying information, it may not be possible to prevent its future use. You will receive a copy of this signed document.

IS BEING IN THIS STUDY VOLUNTARY?

Taking part in this research study is completely voluntary. You may choose not to take part at all. If you decide to be in this study, you may stop participating at any time. If you decide not to be in this study, or if you stop participating at any time, you won't be penalized or lose any benefits for which you otherwise qualify.

WHAT IF I HAVE QUESTIONS?

We encourage you to ask questions. If you have any questions about the research study itself, please contact: Elizabeth Altmaier, PhD, (319) 335-5566. If you experience a research-related injury, please contact: Dr. Altmaier at the telephone number above or by email at Elizabeth-altmaier@uiowa.edu.

If you have questions, concerns, or complaints about your rights as a research subject or about research related injury, please contact the Human Subjects Office, 340 College of Medicine Administration Building, The University of Iowa, Iowa City, Iowa, 52242, (319) 335-6564, or e-mail irb@uiowa.edu. General information about being a research subject can be found by clicking "Info for Public" on the Human Subjects Office web site, http://research.uiowa.edu/hso. To offer input about your experiences as a research subject or to speak to someone other than the research staff, call the Human Subjects Office at the number above.

This Informed Consent Document is not a contract. It is a written explanation of what will happen during the study if you decide to participate. You are not waiving any legal rights by signing this Informed Consent Document. Your signature indicates that this research study has been explained to you, that your questions have been answered, and that you agree to take part in this study. You will receive a copy of this form.

Subject's Name (printed): _____

Do not sign this form if today's date is on or after $STAMP_EXP_DT.

_____ _____

(Signature of Subject) (Date)

Statement of Person Who Obtained Consent

I have discussed the above points with the subject or, where appropriate, with the subject's legally authorized representative. It is my opinion that the subject understands the risks, benefits, and procedures involved with participation in this research study.

_____ _____

(Signature of Person who Obtained Consent) (Date)

APPENDIX D

COLLATERAL CONSENT DOCUMENT

We invite you to participate in a research study. The purpose of this study is to understand the quality of life cancer patients experience before and after treatment (everyday life, relationships, feelings, etc.). We will collect information about their beliefs, expectations, and mood from persons with cancer and persons close to them over a period of about eight months. We hope to gain a better understanding of the everyday life of individuals diagnosed with cancer and enhance the quality of life of future cancer patients.

We are inviting you to participate in this study because you were identified by someone close to you who has recently been diagnosed with cancer as someone who knows him or her well. That person gave us your address/phone number, or if you are receiving this letter during an appointment, introduced us to you. If you agree to participate, we will ask you to complete questionnaires about your feelings, perceptions, and your attitudes regarding your friend's diagnosis of cancer. We will ask you to complete these questionnaires twice: the first time before your friend receives treatment and the second time after your friend has completed treatment (in about 8 months). It will take approximately 10-15 minutes to complete the questionnaires. These questionnaires can be completed while you are at the clinic or during a telephone interview.

We will keep the information you provide confidential, however federal regulatory agencies and the University of Iowa Institutional Review Board (a committee that reviews and approves research studies) may inspect and copy records pertaining to this research. To help protect your confidentiality, we will use identification numbers on all of the information we gather from you instead of your name. In addition, all of this information will be stored in locked filing cabinets in locked offices that are only accessible by members of this research team. The list linking your name and your study identification number will be stored in a secure location that is accessible only to the investigators. If we write a report about this study we will do so in such a way that you cannot be identified.

The questions ask about your feelings and beliefs, changes in your life, and your relationship with your friend. You may be uncomfortable answering questions about these topics. You may skip any questions you do not wish to answer. You will not benefit personally from being in this study. However we hope that others may benefit in the future from what we learn as a result of this study.

You will not have any costs for being in this research study. You will not be paid for being in this research study.

Participating in this research study is completely voluntary. If you decide that you do not want to be in this study, or, if at a later date you would like to discontinue your participation, you will not be penalized in any way.

If you have any questions about this study, please contact Elizabeth M. Altmaier, Ph.D., 360 Lindquist Center, University of Iowa, Iowa City, IA 52242. Her telephone number is (319) 335-5566. Her email is Elizabeth-altmaier@uiowa.edu. If you experience a research-related injury, please contact Dr. Altmaier whose contact information is above. If you have questions about the rights of research subjects, please contact the Human Subjects Office, 300 College of Medicine Administration Building, The University of Iowa, Iowa City, IA 52242, (319) 335-6564, or e-mail irb@uiowa.edu. To offer input about your experiences as a research subject or to speak to someone other than the research staff, call the Human Subjects Office at the number above.

If you are receiving this letter in person, and it is convenient for you to complete the questionnaires today, the person who gave you the letter will give you the questionnaires. If you cannot complete the questionnaires today, we will arrange a time to telephone you.

If you are receiving this letter in the mail, a person will contact you by telephone in the next two weeks to determine if you will consent and, if you do, to schedule a time for the interview. If you do not want to be contacted, please telephone Mr. Benjamin Tallman and leave a message at (319) 310-3995.

Thank you for your consideration.

Elizabeth M. Altmaier, Ph.D.
Department of Psychological and Quantitative Foundations
University of Iowa

APPENDIX E

PATIENT DEMOGRAPHIC QUESTIONNAIRE

Demographic Information

1) Is this the first time you have been diagnosed with Cancer? Yes No

If Yes, go to question 2.

If No, when were you first diagnosed? Date (_____/_____/_____)

What was your diagnosis?_____

What treatment(s) did you receive? BMT Chemotherapy

Radiation Surgery Other_____

2) What is your current diagnosis?_____

3) What stage is your current cancer? 1 2 3 4 5 no stage

4) What treatment(s) are you currently receiving or have recently received?

BMT (allo/auto) Chemotherapy Surgery Radiation

Other_____

5) What is your age? _____

6) What is your gender? Female Male

7) What is your occupation?_____

8) What is your employment status?

Full-time Part-time Full-time homemaker Student

Self-employed Retired Disabled Not employed

9) What is your marital status?

Single or never married Married Separated Divorced

Widowed Cohabiting Other_____

10) How many children under age 18 are currently living in your home?

0 1 2 3 4 5 6 7 8 more than 8

11) What is your highest educational degree?

Below high school High School Community College or Some College

College Degree Graduate/Professional Degree

12) What is your racial/ethnic group?

Hispanic Asian African American Caucasian

American Indian Bi-racial Other_____

13) What is the Zip code where you currently live?_____

14) What was the primary religious affiliation of your family while you were growing up?

Protestant Catholic Jewish Muslim No affiliation

Spiritual Other_____

15) How often did your family participate in religious activities while you were growing up? (for example, attend church, read religious scripture, pray/meditate)?

Never Once a year Once a month Once a week

Once a day More than once a day

16) How important was religion in your family while you were growing up? (circle one number)

Not at all Extremely
1 2 3 4 5 6 7 8 9 10

17) What is your current primary religious affiliation?

Protestant Catholic Jewish Muslim No affiliation

Spiritual Other_____

18) How often do you currently participate in religious activities?

Never Once a year Once a month Once a week

Once a day More than once a day

19) How important is religion to you currently? (circle one number)

Not at all									Extremely
1	2	3	4	5	6	7	8	9	10

APPENDIX F

COLLATERAL DEMOGRAPHIC QUESTIONNAIRE

Demographic Information

1) What is your age? _____

2) What is your gender? Female Male

3) What is your occupation?_____

4) What is your employment status?

Full-time Part-time Full-time homemaker Student

Self-employed Retired Disabled Not employed

5) What is your marital status?

Single or never married Married Separated Divorced

Widowed Cohabiting Other_____

6) How many children are currently living in your home?

0 1 2 3 4 5 6 7 8 more than 8

7) What is your highest educational degree?

Below high school High School Some College

College Degree Graduate/Professional Degree

8) What is your racial/ethnic group?

Hispanic Asian African American Caucasian

American Indian Bi-racial Other_____

9) What is the Zip code where you live?_____

10) What was the primary religious affiliation of your family when you were growing up?

Protestant Catholic Jewish Muslim No affiliation

Spiritual Other_____

11) How often did your family participate in religious activities when you were growing up? (for example, attend church, read religious scripture, pray/meditate)?

Never Once a year Once a month Once a week

Once a day More than once a day

12) How important was religion in your family when you were growing up? (circle one number)

Not at all									Extremely
1	2	3	4	5	6	7	8	9	10

13) What is your current primary religious affiliation?

Protestant Catholic Jewish Muslim No affiliation

Spiritual Other_____

14) How often do you currently participate in religious activities?

Never Once a year Once a month Once a week

Once a day More than once a day

15) How important is religion to you currently? (circle one number)

Not at all									Extremely
1	2	3	4	5	6	7	8	9	10

APPENDIX G

PATIENT 60 DAY LETTER

Date here

Counseling Psychology
College of Education, N361 LC
University of Iowa
Iowa City, IA 52242

Dear individual's name:

Thank you again for participating in our research study about the quality of life cancer patients experience before and after treatment. A 60-day time period has passed since you completed the first round of questionnaires, and we are requesting that you complete the second set of questionnaires.

Enclosed are color-coded answer sheets for use during the completion of the questionnaires. At a time that is convenient for you, someone from our research team will contact you via phone to go through the questionnaires. We will ask about your health, how you have coped with your cancer, and how having cancer has impacted your life. It will take approximately 15-20 minutes to complete the questionnaires. You may skip any questions that you do not wish to answer.

If at any time throughout the interview you have questions, please let your interviewer know. Your continued participation in this study is completely voluntary. If you decide not to be in this study, or if you stop participating at any time, you won't be penalized or lose any benefits for which you otherwise qualify.

If you have any questions about this study, please contact Dr. Elizabeth Altmaier. Her address is 360 Lindquist Center, University of Iowa, Iowa City, IA 52242. Her telephone number is (319) 335-5566. Her email is Elizabeth-altmaier@uiowa.edu.

If you have questions about the rights of research subjects, please contact the Human Subjects Office, 300 College of Medicine Administration Building, The University of Iowa, Iowa City, IA 52242, (319) 335-6564, or e-mail irb@uiowa.edu. Offer input about your experiences as a research subject or to speak to someone other than the research staff, call the Human Subjects Office at the number above.

The next step is that someone will call you to schedule an interview. If at this point you do not wish to participate, please call Mr. Benjamin Tallman at (319) 310-3995 and leave a message that you do not wish to be contacted. Otherwise, you do not need to do anything but wait to be contacted.

Thank you again for your participation, and we look forward to speaking with you.

Elizabeth M. Altmaier, PhD
Department of Psychological and Quantitative Foundations
University of Iowa

APPENDIX H

PATIENT 9 MONTH LETTER

Date here

Counseling Psychology
College of Education, N361 LC
University of Iowa
Iowa City, IA 52242

Dear individual's name:

Thank you again for participating in our research study about the quality of life cancer patients experience before and after treatment. An 8-month time period has passed since you completed the first round of questionnaires, and we are requesting that you complete the last set of questionnaires at this time.

Similar to the last interview, enclosed are color-coded answer sheets for use during the completion of the questionnaires. At a time that is convenient for you, someone from our research team will contact you via phone to go through the questionnaires. We will ask about your health, how you have coped with your cancer, and how having cancer has impacted your life. It will take approximately 15-20 minutes to complete the questionnaires. You may skip any questions that you do not wish to answer.

We sincerely appreciate your participation. If at any time throughout the interview you have questions, please let your interviewer know. Your continued participation in this study is completely voluntary. If you decide not to be in this study, or if you stop participating at any time, you won't be penalized or lose any benefits for which you otherwise qualify.

If you have any questions about this study, please contact Elizabeth M. Altmaier, 360 Lindquist Center, University of Iowa, Iowa City, IA 52242. Her telephone number is (319)335-5566. Her email is Elizabeth-altmaier@uiowa.edu.

If you have questions about the rights of research subjects, please contact the Human Subjects Office, 300 College of Medicine Administration Building, The University of Iowa, Iowa City, IA 52242, (319) 335-6564, or e-mail irb@uiowa.edu. To offer input about your experiences as a research subject or to speak to someone other than the research staff, call the Human Subjects Office at the number above.

You do not need to do anything to schedule this interview. Someone will call you within two weeks to determine a convenient time to have the interview. However, if you do not wish to be contacted, please call Benjamin Tallman at (319) 310-3995 and leave a message that you do not wish to be called. Thank you again for your participation, and we look forward to speaking with you.

Elizabeth M. Altmaier, PhD
Department of Psychological and Quantitative Foundations
University of Iowa

APPENDIX I

COLLATERAL 9 MONTH LETTER

Date here

Dear individual's name:

Thank you again for participating in our research study about the quality of life cancer patients experience before and after treatment. We are collecting information about their beliefs, expectations, and mood from persons with cancer and persons close to them over a period of about eight months. We hope to gain a better understanding of the everyday life of individuals diagnosed with cancer and enhance the quality of life of future cancer patients. An 8-month time period has passed since you completed the first round of questionnaires, and we are requesting that you complete the last questionnaires at this time.

At a time that is convenient for you, someone from our research team will contact you via phone to go through the questionnaires. During this interview, we would ask some of the same questions we did before about your health, how you have coped with your spouse/patient/other/having cancer, and how their having cancer has impacted your life. It will take approximately 20 minutes to complete the questionnaire. You may skip any questions that you do not wish to answer.

Enclosed with this letter are the color-coded answer sheets for your use in completing the questionnaires.

We will keep the information you provide confidential, however federal regulatory agencies and the University of Iowa Institutional Review Board (a committee that reviews and approves research studies) may inspect and copy records pertaining to this research To help protect your confidentiality, we will use identification numbers on all of the information we gather from you instead of your name. In addition, all of this information will be stored in locked filing cabinets in locked offices that are only accessible by members of this research team. The list linking your name and your study identification number will be stored in a secure location that is accessible only to the investigators. If we write a report about this study we will do so in such a way that you cannot be identified.

The questions ask about your feelings and beliefs, changes in your life, and your relationship with your friend. You may be uncomfortable answering questions about these topics. You may skip any questions you do not wish to answer. You will not benefit personally from being in this study. However we hope that others may benefit in the future from what we learn as a result of this study.

You will not have any costs for being in this research study. You will not be paid for being in this research study.

We sincerely appreciate your participation. If at any time throughout the interview you have questions, please let your interviewer know. Your continued participation in this study is completely voluntary. If you decide not to be in this study, or if you stop participating at any time, you won't be penalized or lose any benefits for which you otherwise qualify.

If you have any questions about this study, please contact Elizabeth Altmaier, PhD., at 360 Lindquist Center, University of Iowa, Iowa City, IA 52242. Her telephone number is (319) 335-5566; her email is Elizabeth-altmaier@uiowa.edu. If you experience a research-related injury, please contact: Dr. Altmaier at the contact information above. If you have questions about the rights of research subjects, please contact the Human Subjects Office, 300 College of Medicine Administration Building, The University of Iowa, Iowa City, IA 52242, (319) 335-6564, or e-mail irb@uiowa.edu To offer input about your experiences as a research subject or to speak to someone other than the research staff, call the Human Subjects Office at the number above.

An interviewer will call you within a week to schedule a time that is convenient for you for the interview. If you have decided not to participate, please contact Mr. Benjamin Tallman at (319) 310-3995 and leave a message with your name and the fact that you wish to not be contacted.

Thank you for your consideration.

Elizabeth M. Altmaier, PhD
Department of Psychological and Quantitative Foundations
University of Iowa

NOTES

[1] Upon inspection of scatter plots between dispositional planning coping and APTG, and dispositional planning coping and PTG, several outliers were present. One such outlier did not appear to be within the same trend with the other cases. This outlier was removed from the analysis and the significant interaction remained. Additionally, after the data were winsorized the interaction remained significant.

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