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Cancer and Posttraumatic Growth

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General Abstract

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Cancer and Posttraumatic Growth

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Cancer is a major medical problem and a leading cause of mortality in the UK. The experience of diagnosis and treatment can be a traumatic one for many people, with symptoms of anxiety, depression, and posttraumatic stress disorder (PTSD) common for many patients. Despite this, many survivors also report benefits and a sense of personal growth from their experience. Understanding this process and the influence of posttraumatic growth (PTG) on mental health outcomes for cancer patients may have far reaching implications for the promotion of psychological adjustment to this chronic illness. The literature review in this paper explores the predominant theories of PTG and the research on cancer-related PTG.

The literature review explores links between the predictions of these general theories and research findings for cancer patients specifically. Establishing factors that predict PTG and its relationship with a range of mental health outcomes would help to build our understanding of emotional adjustment to chronic illness and inform the development of psychological interventions.

The empirical paper investigates the role of trauma-related cognitive appraisals in the perception of PTG for breast cancer patients. More negative appraisals in relation to the event were associated with benefit finding.

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List of Tables

List of Figures

CONTENTS

Empirical Paper

Literature Review Paper

Cancer and Posttraumatic Growth

Julie Moore

Psychological Bulletin was used as a guide in determining the preparation of this paper (see Appendix 1 for notes to contributors).

Abstract

Posttraumatic growth (PTG), the experience of finding benefit from a traumatic experience, has been conceptualised by a number of theorists. These models of PTG have been informed by a wealth of general trauma research from such experiences as road traffic accidents, violent crimes, and war. In recent years, attention has turned to the examination of PTG in groups of cancer patients. This article aims to summarize the current theoretical models of PTG and examine the research on PTG associated with cancer specifically. It will then aim to synthesise the information to review the relevance of these general models of PTG for cancer patients in light of the current research literature available. Clinical implications of current knowledge are discussed and future directions for research are explored.

Key words: Posttraumatic growth, PTG, benefit finding, breast cancer

Introduction

The truth is that cancer was the best thing that ever happened to me. I don't know why I got the illness, but it did wonders for me, and I wouldn't want to walk away from it. Why would I want to change, even for a day, the most important and shaping event of my life? (Armstrong, 2001)

This statement was made by Lance Armstrong, an American road cyclist who won the Tour de France for seven consecutive years after surviving a testicular tumour which spread to his brain and lungs. His treatments included brain and testicular surgery as well as extensive chemotherapy. This is a famous example of the benefit finding that can arise after diagnosis and treatment of cancer. However, researchers have been careful to point out that cancer, and other traumatic experiences, are not perceived as desirable by those who have been through them, and traumatic experiences can give rise to both positive and negative outcomes simultaneously (Stanton, Bower, & Low, 2006).

Cancer is a major medical problem and a leading cause of mortality in the UK. One in every 205 men and one in every 300 women are diagnosed with cancer each year (Souhami & Tobias, 2005). It is now estimated that more than one in three people will develop cancer during their lifetime (Office of National Statistics, 2005).

Cancer is a term used to describe a group of more than 200 different diseases resulting from uncontrolled abnormal cellular growth and the forming of a tumour. If the cancer cells

continue to grow, the tumor invades and destroys surrounding healthy tissue interfering with normal functioning of that region (Veach, Nicholas, & Barton, 2002). The many different types of cancer originate in different cell types and vary in rates of growth, symptoms, and response to medical treatments. There can also be wide variation in symptoms within cancer types when the tumour is located in a different region of the body (Kangas, Henry, & Bryant, 2002). Treatment can involve surgery, chemotherapy, radiation therapy, biological (hormone) therapy, and immunotherapy. The type of treatment depends on the type and stage of the cancer, and many patients undergo more than one type of treatment (Kangas et al, 2002). Progress in early detection and the development of treatments has greatly improved survival rates for many types of cancer. In the UK survival rates have seen a gradual increase of approximately 1% each year since the 1990s (Coleman, Rachet, & Woods, 2004). However, cancer remains a life-threatening illness surrounded in fear. Diagnoses can be unexpected and challenge an individual's core beliefs about the world (Taylor, 1983; Janoff-Bulman, 1992). Treatments are often intrusive and painful, causing fatigue and aversive side effects. Many areas of a patient's life can be disrupted, with changes in social roles and relationships (Stanton et al, 2006).

61% of breast cancer patients reported to have responded to their diagnosis with intense fear and helplessness, perceiving the cancer to be a threat to their life and physical integrity (Cordova, Cunningham, Carlson, & Andrykowski, 2001). This suggests that the experience of breast cancer can be a traumatic one for a significant proportion of patients. Indeed, a wealth of research on the psychological impact of cancer has demonstrated that some patients report clinical levels of distress, including post-traumatic stress disorder (PTSD) (Cordova,

Andrykowski, Kenady, McGrath, Sloan, & Redd, 1995), depression (Derogatis, Morrow, Fetting, Penman, Piasetsky, & Schmale, 1983), and anxiety (Moyer, & Salovey, 1996).

However, throughout history philosophers and authors have described, not only recovery from periods of suffering, but the perception of personal growth and enhanced levels of functioning (Kierkegaard, 1983; Bettelheim, 1975). More recently, positive psychologists have demonstrated evidence that many people experience positive psychological changes after a traumatic experience (Zoellner, & Maercker, 2006). These changes have been conceptualised as posttraumatic growth (PTG) (Tedeschi & Calhoun, 1996). However, a range of other terms have also been used to describe it, such as *finding benefits* (Affleck & Tennen, 1996), *stress-related growth* (Park, Cohen, & Murch, 1996), *thriving* (O'Leary, Alday, & Ickovics, 1998), and *positive psychological changes* (Yalom & Lieberman, 1991).

Posttraumatic growth has been reported following a range of traumatic events such as, war (Fontana & Rosenheck, 1998), vehicle accidents (Calhoun, Cann, Tedeschi, & McMillan, 2000) and rape (Tedeschi & Calhoun, 1995). It can involve changes to basic beliefs and assumptions about the world, relationships and identity (Janoff-Bulman, 1992). Tedeschi, Park, and Calhoun (1998) subdivided PTG into three positive domains: 1. Perceived changes in the self (e.g. feeling stronger, more self-assured, more experienced, and more able to face future challenges); 2. Changes in interpersonal relationships (e.g. a sense that certain relationships have been strengthened); 3. Changes in philosophy or spirituality (e.g. a new awareness of what is important to that person and an increased appreciation for life).

Since the early studies on victims of acute trauma, evidence has accumulated with a general consensus that cancer survivors also report some benefit from the experience. For example, a typical study of 150 survivors of cancer found that 85% described some form of personal growth and positive change associated with overcoming the disease (Barakat, Alderfer, & Kazak, 2005). A review of several studies in this area suggested that this constitutes a general rule for individuals with a cancer experience, rather than the exception (Sumalla, Ochoa, & Blanco, 2009).

Cancer patients commonly report perceived improvements in their psychological resources and coping skills (e.g. Fritz & Williams, 1988) as well as improvements in areas such as relating to others and appreciation for life (Cordova et al, 2001). These reports have been found in a range of different cancer types, such as melanoma (Dirksen, 1995), lung and colorectal cancers (O'Connor, Wicker, & Germino, 1990), testicular cancer (Rieker, Fitzgerald, Kalish, Richie, Lederman & Edbril, 1989), and prostate cancer (Gritz, Wellish, Siau, & Wang, 1990).

While this is a new area of research and studies are few, the fast growing body of research suggests that people who have been affected by cancer show a pattern of posttraumatic growth that is distinct from populations affected by acute traumas (Sumalla et al, 2009). A range of qualitative differences between the experience of cancer and acute traumas may account for this. For example, cancer is not an acute, singular trauma (Sawyer, Ayers, & Field, 2010). In oncological illness it can often be difficult to identify the exact stressor or cluster of stressors that precipitate psychological change. Stressors can be associated with

diagnosis, severity, prognosis, aggressiveness of treatment, changes in body image, or role changes, all of which make it difficult to identify one stressor. Events such as road traffic accidents occur in the external environment, while cancer is an internal stressor that the individual cannot escape or avoid. For most acute traumas, the threat to personal safety is in the past. In cancer, the potential presence of hereditary cancer risk and the possibility of recurrence pose an ongoing threat to personal safety and so the fear for one's life may continue. Therefore, there is difficulty in establishing both the onset and termination of the experience considered to be traumatic (Sumalla et al, 2009). Perhaps due to these differences, cancer was only recognised as an event that could precipitate trauma reactions in 1994 (DSM-IV) (American Psychiatric Association, 1994). Consequently, theoretical descriptions of posttraumatic growth so far, have been largely based on acute traumas.

Given this qualitatively unique traumatic experience and the distinct descriptions of benefit finding, how do these general theories of PTG apply to people with experience of cancer? The following article aims to firstly summarise the most prominent models of PTG that have been informed by the general trauma research, and to then describe some of the research literature on PTG following cancer specifically. A synthesis of these two areas will then aim to provide some clarity on the relevance of these models for the experience of PTG after cancer, and to discuss current understanding of benefit finding in cancer. The following section describes an overview of the most influential models of PTG to date and provides an evaluation of the research literature in this area.

Models of Posttraumatic Growth

Different conceptualisations of PTG have led to the development of diverse models. There is a widely held view that PTG refers to actual changes that an individual can make in relation to an identified trauma, and this view is the foundation for models that conceptualise PTG as an *outcome* of the struggle with a stressor (e.g. Schaefer & Moos, 1992). Taking exception to this, Affleck and Tennen (1996) carefully described PTG as the *perception* of change, and not necessarily actual change. This conceptualisation formed the model of PTG as a *coping strategy* (Affleck & Tennen, 1996).

Coping strategy models describe PTG as an illusory perception of change in identity achieved through such strategies as self-enhancing appraisal, making past memories negative, or making comparisons with others. All of these processes could be compensatory or defensive in order to protect the original identity from being changed or shattered. The contrasting view that PTG represents a real and actual change, suggests that the experience of suffering leads to learning processes that change the way an individual views themselves, others, and the world. This change in identity has behavioural implications such as improvement in communication with significant others and a new commitment to activities. This section gives an overview of some of the most prominent theories of PTG to date.

PTG as outcome

Models of PTG specifically, have been informed by a range of more general theories for life change. For example, Aldwin's (1994) model of transformational coping described three possible types of coping after a stressful event, that result in three distinct outcomes.

Utilisation of previous stress coping methods lead to a return to an original state of functioning, whereas transformational negative coping may result in a lower level of functioning. Transformational positive coping can subsequently produce a higher level of functioning (O'Leary et al, 1998). The models that describe PTG build on these more general theories of change.

Model of personal growth (Schaefer and Moos, 1992)

Schaefer and Moos (1992) viewed PTG as a positive outcome of life crises and outlined factors that predict those positive outcomes. They described a number of environmental (e.g. social support, and relationships) and personal system factors (e.g. health, motivation, sociodemographics, and personal resources) that work to impact on the outcome of a crisis through event-related factors such as the duration, timing, and severity of the event. They suggested that all of these factors combine to shape cognitive appraisals and coping styles. The model distinguished between approach coping and avoidance coping. Approach coping (e.g. positive reappraisal, support seeking, and active analysis and coping with the situation) was suggested to lead to benefit finding, while avoidance coping (e.g. withdrawing from the problem, avoiding reminders of the event) would not. The model also describes three general domains for benefit finding. These were enhanced social resources (e.g. improved relationships), increased personal resources (e.g. new sense of empathy, a sense of maturity), and improved coping resources (e.g. established support network, emotional regulation) (Shaefer & Moos, 1998).

Revised Model of Posttraumatic growth (Tedeschi & Calhoun, 1995, 2004)

Janoff-Bulman (1992) suggested that a traumatic event can be defined by its ability to shatter one's core beliefs and therefore provide a foundation for identity change. Tedeschi and Calhoun (1995) later developed this idea with more detail. They conceptualised PTG as a result of a traumatic event that challenges one's beliefs about the world and important goals. This in turn compromises the ability to manage emotional distress. This emotional distress induces rumination about the event, as the individual tries to make sense of what has happened and why. In the early stages this ruminative activity is automatic and often distressing for the individual. However, the rumination gradually becomes a more deliberate analysis of the trauma and it's resulting impact, re-evaluating and searching for meaning in the new situation. This is viewed as cognitive activity aimed at rebuilding the schema which were shattered by the traumatic experience. The model suggests that this process is key to the development of PTG.

This model also describes social support as an important factor, proposing that good support can provide comfort, reassurance, and coping ideas, which all influence the rumination process and aid the re-construction of the shattered schema. They describe successful coping as the disengagement of pre-trauma beliefs that are not consistent with the occurrence of the traumatic event.

PTG as coping strategy

Taylor (1983): Cognitive Adaptation theory

Taylor (1983) provided one of the earliest and most influential theories of adaptation to threatening events. According to the cognitive adaptation model, traumatic events lead individuals to search for meaning in the experience, in an attempt to restore a sense of mastery over the event and life more generally, and engage in self-enhancing evaluations in an effort to regain a sense of self-esteem. Taylor emphasised that benefit finding depends on the capacity to sustain and modify cognitive biases or illusions that buffer against the sense of threat in the present and the future. By illusions, she does not mean beliefs that oppose known facts, but rather looking at facts in a particular light that yields a more positive picture. She proposed that these positive illusions are a part of normal cognitive functioning and beneficial to mental health (Taylor & Brown, 1988).

Park & Folkman (1997): Model of PTG as part of a meaning-making coping process.

The important role of deriving meaning from traumatic experiences is well established among theorists (Kelley, 1972). Park and Folkman (1997) described two distinct forms of meaning in the context of stress and coping with trauma. Global meaning is made up of a person's core values and enduring beliefs, while situational meaning is that which is formed of specific environmental events. A traumatic event may challenge global meaning and beliefs about the world. To cope with this the individual faces the challenge of integrating global meaning with the contradictory appraisal of the trauma. Finding benefit in the event and perceiving personal growth requires the assimilation of the two by changing the situational meaning to fit with

global meaning. Alternatively, core beliefs and philosophy on life may be adapted to accommodate the occurrence of the traumatic event.

Similarly, Davis, Nolen-Hoeksema, & Larson (1998) conceptualised this meaning making process and included PTG as one possible version of that meaning. According to this model one may perceive personal growth when causal attributions answer not only the question of "why did it happen?" but also "what for?" In attributing the new benefits to this question growth may be perceived.

Zoellner and Maercker (2006): the two component model

The more recent two component model considers PTG to have both a functional and constructive side, as well as an illusory, self-deceptive or dysfunctional aspect (Zoellner & Maercker, 2006). They suggest that the perception of PTG is partly a distorted positive illusion that helps to ease emotional distress. The constructive side of PTG may be evident in healthy adjustment in the long term, while the illusory, self-deceptive side is associated with denial in the short or long term. This side of PTG presents as a cognitive avoidance strategy which can be maladaptive to long term adjustment. However, if an illusory perception of growth co-exists with deliberate attention to the traumatic event, rather than avoidance, then it is thought to serve as a short term adaptive coping strategy. The model proposes that the illusory perception of growth represents a coping effort with a short term function. However, the realistic constructive aspect is expected to be associated with adjustment and wellbeing in the long term. It is suggested that successful coping after a trauma sees the realistic, self-

transforming component of PTG grow over time and the illusory component reduce over time (Zoellner & Maercker, 2006).

Evaluation of Posttraumatic growth models

The development of different theoretical approaches to PTG as coping strategy and outcome artificially polarises the two concepts (Zoellner & Maercker, 2006). More recent approaches such as the two component model (Zoellner & Maercker, 2006) have begun to recognise that PTG could represent both the coping style and the outcome of that coping.

The theoretical approaches that regard PTG as a real and positive identity change are based on the model that traumatic events lead to the shattering of basic assumptions about the world. Within this framework, it has been suggested that diagnosis and treatment of cancer have the potential to alter previously held beliefs about the self as lucky or valuable, or about the world as safe, fair and controllable. Cancer can also test sources of social support to the limits and change views on others as loyal, and reliable (Sumalla et al, 2009).

Janoff-Bulman (1992) suggested that a traumatic event has the ability to shatter one's core beliefs, which provides a foundation for identity change. While studies on torture victims (Dekel, Solomon, Elklit, & Ginzburg, 2004) and combat trauma (Magwaza, 1999) have demonstrated changes to core beliefs, examination of belief changes in cancer patients is scarce among the literature (Sumalla et al, 2009). One of the few studies to examine belief change in cancer patients assessed core beliefs during and after completion of treatment for

haematological cancer, and revealed that belief change is not necessary for PTG (Carboon, Anderson, Pollard, Szer, & Seymor, 2005). These results contradict the views of Janoff-Bulman that core beliefs are destroyed and instead, supports Park and Folkman's (1997) view that when beliefs are threatened by an event, PTG involves the adaptation and assimilation of the event with previously held core beliefs as part of a meaning-making coping process.

Taylor (1983) would argue that this adaptation process may be somewhat illusory and laboratory experiments are providing some evidence for this. For example, McFarland and Alvaro (2000) demonstrated that threats to the self can prompt illusory self-enhancing comparisons over time, which leads to the perception of growth. In addition, limited evidence suggests that self-enhancing cognitions may aid more positive perceptions of the quality of social relationships. For example, a study of individuals who were present at the World Trade Centre during the terrorist attacks showed that those with higher levels of self-enhancement reported better quality relationships and better emotional outcomes (Bonanno, Rennicke, & Dekel, 2005). However, the cross-sectional design of this study limits the conclusions that can be made about causality, and research with cancer patients is needed.

In their model of PTG Tedeschi and Calhoun (1995) emphasised that the process of benefit finding involves some enduring distress from the trauma, but eases distress over time. The potential for benefit finding to reduce distress and improve mental health has important clinical implications for health professionals working with cancer patients. This issue is explored further in the next section which provides an overview of the most current research in this area.

Posttraumatic growth and mental health outcomes after cancer

If benefit finding can be shown to relate to better mental health and psychosocial functioning after cancer then it may be viewed as positive (Klauer, Ferring, & Filipp, 1998). The prospect of finding links between cancer-related PTG and psychological health has led to increased attention from researchers in recent years. However, the accumulating evidence suggests a rather complex story (Algoe & Stanton, 2009). Adjustment to any chronic disease is multifaceted (Stanton, Revenson, & Tennen, 2007), and it is important to consider both negative (e.g. depressive symptoms) and positive (e.g. well-being) measures of adjustment (Algoe & Stanton, 2009).

Measures of positive psychological outcomes

Studies have examined positive psychological outcomes with a variety of measures. In a longitudinal study of breast cancer patients, Carver and Antoni (2004) utilised a 10-item rating scale to measure positive aspects of life such as spiritual fulfilment and challenge (Andrews & Withey, 1976). They reported that benefit finding early after diagnosis and treatment predicted greater wellbeing between 4 and 7 years later. In addition, early benefit finding predicted a reduction in distress and depression at follow-up. These findings reflect those of similar research (e.g. Affleck & Tennen, 1996). However, they contrast with the results of a study by Tomich and Helgeson (2004), which found that initial benefit finding in breast cancer patients was associated with more negative affect later on. Methodological differences may account for this apparent contradiction. For example, the Tomich and Helgeson (2004) sample included women with more severe illness. It is possible that when the prognosis is much worse, finding benefit may represent avoidance in response to a high

level of distress. Another influence may be that the Tomich and Helgeson (2004) study assessed patients at 3 and 9 months rather than the 4 to 7 years in the Carver and Antoni (2004) study. This area of investigation requires assessment across both the early stages after treatment and longer-term follow-up in order to clarify this issue.

A much larger study which assessed 763 breast cancer survivors between 1 and 10 years postdiagnosis found that benefit finding was associated with positive affect in both cross-sectional and longitudinal analyses (Bower, Meyerowitz, Desmond, Bernaards, Rowland, & Ganz, 2005). This study also demonstrated a positive correlation between self-reports of benefit finding and the perception of vulnerability. Reports of vulnerability were also associated with negative affect. Therefore, while a cancer diagnosis can lead to a lasting sense of vulnerability as well as benefit finding, the two showed very different mental health correlates.

The link between PTG and psychological adjustment to cancer is modest in the small number of studies conducted. This finding among cancer patients contrasts to longitudinal studies of a range of other stressors and traumas (e.g., McMillen, Smith, & Fisher, 1997). However, several of these studies were not initially designed to examine the association between PTG and adjustment (e.g., Carver & Antoni, 2004, Bower et al, 2005). This distinction between cancer patients and other individuals indicates the need for further investigation utilising longitudinal designs (Stanton, Bower, & Low, 2006).

Measures of negative psychological outcomes

In their studies of distress in breast cancer patients Carver, Lechner, and Antoni (2009) noticed that women can differ quite dramatically in their psychological reactions to cancer. They classed the observed patterns of reaction into three groups. Group one includes women that do not perceive the breast cancer experience as a crisis and so have low levels of distress. They hypothesised that this group of women are less likely to perceive growth. While the second group experience some distress and growth, the third group experience very high levels of distress and less growth because very high levels of distress makes it too difficult to search for positive meaning in the events. Lechner, Zakowski, Antoni, Greenhawt, and Block (2003) suggested that representation of group one in a study would mask the linear relationship between PTG and outcomes. Some evidence has been produced which supports this idea (Lechner, Carver, Antoni, Weaver, & Phillips, 2006). Other studies have shown no association between PTG and distress (e.g. Antoni, Lehman, Kilbourn, Boyers, Culver, & Alferi, 2001).

A limitation of the research in this area is the cross-sectional design utilised by most of the studies. This only begins to answer all the questions about the effects of PTG on mental health over time. From the cross-sectional data available, a handful of studies suggest a strong link between PTG and better psychological outcomes in cancer (Bower et al, 2005) as well as other severe physical health problems such as SARS (Cheng, Wong, & Tsang, 2006) and HIV (Bower, Kemeny, Taylor, & Fahey, 1998). One longitudinal study found that an increase in PTG between one month and one year after surgery predicted fewer depressive symptoms at one year (Schwarzer, Luszczynska, Boehmer, Taubert, & Knoll, 2006). Another study of patients with mixed cancer types and stages, found that more PTG predicted less health-related worries one year after surgery (Schwarzer et al, 2006).

Links found between PTG and objective physiological markers have been more consistent in the suggestion that perceiving growth is good for people with chronic diseases such as cancer. One study examined samples of breast cancer patients who participated in a cognitive behavioural stress management intervention (Cruess, Antoni, McGregor, Kilbourn, Boyers, & Alferi, 2000). They found that women in a stress management intervention group showed an increase in PTG that in turn predicted reductions in cortisol, a hormone produced during the stress response, so that the posttraumatic growth mediated the effect of the intervention on cortisol levels. Moreover, those who increased in PTG also had better immune function when tested three months later (McGregor, Antoni, Boyers, Alferi, Blomberg, & Carver, 2004). Park (2004) also found that PTG was more strongly linked to outcome measures which were specific to the disease. Therefore, further research is needed for the large number of cancer types and their individual treatments.

In summary, there is little sign that PTG is maladaptive for cancer patients, but the evidence for positive effects is not consistent, and so more research in this area is essential for theoretical advancement. The models currently available provide little to inform hypotheses about the potential effects of PTG on outcomes for cancer patients (Algoe & Stanton, 2009). Theoretical approaches that view PTG as a representation of real change end with the measurement of growth as the outcome of a process. More explicit theories are needed to guide investigations into the effects of PTG on long-term mental health. However, such theories generate a host of hypotheses about the factors that may contribute to and predict PTG, which has guided the research literature in recent years. The following section examines the research into predictors of PTG for cancer patients specifically. Findings for a range of

predictors are described, followed by an evaluation of the links between these findings and the current theoretical models of PTG.

Predictors and correlates of Posttraumatic growth for cancer patients

Although large numbers of cancer patients have reported a perceived sense of growth, the experience is not universal (Stanton et al, 2006). Researchers have attempted to distinguish between those who report PTG and those who do not by identifying a range of predictors and correlates of PTG. However, the literature has yet to successfully establish consistent relationships.

Perceived threat

Several studies have demonstrated a significant positive relationship between perceived threat and PTG (e.g. Bower et al, 2005). A study by Cordova et al (2001) benefited from the use of a healthy control group which were matched for age and education level. They reported a strong positive correlation between perceived life threat and PTG.

Another study reported non-significant correlations (e.g. Weiss, 2004). However, this study used a likert-style rating of stressfulness to indicate threat, rather than perceived threat to life. Studies that used the Impact of Event Scale (e.g. Manne, Ostroff, Winkel, Goldstein, Fox, & Grana, 2004) also tended to show no relationship. However, this tool provides a measure of PTSD symptoms and does not provide a measure of perceived threat to life. These general measures may be less sensitive to cancer related threat. A growing number of studies with

more robust methodology indicate a strong positive relationship between the perception of threat to life and benefit finding following cancer. For example, one study examined the association between subjective and objective threat and demonstrated that perceived threat correlated with clinical ratings of the severity of the cancer, but the relationship between perceived threat and PTG remained strong, even when the disease severity was controlled (Lechner et al, 2003).

Severity of disease

Examination of the relationship between objective disease severity and PTG, without the inclusion of perceived threat, has produced mixed results. The majority of studies have found no significant correlation between the severity of the cancer and reports of PTG. Some studies have demonstrated that individuals with more severe cancers were more likely to report positive changes as a result of their experience than those with a better cancer prognosis (e.g., Urcuyo, Boyers, Carver, & Antoni, 2005). However, correlations were often modest and only found in some domains of PTG. For example, one study demonstrated a relationship between cancer stage and reports of positive change in love felt for the spouse, but no such relationship in other domains of PTG such as life outlook (Andrykowski, Curran, Studts, Cunningham, Carpenter, & McGrath, 1996).

A significant methodological limitation is that few of the studies included patients with advanced cancer. One that did, found an interesting curvilinear relationship between the stage of cancer and reported PTG (Lechner et al, 2003). In this study the patients reporting the lowest levels of PTG were those with the most severe (stage IV) cancer. Patients with stage II

cancer reported significantly higher levels of PTG than those with stage I or stage IV. In their review it was pointed out by Stanton et al (2006) that stage IV cancer is mostly diagnosed when an initial primary cancer has spread several years after the first diagnosis. Therefore, this could also represent a relationship with the length of time in treatment, or changes in perceived threat.

Time since diagnosis

A handful of studies have examined the relationship between the length of time since the onset of the stressor and reports of PTG. A complication arises from the difficulties in identifying the exact stressor, which may differ between individuals. Importantly, for cancer patients, the stressor could be from the moment of diagnosis, but it could also be the experience of invasive treatments, which occur over a long period of time. As one might expect a positive correlation has been demonstrated between time since diagnosis and PTG for samples of breast cancer patients (Klauer, Ferring, & Filipp, 1998). This particular study benefited from the inclusion of patients ranging from stage 0 to stage III of the disease. Again, the majority of studies in this area have been cross-sectional which limits the conclusions that can be drawn from them.

A study that used a longitudinal design to demonstrate a consistent increase in PTG scores over 18 months for women with breast cancer (Manne et al, 2004). However, another study using the same design with a mixed sample of cancer patients found no significant correlation between time of diagnosis/treatment and PTG (Kurtz, Wyatt, & Kurtz, 1995). This may be related to the suggestion by Park (2004) that different cancer types should be investigated

separately. More longitudinal research is needed to clarify this issue and it may be that studying different cancer types individually is necessary given the distinct nature of each cancer type.

Treatments

A number of studies have examined the relationship between different cancer treatments and reports of PTG. While different forms of the disease appear to vary (Park, 2004), results on treatments are fairly consistent in suggesting that there is no association between type of treatment and PTG. One might expect that more aversive treatments such as chemotherapy may be linked to higher levels of PTG but there is minimal evidence for this. In their review Stanton et al (2006) found just one study with a correlation (Bower et al, 2005). Notably, this was the largest sample included in the review with 763 breast cancer patients. The lack of relationship in most studies may reflect the fact that all treatments for cancer are aversive, but side effects vary greatly between individuals. In addition, after the shock and fear associated with a diagnosis, treatment procedures may be viewed as a positive process, despite the pain and discomfort.

Socioeconomic status

The association between socioeconomic status and PTG has been the subject of many studies, most of which examine income, education, and employment status. Findings have been mixed. A number of studies have demonstrated a significant negative association between socioeconomic status and PTG (Urcuyo et al, 2005). Modest correlations have been found with income (Carpenter, Brockopp, & Andrykowski, 1999), and education level (Sears et al,

2003). Others show no significant association (Cruess et al, 2000). There is a major methodological problem with this area of investigation because measures vary greatly and socioeconomic status has been operationalised differently across the studies.

Those studies showing a negative association were found to have assessed patients within a year of diagnosis, when many were still undergoing treatment. However, the studies that demonstrated a positive association between socioeconomic status and PTG focused primarily on women who had completed treatment. Therefore, it appears that higher socioeconomic status may support posttraumatic growth among women who have completed treatment for breast cancer. The fair number of studies that show nonsignificant results suggests that this conclusion must be made with caution as the association between socioeconomic status and PTG does not appear robust.

Personality traits

It has been hypothesised that those who experience PTG may score higher on personality traits such as optimism, hope, and extraversion (Affleck & Tennen, 1996). The few studies that have investigated this provide some limited evidence to support the hypothesis (Urucyo et al, 2005). However, correlations were modest (.19 - .24). Studies on other personality traits such as neuroticism and self-esteem are even more scarce. One study found no association between PTG and neuroticism (Lechner et al, 2003), but this sample included mixed cancer types, which may have masked patterns for specific types of cancer.

A study of breast cancer patients specifically found that benefit finding was associated with higher self-esteem (Carpenter et al, 1999). While the cross-sectional design of this study limited the conclusions that could be made, more robust findings came from a large longitudinal study which assessed patients at 1 month, 6 months, and 12 months post-surgery (Schulz & Mohamed, 2004).

A tool that was developed to measure cancer-related adjustment called the Mental Adjustment to Cancer Scale (MAC) (Watson, Greer, & Bliss, 1989; Watson, Greer, Young, Inayat, Burgess, & Robertson, 1988) has been utilised in a few studies. One study used it to show that MAC fighting spirit (e.g. "I see my illness as a challenge") was positively correlated with posttraumatic growth, and MAC hopelessness (e.g. "I feel that life is hopeless") was negatively correlated with posttraumatic growth (Ho, Chan, & Ho, 2004). These early findings indicate that personality traits such as optimism may serve as positive resources which facilitate the development of posttraumatic growth. This area of research would especially benefit from further longitudinal analysis.

Social context and social support

Social context and its relationship to PTG has been examined with a focus on the quantity of social support and satisfaction with that support. The association between these measures and PTG is so far inconsistent, with some studies demonstrating positive correlations (e.g. Schulz & Mohamed, 2004) and others showing no such pattern (Sears et al, 2003). Interestingly, another study found that the relationship between perceived social support and PTG was mediated by measures of fighting spirit and hopelessness (Lechner et al, 2006).

One of the few studies to use a longitudinal design with a sample of 206 long-term cancer survivors found that those who received more emotional support in the three months following diagnosis reported significantly more positive consequences of the illness eight years after the diagnosis (Schroevers, Helgeson, Sanderman, & Ranchor, 2009). They concluded that support from family and friends in the form of comforting, reassurance and problem-solving, following a cancer diagnosis, may help survivors to find positive meaning in the experience. Given the established influence of social support on the development of PTSD after cancer (e.g. Butler, Koopman, & Classen, 1999), the inconsistent findings in this area point to a need for improved methodology to establish the relationship between social support and benefit finding. It has been suggested that the inconsistent findings may be explained by the impact of unmeasured, but important moderating variables (Algoe & Stanton, 2009).

Gender

It has been suggested by some researchers that women are more susceptible to distress and subsequent PTG because they tend to be more emotion focused in their coping strategies (Fife, Kennedy, & Robinson, 1994). It has been hypothesised that women may perceive more benefits through their greater use of social support (Park et al, 1996). However, social support does not consistently predict PTG, as discussed previously.

While some mixed-cancer studies have reported greater PTG in women (e.g. Bellizzi, 2004), a large number of studies have demonstrated a lack of gender difference and this has been consistent across a range of cancer diagnoses, age, nationalities and stage of disease, as well

as methods of assessment for PTG (e.g. Schulz & Mohamed, 2004). Therefore, the cancer literature suggests that men and women do not differ in the level of PTG reported after cancer. Researchers are yet to explore any differences in the areas of life in which benefit is found.

Age

The examination of age as a predictive factor for PTG in cancer has shown a negative relationship between age and perceived growth (Belizzi & Blank, 2006). In a study of breast cancer patients, Manne et al (2004) reported that older patients had lower PTG scores immediately after surgery as well as 9 and 18 months later. They proposed that older patients may be less motivated to conform to expectations to present a positive attitude toward the experience and the future. Others have suggested that chronic diseases such as cancer produce more distress for younger individuals and require more psychological adjustment because there is an expectation of ill-health in older age (Salmon, Manzi, & Valori, 1996).

Evaluation and theory-research links

As described previously, the majority of the most prominent models for posttraumatic growth have been informed by the research on adjustment to acute trauma. The differences between a cancer experience and models of acute trauma are well-documented (Sumalla et al, 2009). This section aims to evaluate the links between theories of PTG and the current research literature on growth associated with cancer.

While research in this area is still in the early stages of development, results have been inconsistent across the various areas of investigation. The measures being used by researchers may partially explain this. The most widely used quantitative measurement tools, such as the Posttraumatic growth Inventory (Tedeschi & Calhoun, 1996) focus on just the five main areas of growth identified from the general research; perceived changes in self, closer family relationships, changed philosophy, a new perspective on life, and a strengthened belief system (Tedeschi & Calhoun, 1995). This neglects the unique positive changes reported by survivors of cancer and other chronic illnesses (Park & Lechner, 2006). In particular, the occurrence of PTG in physical illness has shown a unique sixth element to growth: a new awareness of the body (Thornton, 2002). A review of the qualitative studies on PTG in physical illness suggested that surviving a life threatening illness such as cancer can create a new appreciation and sense of heightened importance of the body (Hefferon, Grealy, & Mutrie, 2009). This supports the idea that the research so far is missing important elements of the PTG process in cancer patients, as well as key factors connected to it.

This issue has been recognised by a small handful of researchers and new measures are beginning to emerge, designed specifically for the cancer population. For example, The Impact of Cancer Scale (Zebrack, Patricia, Bernaards, Petersen, & Abraham, 2006) focuses on areas of benefit finding that are unique to cancer patients. It also measures the degree to which an individual perceives a negative impact on their life, something neglected by previous research that has so far measured the negative outcomes with the use of symptom measures only.

The timing of the assessments is another methodological issue that could have influenced the different research findings. Meta-analyses of cross-sectional research in the general PTG literature has shown stronger associations between PTG and psychological adjustment when assessments were conducted more than two years after the traumatic event (Helgeson, Reynolds, & Tomich, 2006). However, Algoe and Stanton (2009) pointed out that all but one study of women with breast cancer, in their review, had assessed women within a year of diagnosis. In addition to their observation, many of those women could have been just weeks or days away from completion of the invasive treatments that could be considered the main stressor over and above diagnosis. Influence of PTG on positive adjustment was demonstrated in studies that assessed breast cancer patients more than 1 year after diagnosis (Bower et al, 2005). Examination of the long-term process of PTG is needed to give some clarity on when assessment is most informative to research.

Tedeschi and Calhoun (1995) developed a model of PTG based on the earlier views of Janoff-Bulman (1992) that a traumatic event can be defined by its ability to shatter one's core beliefs. They suggested that PTG requires an event that challenges core beliefs and leads to a search for meaning. However, the experience of cancer is different for each individual and not everybody considers their experience traumatic (Carver et al, 2009). Variability in appraisals of the experience as traumatic should therefore reflect variability in reports of PTG. Studies have found that older cancer patients report less benefit finding (Belizzi & Blank, 2006) as well as lower levels of distress (Green, Rowland, & Krupnick, 1998). These findings could be perceived as supportive of the theory because ill-health is expected in older age, while diagnosis at a younger age may challenge beliefs about the safety of the world and require

more psychological adjustment (Klauer et al, 1998). An interesting avenue for future research might be to assess whether age is associated with appraisals of the trauma.

The debate about whether reports of PTG represent actual changes or the illusory perception of change is still ongoing. An important study showed that the adaptive nature of PTG in improving emotional outcomes may also be illusory (Widows, Jacobsen, Booth-Jones & Fields, 2005). In their sample of bone marrow transplant patients, PTG was associated with the perception of improvement in distress levels. However, this perception of change in distress did not match up with pre and post measures of distress and was instead attributed to the deprecation of past psychological wellbeing. Patients perceived that their level of distress had decreased over time, but when asked to recall their level of distress before treatment patients overestimating their previous level of distress. Greater perceived improvement was associated with greater PTG on the Posttraumatic Growth Inventory (PTGI, Tedeschi & Calhoun, 1996). Zoellner and Maercker (2006) pointed out that, while this study cannot provide clear evidence for the illusory component of PTG, it does illustrate an illusory perception of change in distress, which is associated with benefit finding.

In their model of personal growth, Schaefer and Moos (1992) predicted that environmental factors such as socioeconomic status and standard of living can have an influence on both cognitive appraisal of the event and the coping styles used. However, research findings for cancer patients have been inconsistent and an association between PTG and socioeconomic status is not clear. In a review it was pointed out that the majority of studies in this area demonstrating no correlation utilised samples of mixed cancer diagnosis, while all but one of

the studies with significant positive correlations were conducted with breast cancer patients (Stanton et al, 2006). In reviewing this research one must also be careful to distinguish between studies conducted in the UK and studies conducted in the USA. Those with low income in America who receive a cancer diagnosis may experience added stresses and may perceive a greater threat to life due to unaffordable treatments. Therefore the relationship between socioeconomic status and PTG in the USA may represent the influence of perceived threat to life, which is a more established predictor (Bower et al, 2005).

This area of research is further complicated by ethnicity. A recent review concluded that ethnicity moderates the relationship between PTG and improved mental health for cancer survivors (Sawyer et al, 2010). Specifically, individuals from ethnic minority groups report higher levels of PTG (Bower et al, 2005). The relationship between PTG and ethnicity is significant even when the analysis has controlled for socio-economic status, indicating that ethnicity has an effect independent of socio-economic status (Tomich & Helgeson, 2004). These findings may relate to differences in coping styles, social support structures or religiosity; all of which would be predictions of the various models described in this paper. One study demonstrated that religious coping increased PTG and mediated the relationship between minority status and growth (Urcuyo et al, 2005). More research is needed to understand this complex factor and the processes through which it influences posttraumatic growth.

Among the inconsistent findings the most robust predictor of PTG in cancer patients appears to be perceived threat to life (Bower et al, 2005), which is also a strong predictor of PTSD

(Ehlers & Clark, 2000). Early models such as that by Schaefer and Moos (1992) appeared to draw on constructs found in conceptualisations of posttraumatic stress by including cognitive appraisal, coping, and social factors (Joseph, Williams, & Yule, 1995). The finding that threat predicts PTG is also consistent with Taylor's (1983) cognitive adaptation theory that more threat to the self leads individuals to search for meaning in the event in order to restore a sense of mastery and self-esteem. This may also provide clues to explain the conflicting results on the association of PTG with lower levels of distress and better mental health. If a greater sense of threat leads to more distress, which in turn leads to benefit finding, then cross-sectional studies may find an association between PTG and distress. Examination of changes in distress over time may provide support for this model. Each of the findings in this discussion generate a number of important clinical implications. These are examined in the following section with suggestions for the direction of future research in this area.

Clinical implications and future direction for research

There are a number of interesting questions to be answered by future research into posttraumatic growth following cancer. One of those questions concerns the extent to which therapists should aim to facilitate the perception of growth, whether there are downsides to fostering growth, and how it can be encouraged (Park, 2009). First, a clear understanding of the adaptive nature of PTG must be established with the investigation of mental health outcomes over time.

Some researchers have begun to publish studies that test the clinical utility of PTG. One study randomly assigned breast cancer patients to different intervention groups (Stanton, Danoff-

Burg, Sworowski, Collins, Branstetter, & Rodriguez, 2002). Group 1 spent four sessions writing their deepest thoughts and feelings about the cancer experience, group 2 was a fact-writing control, while group 3 spent the four sessions writing about the benefits they found in their breast cancer. Three months later the benefit finding group reported fewer cancer-related symptoms and hospital appointments than the fact-writing control. However, the thoughts and feelings group reported slightly better mental health outcomes than the benefit-writing group. It was concluded that the thoughts and feelings intervention promoted PTG. However, no measure of PTG was administered and so interpretations are speculative and other mechanisms may need to be considered.

Other studies have not explicitly attempted to manipulate or promote PTG, but looked at the role it plays in adjustment. For example, women with breast cancer who engaged in a cognitive behavioural stress management intervention increased in PTG (Antoni, et al, 2001). The same results were found for a sample of men with prostate cancer, whose increased benefit finding was mediated by the development of stress management skills (Penedo, Molton, Dahn, Shen, Kinsinger, & Traeger, 2006). Future studies should focus on isolating specific components of such interventions to better understand causal pathways. This in turn may also help to further theoretical descriptions of PTG. If a set of specified stress management techniques were identified as important, this would have important clinical implications for making those skills available to cancer patients in a wide range of settings (Park, Lechner, Antoni & Stanton, 2009).

An important criticism of this research is that samples so far have been predominantly middle class, educated, white American women. Before interventions can be applied in clinical practice researchers must establish the cultural sensitivity of the work. Research has indicated significant differences in reported PTG by minority groups (Sawyer et al, 2010). This area of PTG research is a valuable one, and warrants further investigation. However, many theoretical questions about posttraumatic growth remain unanswered. Researchers are increasingly attempting to test the specific hypotheses derived from the range of theories for posttraumatic growth, but the evidence base is far behind theoretical developments and so models remain descriptive (Park, 2009).

It is widely recognised that cancer is different from other traumas. However, we still do not fully understand how these differences may influence the benefit finding process (Sumalla et al, 2009). While many areas of the research present significant methodological challenges, so far one area with especially promising results is the studies linking PTG with objective physiological markers. Overall, the few studies that exist in this area consistently show that PTG may be associated with some specific physiological functions and suggest that PTG may be good for people with cancer and other chronic diseases. However, this evidence originates from just six published studies, and a number of unpublished studies which found null effects may exist (Algoe & Stanton, 2009).This could be an important avenue for future research. However, there is little theoretical work to guide the direction of this research. Bower and Segerstrom (2004) proposed that each of the individual domains of PTG reported by individuals with cancer may be linked to physiological changes, and so evaluating these domains individually might be insightful. A review by Pressman and Cohen (2005) supports this idea. They proposed a model for influence of positive affect on physical health, with

several direct ways in which positive affect could benefit outcomes. They suggested that positive affect has an effect on the autonomic nervous system which helps to speed up recovery from stress reactions, as well as influencing health behaviours.

The key to achieving more consistent results between PTG and psychological adjustment appears to be in the consideration of other explanations such as non-linear relationships and the impact of unmeasured, but important moderating variables (Algoe & Stanton, 2009). The recent review by Stanton et al (2007) summarised five domains of constructs that have been shown to impact on adjustment after cancer and other chronic illnesses. These were: cognitive appraisals, social resources, coping processes, dispositional factors and contextual factors such as socioeconomic status. Further research into the role of each of these constructs might aid the development of existing theoretical models. Certainly research into chronic illness other than cancer has shown the relationship between PTG and psychological adjustment to be dependent on specific variables (Rini, Manne, DuHamel, Austin, Ostroff, & Boulad, 2004).

In summary, this area of research may have important implications for our understanding of the perception of growth after diagnosis and treatment of cancer and psychological interventions provided to patients. However, theoretical developments are stalled by the current evidence base available. The research literature is limited by a range of methodological issues that need to be addressed in future studies. The relative infancy of this area of research means that a large number of the studies are being conducted by too few researchers. The growth of positive psychology in the USA has created a research literature biased with samples of white, middle class, American females. This limits the relevance of findings to citizens of the UK who are largely multi-cultural and have access to the NHS. The

large numbers of breast cancer patients have created a bias in which the majority of studies involve breast cancer patients. More research is needed into other cancer types, as well as those with multiple episodes or terminal illness. The research programme as a whole remains in its infancy and so provides a limited insight into posttraumatic growth for survivors of cancer. The conclusions that can be made from this examination of the current literature are summarised in the final section below.

Conclusion

This review highlights that there are many remaining questions unanswered concerning posttraumatic growth and cancer. The use of general methods of measurement for cancer populations needs to be addressed in order to limit the inconsistencies in results. The use of cancer-specific PTG measures such as the Impact of cancer tool (IOC) (Zebrack et al, 2006) in future research could provide a more detailed picture of the diverse areas of benefit finding.

The models for PTG that were developed from research on acute traumas, make predictions that growth, whether through positive illusion or actual change in identity, has an adaptive function to reduce distress and improve mental health. The cancer literature suggests that these models have some relevance for benefit finding after cancer. The literature suggests that benefit finding for cancer patients is related to reductions in negative psychological symptoms, increases in positive psychological factors, and better physical health (Sawyer et al, 2010). For the one in three people diagnosed with cancer (Office of National Statistics, 2005), continued endeavour to understand the processes of posttraumatic growth could play an important role in mental health services for cancer patients in the future.

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Empirical Paper

The role of trauma-related cognitive appraisals in posttraumatic growth for women with breast cancer

Julie Moore

The British Journal of Health Psychology has been used as a guide in determining the preparation of this paper (see Appendix 2 for notes to contributors)

Abstract

Objectives. Posttraumatic growth (PTG) is the finding of benefit and meaning in a traumatic experience. This study was conducted to examine whether trauma-related cognitions were associated with PTG in breast cancer patients. It examined whether the effects of social support and age on PTG and the perception of the negative impact of cancer are mediated through their influence on posttraumatic cognitions.

Design. This cross-sectional study used correlation analysis to examine the relationships between the variables and the method proposed by Baron and Kenny (1986) to assess whether the relationship between social support, age, and the impact of cancer was mediated by trauma related appraisals.

Method. A total of 86 breast cancer patients completed measures of perceived social support, negative trauma-related cognitions, symptoms of anxiety, depression, and posttraumatic stress disorder (PTSD), the perception of PTG and the negative impact of cancer.

Results. Posttraumatic cognitions were positively associated with the perception of PTG and the negative impact of cancer. Cognitions mediated the relationship between support and the negative impact of cancer, and also mediated the relationship between age and the negative impact of cancer. Neither age nor social support were significantly associated with PTG. However, both were significantly correlated with posttraumatic cognitions.

Conclusions. This study suggests that posttraumatic cognitions are associated with PTG after breast cancer and highlights the need for one integrative model of psychological reaction to the trauma of cancer that includes both the positive and negative outcomes.

Introduction

One in nine women will develop breast cancer at some point in their lives. It is the most common cancer in women and just under 10,000 people died from breast cancer in England in 2007 (Office of National Statistics, 2009).

The experience can be traumatic for many people. 61% of breast cancer patients reported to have responded to their diagnosis with intense fear and helplessness, perceiving cancer to be a threat to their life and physical integrity (Cordova, Cunningham, Carlson, & Andrykowski, 2001). Diagnoses can be unexpected, treatments can be intrusive and painful, surgery causes permanent disfigurement, and severe, aversive side effects can last for months after treatment. During this time many areas of a patient's life can be disrupted, with changes in social roles and relationships (Stanton, Bower, & Low, 2006). Studies show posttraumatic stress disorder (PTSD) in 5% to 35% of patients (Kangas, Henry, & Bryant, 2002). A significant proportion also report clinical levels of depression (Derogatis, Morrow, Fetting, Penman, Piasetsky, & Schmale, 1983) and anxiety (Moyer & Salovey, 1996).

Despite the negative impact that cancer can have on an individual's life, cancer survivors also report a number of positive psychological changes and benefits (Zoellner & Maercker, 2006). Reports of improvements in social resources (Schaefer & Moos, 1992), coping skills (Fritz & Williams 1988), relating to others and appreciation for life (Cordova et al, 2001) are common. Research suggests that the more traumatic and threatening the event, the greater the benefit finding (Bower, Meyerowitz, Desmond, Bernaards, Rowland, & Ganz, 2005). These changes have been conceptualised as posttraumatic growth (PTG) (Tedeschi & Calhoun, 1996). Other

terms have also been used to describe it such as *benefit finding* (Affleck & Tennen, 1996) and *thriving* (O'Leary, Alday, & Ickovics, 1998) and *positive impact* (Zebrack, Peterson, & Ganz, 2008). This paper refers to PTG and benefit finding interchangeably to describe this phenomenon.

Models of PTG are in the early stages of development. One of the earliest and most influential models is Taylor's (1983) cognitive adaptation theory. According to this model, traumatic events lead individuals to search for meaning in the experience, in an attempt to restore a sense of mastery over the event and life more generally, and engage in self-enhancing evaluations in an effort to regain a sense of self-esteem. It is suggested that the benefit finding process requires the capacity to sustain and modify cognitive biases or illusions that buffer against the sense of threat in the present and the future. By illusions, she does not mean beliefs that oppose known facts, but rather looking at facts in a particular light that yields a more positive picture. She proposed that these positive illusions are a part of normal cognitive functioning and beneficial to mental health (Taylor & Brown, 1988). Cognitive processes were the core feature of the cognitive adaptation theory and continued as a theme throughout other predominant models in this area. However, little research has investigated these cognitive processes in more detail and so theories remain speculative and vague.

The role of cognitive processes has been much more established in the research on negative psychological outcomes of cancer such as PTSD, a disorder that which has been found to be associated with more PTG (Morrill, Brewer, O'Neill, Lillie, & Dees, 2007). Negative trauma-related cognitions about the self, the world, and blame for the event have been shown to

predict the severity of PTSD symptoms in acute trauma survivors (Elwood & Williams, 2007). In stroke victims appraisals about the self are a strong predictor of PTSD (Field, Norman, Barton, 2008). It was suggested by Foa and Rothbaum (1998) that these specific thoughts about the dangerousness of the world and one's own ability to cope mediate the development of PTSD after a trauma. Ehlers and Clark (2000) extended this to suggest that these negative appraisals serve to create a sense of threat, which increases levels of anxiety and perpetuates PTSD. Evidence supports this cognitive theory (e.g. Beck, Coffey, Paylo, Gudmundsdottir, Miller, & Colder, 2004). While the perception of threat leads to greater PTSD symptoms, it has also been demonstrated that perception of threat predicts greater PTG in cancer patients (Lechner, Zakowski, & Antoni, 2003). Given that these cognitions increase the sense of threat, and that perceived threat leads to greater PTG, it could be hypothesised that trauma-related cognitions, will also be associated with PTG after breast cancer.

Ehlers and Clark (2000) also identify social support as an important factor in the development of PTSD and cancer survivors with less social support have been found to report greater PTSD symptoms (Butler, Koopman, & Classen, 1999). It has been suggested in the PTG literature that social support can influence ones cognitive appraisals and beliefs about the world (Lepore & Kernan, 2009). However, research into the links between social support and PTG has produced inconsistent results. While a handful of studies have reported positive correlations (e.g. Schulz & Mohamed, 2004), others have shown no such pattern (Cordova et al, 2001). It has been suggested that the inconsistent findings may be explained by the impact of unmeasured, but important moderating variables (Algoe & Stanton, 2009). Given the strong relationships found between trauma-related cognitions and PTSD, it could be predicted that those cognitions moderate the relationship between social support and PTG.

Age appears to be an important predictor of both PTSD and PTG in cancer. Younger survivors are at greater risk of cancer-related posttraumatic stress (Green, Rowland, & Krupnick, 1998). Similarly, the most robust predictor of PTG in cancer patients has been younger age at diagnosis (Jim & Jacobsen, 2008). A study of breast cancer patients reported that older patients had lower PTG scores immediately after surgery as well as 9 and 18 months later (Manne, Ostroff, & Winkel, 2004). It was concluded that older patients may be less motivated to conform to expectations to present a positive attitude toward the experience and the future. It has also been suggested that cancer may produce more distress for younger individuals and require more psychological adjustment because there is an expectation of ill-health in older age (Klauer, Ferring, & Filipp, 1998). Therefore, it could be hypothesised that the influence of age on psychological adjustment to cancer is also mediated by trauma-related cognitions.

This study is interested in the relationship between negative trauma-related cognitions and PTG following breast cancer. The study also aims to investigate the association of both social support and age with PTG following breast cancer. It is expected that negative trauma-related cognitions mediate the relationships between these variables and PTG. More specifically, the study tested the following hypotheses.

1. Posttraumatic cognitions on the Posttraumatic Cognitions Inventory (PTCI) will positively correlate with ratings of positive impact on the Impact of Cancer Scale (IOC).

2. Posttraumatic cognitions (PTCI) will positively correlate with ratings of the negative impact of cancer (IOC).

3. Posttraumatic cognitions (PTCI) will mediate the relationship between age and the impact of cancer (IOC).

4. Posttraumatic cognitions (PTCI) will mediate the relationship between perceived social support (PSSS) and the impact of cancer (IOC).

Method

Participants

Breast cancer patients were recruited through two methods.

1. Participants were recruited from Salisbury District Hospital at post-treatment follow-up appointments. All participants that met the inclusion criteria were identified and approached by nursing staff at the end of their appointment and invited to participate. Those who expressed an interest took home the questionnaire pack, which contained more information and a consent form.

2. Participants were also recruited through a number of UK breast cancer charities that agreed to advertise the study in newsletters. Those who contacted the researcher were sent a questionnaire pack. Those participants were asked to sign a form indicating that they met the inclusion criteria before participating.

All those who consented, completed the questionnaires and returned them in the post comprised the sample of self-selected participants.

Inclusion criteria for recruitment were that participants:

i) Were aged over 18 years of age;

ii) Had completed treatment for breast cancer a minimum of six months previous to participation,[1]

iii) Were not currently undergoing treatment for cancer of any type (ongoing hormone therapy not considered treatment for this study, e.g. Tamoxifen),[2]

iv) Must be able to read and understand the information provided on the participant information sheet and consent form,

v) Had completed the consent form to participate in the study.

Of 100 questionnaire packs provided to patients at Salisbury District Hospital 60 were returned completed. Of 30 packs sent out to participants upon request, 26 were returned completed.

[1] Treatments for breast cancer such as surgery, radiotherapy and chemotherapy cause a range of side effects that can last for many weeks after treatment has ended. It was felt that any responses to questionnaires given by participants during this early stage of recovery could be influenced by variation in physical health. This was also an ethical consideration of the vulnerability of participants who would be completing the questionnaires at home, without immediate support available.

[2] Hormone therapy is a treatment used to aid the prevention of the recurrence of breast cancer after surgery. This treatment is administered in tablet form and can continue for 5 years after surgery.

Procedure

The study was granted ethical approval by the Department of Psychology at Southampton University (see Appendix 3), and the Research Ethics Committee at Salisbury Health Care NHS Trust (see Appendix 4).

The specialist breast care nurses responsible for conducting the post-treatment follow-up appointment offered the questionnaire packs to participants that met the inclusion criteria for the study. Participants recruited through charities responded to information in a newsletter by contacting the researcher. Participants were then sent the questionnaire packs by post. For those participants the inclusion criteria was included on the front invitation letter (Appendix 5). Participants were advised to participate only if they met all of the inclusion criteria.

The first page of the pack contained an invitation letter (Appendix 6) that instructed participants to carefully read the participant information sheet (appendix 7) and complete the consent form (appendix 8).

Those participants recruited at Salisbury District Hospital were able to tick a box to indicate that they would like to be offered an assessment at the department of clinical psychology if their results showed that they may benefit from support. All participants were also given a telephone number for the opportunity to ask further questions about the study or for support if they became upset during completion of the questionnaires.

After signing the consent form participants provided demographic information (Appendix9) and then completed the five questionnaires (Appendices 10 to 13). All packs contained pre-paid envelopes in which to return the completed questionnaires. All potential participants were offered the opportunity to receive a summary of the results of the study.

Measures

Participants were asked to provide demographic information on age, marital status, employment status, treatment type, and length of time since completion of treatment (Appendix 9). The following five measures were then completed:

Posttraumatic Cognitions Inventory (PTCI) (Appendix 11)

The PTCI (Foa, Ehlers, Clark, Tolin, & Orsillo, 1999) is a thirty-seven item self-report questionnaire that measures trauma-related cognitions and beliefs. Scores from 33 of the items measure three factors (negative thoughts about the self; negative thoughts about the world; and self-blame). Researchers have demonstrated excellent internal consistency and good test-retest reliability for each of these factors (Beck et al., 2004). Moderate to strong correlations have been demonstrated between the PTCI and other measures of dysfunctional beliefs about the self and world (Emmerik, Schoorl, Emmelkamp, & Kamphuis, 2006). The PTCI has been shown to predict the severity of PTSD, but has different underlying constructs to symptom measures (Foa et al, 1999).

Perceived Social Support Scale (PSSS) (Appendix 12)

The PSSS (Procidano & Heller, 1983) is a forty-item self-report questionnaire containing two subscales. The first subscale measures perceived social support from friends and the second measures perceived social support from family. Scores range from 0 to 20 on each subscale, which combine to give one total score for perceived social support. Across a range of clinical and non-clinical samples, validation studies show good internal consistency with a Cronbach's alpha of 0.88 and 0.92 for the friends and family subscales, respectively (Lyons, Perotta, & Hancher-Kvam, 1988).

The Impact of Events Scale (IES) (Appendix 10)

The IES (Horowitz, Wilner, & Alvarez, 1979) provides a measure of posttraumatic stress symptoms of avoidance and intrusion. It is a fifteen item self-report scale with descriptive statements. Eight items are assigned to the avoidance subscale, which measure the extent to which the individual attempts to avoid reminders of the event, unpleasant memories, and the distress that accompanies these. The remaining seven items measure the frequency of intrusive memories of the traumatic event. The two subscales combine to provide a total score indicating the extent of these symptoms for the individual. Cronbach's alpha scores indicate high internal consistency for the two subscales (intrusion = 0.78; avoidance = 0.82) and good reliability for the total score (r = 0.86) (Horowitz et al, 1979).

The brevity of this measure is an advantage and it has been used extensively in PTSD research (Joseph, Yule, Williams, & Hodgkinson, 1993). However, this is not a diagnostic tool and is used to measure the severity of these stress symptoms after any life event.

Horowitz (1982) suggested a classification system for scores, providing three levels of distress (low ≤ 8, medium 9-19, high ≥ 20).

Hospital Anxiety and Depression Scale (HADS)

The HADS (Zigmond & Snaith, 1983) is a measure that indicates the severity of both anxiety and depression symptoms. It has seven depression items and seven anxiety items (each item rated 0-3). It was designed to be used in both general hospital and out-patient settings such as this one (Lindsey & Powell, 2007). This brief measure is not a diagnostic tool, but has been used widely in both clinical and research settings to provide a quantitative measure of anxiety and depression symptoms (Lampic, 2009). Reliability data has been reported at 0.92 for the depression scale and 0.89 for the anxiety scale (Zigmond & Snaith, 1994).

The Impact of Cancer Tool (IOC) (Appendix 13)

The IOC (Zebrack, Patricia, Bernaards, Petersen, & Abraham, 2006) is a newly developed measure of PTG designed for cancer patients specifically. It is the first measure to provide information on both the positive and negative impact that cancer can have in various areas of an individual's life. This is something not present in existing measures used in cancer survivor studies (Zebrack et al, 2006). It consists of 41 items comprising 10 subscales. The subscales include: life outlook, health anxiety, body image, feelings about cancer, the meaning of cancer, relationships, social interference, activities, positive health behaviour, and evaluation of the self. The subscales combine to produce two totals. One is a score of the benefits found in the experience of cancer and the other is a score of the perceived negative impact of the cancer. Internal consistency measures for the subscales range from .67 to .89,

and the positive subscales of the IOC have been associated with the Posttraumatic Growth Inventory, a comparative measure of PTG (Zebrack et al, 2006). This consistency is important as the IOC was developed specifically not to duplicate content from other well-validated measures such as this one, but instead to focus on concepts within the domains of PTG that were unique to the experience of long-term survivors of cancer.

Statistical analysis

Analysis was conducted using the Statistical Package for Social Sciences (SPSS) version 17. Power calculations indicated that 86 participants would be an adequate number for using linear regression analysis (Field, 2009). Descriptive statistical analysis was performed to examine the distributions and scan for outliers. As the data were not normally distributed non parametric Spearman's rank correlations were used to identify relationships between the variables.

The data used for hierarchical linear regression analyses were checked for potential problems. Analysis of the residuals revealed no violations of the assumptions of normally distributed errors, or equal variability (Field, 2009). The variance inflation factor (VIF), which measures the impact of collinearity among the variables in a regression model, was examined to ensure there were no problems with multicollinearity. A VIF value of greater than 10 can indicate possible violations of this assumption (Marquandt, 1980). All of the VIF values in this analysis were less than 2, suggesting there were no problems with multicollinearity.

Results

Demographic and clinical characteristics

The age range of the sample (n=86) ranged from 25 to 85 years, with a mean of 59.9 years. 41% of the sample were employed and 45% were retired. Mean time since completion of treatment was two years, ranging from six months to six years. 69% had received no support from groups or individual counselling. Treatment types varied considerably with 18 different treatment combinations identified, including chemotherapy, radiotherapy, local excision, and mastectomy with or without reconstruction. The means and standard deviations of the questionnaire measures are shown in Table 1.

Table 1. Mean, standard deviation and range of scores for questionnaires

Scale or subscale	Mean	St Dev	Range
Positive impact of cancer (PIOC)	3.64	.57	2.49(0-4)
Negative impact of cancer (NIOC)	2.72	.81	3.43(0-4)
Perceived social support (PSSS)	63.73	11.94	47.00(0-80)
Posttraumatic cognitions inventory (PTCI)	5.00	2.06	7.00(0-21)
Cognitions about the self (PTCIself)	1.86	.94	3.90(0-7)
Cognitions about the world (PTCIworld)	1.91	.94	4.57(0-7)
Cognitions about blame (PTCIblame)	1.47	.85	3.60(0-7)
Hospital Anxiety and Depression Scale (HAD)	8.62	6.65	30.00(0-42)
Impact of Event Scale (IES)	18.41	17.40	59.00(0-75)

Hypothesis 1: Posttraumatic cognitions will positively correlate with ratings of benefit finding.

The results of the study supported this hypothesis. More trauma-related cognitions were significantly associated with greater PTG ($r = .288$, $p < .01$). However, the only subscale that was significant was cognitions about the self ($r = .314$, $p < .01$).

Hypothesis 2: Posttraumatic cognitions will positively correlate with ratings of the negative impact of cancer.

Following expectations, negative trauma cognitions was significantly correlated with ratings of negative impact ($r = .673$, $p < .001$).

Hypothesis 3: Posttraumatic cognitions will mediate the relationship between age and the impact of cancer.

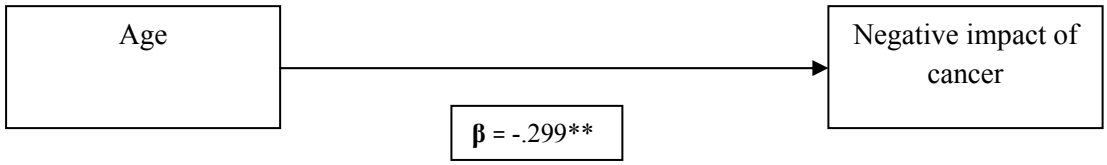
The Baron and Kenny (1986) procedure was followed for the multiple regression analysis. This analysis involves the following steps.

Step 1 requires demonstration that the initial variable (age) is correlated with the outcome (impact of cancer). This step establishes that there is an effect that may be mediated.

There was no evidence for a statistically significant association between the variables age and PTG (see Appendix 14). Therefore, further analysis of the contribution of these variables to PTG, and the mediating role of cognitions was not possible. A linear regression was performed to predict the negative impact of cancer. Regression analysis revealed that age

significantly correlated with the negative impact of cancer (F 1,82 = 7.943, $p < .01$) (see Figure 1).

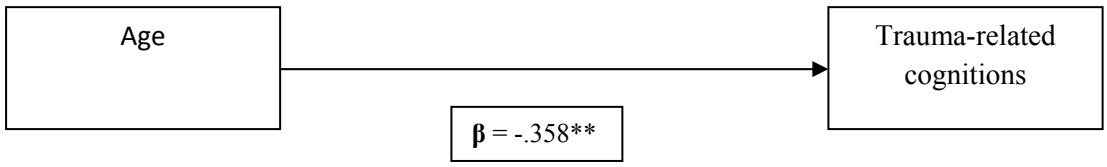
Figure 1. The relationship between age and the negative impact of cancer.



Note: **$p < .01$

Step 2 requires demonstration that the initial variable (age) is correlated with the mediator (trauma-related cognitions). This step involves treating the mediator as if it were an outcome variable. This analysis showed that age significantly correlated with trauma-related cognitions (F 1, 77 = 11.200, p< .01).

Figure 2. The relationship between age and trauma-related cognitions.

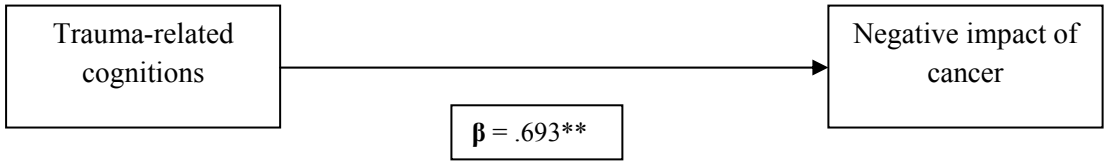


Note: **$p < .01$

Step 3 involves demonstration that the mediator (trauma-related cognitions) affects the outcome variable (negative impact of cancer). It is not sufficient just to correlate the mediator with the outcome; the mediator and the outcome may be correlated because they are both caused by the initial variable. Thus, the initial variable must be controlled in establishing the effect of the mediator on the outcome. The analysis established that trauma-related cognitions

significantly correlated with the negative impact of cancer, $F(2,77) = 38.756$, $p<.001$. This relationship is shown below in Figure 3.

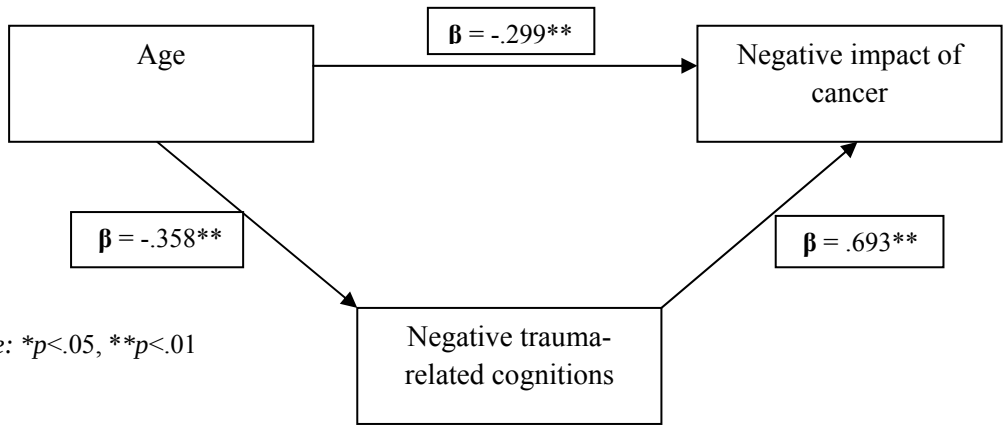
Figure 3. The relationship between trauma-related cognitions and the negative impact of cancer.



Note: $^{**}p< .01$

Step 4 established that trauma-related cognitions completely mediates the relationship between age and the negative impact of cancer. The mediation model is presented in Figure 4. Consistent with the hypothesis, negative trauma-related cognitions mediated the relationship between age and the negative impact of cancer ($F\ 2, 77 = 38.756$, $p < .001$). This model is also summarised in Table 3.

Figure 4. Trauma-related cognitions as a mediator of the relationship between age and the negative impact of cancer.



Note: $^{*}p<.05$, $^{**}p<.01$

Table 2. Multiple regression to predict the negative impact of cancer scores for hypothesis 3: standardised regression coefficients.

		B	*SE B*	β
Step 1	DV: Negative impact of cancer			
	(Constant)	3.953	.446	
	Age	-.021	.007	-.299**
Step 2	DV: Cognitions			
	(Constant)	8.770	1.146	
	Age	-.063	.019	-.358**
Step 3&4	DV: Negative impact of cancer			
	(Constant)	1.564	.453	
	Cognitions	.272	.034	.693**
	Age	-.003	.006	-.050

Step 1 - R^2 = .089, F(1,82) = 7.943, P<.01
Step 2 - ΔR^2 = .128, F(1,77) = 11.200, p<.001
Step 3 -Δ R^2 = .508, F(2,77) = 38.756, p<.001

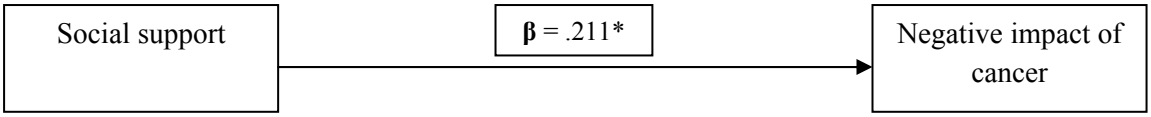
*$p < .05$; **$p < .01$;

Hypothesis 4: Posttraumatic cognitions will mediate the relationship between perceived social support and the impact of cancer.

The Baron and Kenny (1986) procedure was also followed for the analysis of hypothesis 4. There was no evidence for a statistically significant association between social support and PTG. Therefore, further analysis of the contribution of this variable to PTG, and the

mediating role of cognitions was not possible. A linear regression was performed to predict the negative impact of cancer. Step 1 demonstrated that the initial variable (social support) is correlated with the outcome (negative impact of cancer). This step establishes that there is an effect that may be mediated. Social support was significantly correlated with trauma-related cognitions (F 1, 85 = 3.928, p< .01). This relationship is demonstrated in Figure 5.

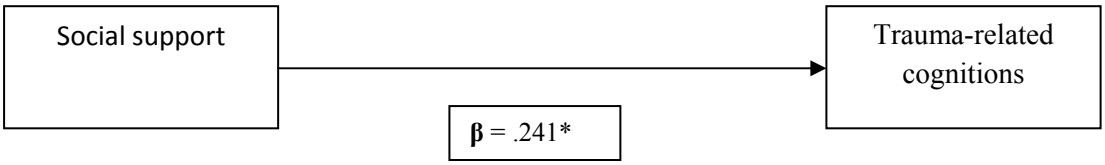
Figure 5. The relationship between social support and the negative impact of cancer.



*Note: *p*<.05

Step 2 demonstrated that the initial variable (social support) is correlated with the mediator (trauma-related cognitions). This step involves treating the mediator as if it were an outcome variable. This analysis showed that social support was significantly correlated with the negative impact of cancer (F 1, 77 = 11.200, p< .01) and is illustrated in Figure 6.

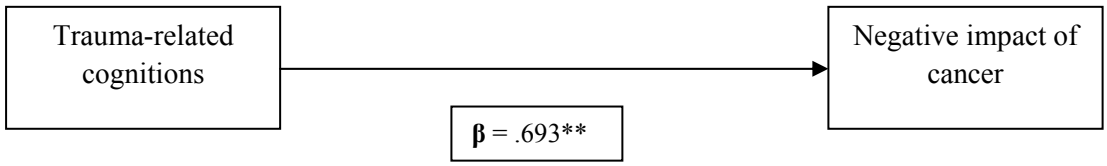
Figure 6. The relationship between social support and trauma-related cognitions.



*Note: *p*< .05

Step 3 involves demonstration that the mediator (trauma-related cognitions) affects the outcome variable (negative impact of cancer). The analysis established that trauma-related cognitions significantly correlated with the negative impact of cancer, $F(2,77) = 38.756$, $p<.001$. This relationship is shown below in Figure 7.

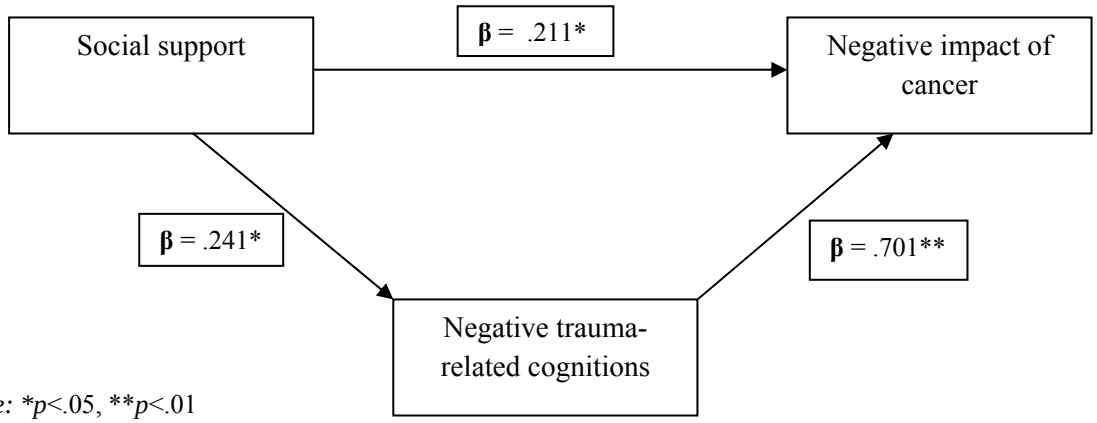
Figure 7. The relationship between trauma-related cognitions and the negative impact of cancer.



Note: $^{**}p< .01$

Step 4 established that trauma-related cognitions mediates the relationship between social support and the negative impact of cancer. The mediation model is presented in Figure 8.

Figure 8. Trauma-related cognitions as a mediator of the relationship between social support and the negative impact of cancer.



Note: $^{*}p<.05$, $^{**}p<.01$

Consistent with the hypothesis, negative trauma-related cognitions mediated the relationship between social support and the negative impact of cancer (F 2, 80 = 40.220, $p < .001$). This model is also summarised in Table 3.

Table 3. Multiple Regression to predict the negative impact of cancer scores for hypothesis 4: standardised regression coefficients.

		B	***SE B***	**β**
Step 1	DV: Negative impact of cancer			
	(Constant)	2.393	.186	
	Social support	.219	.111	.211*
Step 2	DV: Cognitions			
	(Constant)	4.057	.484	
	Social support	.637	.288	.241*
Step 3	DV: Negative impact of cancer			
	(Constant)	1.276	.190	
	Cognitions	.275	.032	.701**
	Social support	.044	.085	.042

Step 1 - $R^2 = .045$, F(1,85) = 3.928, $P<.05$
Step 2 - $\Delta R^2 = .058$, F(1,80) = 4.880, $p<.05$
Step 3 -$\Delta R^2 = .508$, F(2,80) = 40.220, $p<.001$

*$p < .05$; **$p < .01$;

Post-hoc Analyses

Correlations between variables were analysed and these are presented in Appendix 14. As predicted, the correlations showed that older age was significantly associated with lower scores for negative trauma related cognitions (r = -.360, p<.01). Each of the subscales showed a significant relationship with age, but the strongest was cognitions about the self (r = -.393, p<.01). Age was not significantly related to perceived level of social support (r = .021, p=.852) However, social support did show a significant negative correlation with the trauma related cognitions (r = -.453, p<.01), as expected. This relationship was significant for each of the cognition subscales. Trauma related cognitions were not significantly associated with the length of time since treatment completion (r =.-.144, p=.205).

As predicted, perceived social support was negatively correlated with ratings of the negative impact of cancer (r = -.446, p<.01). Unexpectedly, no significant trend was found between perceived social support and PTG (r =.086, p=.438).

The PTG subscale scores were significantly associated with the negative impact of cancer subscale scores (r = .219, p<.05), as expected. The PTG scores also showed a significant relationship with posttraumatic stress symptoms on the IES (r = .218, p< .05) and anxiety and depression scores on the HADS (r = .213, p<.05). No other variables showed a significant relationship with PTG.

Following expectations, negative trauma cognitions was significantly correlated with negative impact (r = .673, $p < .001$). Length of time since treatment was negatively correlated with the perception of negative impact (r = -.278, $p < .05$). As expected, length of time since treatment completion showed a significant negative correlation with IES (r = .338, $p < .001$). However, time was not significantly related to the HADS (r = -.207, $p = .07$). In line with expectations the negative trauma cognitions were correlated to both the HADS (r = .723, $p < .01$) and the IES (r = .521, $p < .01$). A significant negative correlation was found between age and both the HADS (-.335, $p < .01$) and the IES (r = .338, $p < .01$). Social support correlated negatively with the HADS (r = -.367, $p < .01$) but the trend was not significant for IES (r = .138, $p = .207$).

Discussion

The primary aim of this research was to test the hypothesis that posttraumatic cognitions were associated with the perception of growth following breast cancer. The results supported this hypothesis with more negative trauma-related cognitions predicting greater PTG. This finding and the other hypotheses are discussed below.

Correlates of the impact of cancer

Posttraumatic growth

PTG scores were significantly associated with the negative impact of cancer scores, so that those who perceived a more negative impact in their lives also perceived greater benefits. In line with this, scores of anxiety, depression, and posttraumatic stress symptoms correlated positively with benefit finding. This was expected given Taylor's (1983) cognitive adaptation theory, which proposed that high levels of distress leads individuals to search for meaning in the experience in an attempt to regain a sense of mastery over life and regain a sense of self-esteem.

Higher scores for negative trauma-related cognitions predicted greater benefit finding. Therefore, cognitions which predict PTSD severity also predict greater PTG. These findings indicate that the Ehlers and Clark (2000) cognitive model of PTSD may be a relevant foundation from which to further understand the role of cognitive processes in benefit finding for cancer patients.

Benefit finding was not significantly associated with the perceived level of social support or age of the participant. This was unexpected as it was inconsistent with some previous studies that have reported links between good support and PTG (Porter, Clayton, Belyea, Mishel, Gil, & Germino, 2006). While these variables did not show significant correlations with benefit finding, they showed a significant relationship with the perception of negative impact, symptoms of depression and anxiety, and trauma-related cognitions.

Negative impact of cancer

Those with a greater level of perceived social support reported significantly lower levels of perceived negative impact. More social support was also significantly linked to lower scores for depression, and anxiety symptoms. This reflects previous research findings that social support plays a protective role against mental health problems following a trauma (Butler et al, 1999).

The perceived level of social support was not linked to the age of participants. However, older age was significantly associated with less negative trauma-related cognitions and the perception of less negative impact. This supports the idea that ill-health is an expectation in older age and so does not challenge beliefs about the self or the dangerousness of the world to such a degree as those who are diagnosed with cancer at a much younger age (Klauer et al, 1998).

Older age showed a slight negative correlation with benefit finding. Although this pattern was not statistically significant, the direction of the correlation is consistent with previous findings that have shown a negative relationship between age and PTG (Belizzi & Blank, 2006). The stronger correlation between age and the perception of negative impact suggests that perhaps age acts as a protective factor against the negative impact of cancer, which in turn, reduces the need to search for meaning and benefit in the experience. This may explain the inconsistent findings for both age and social support as predictors of benefit finding in the literature. None of the previous studies measured the negative impact of cancer, which appears to have a stronger relationship with these factors.

Scores for the perception of the negative impact of cancer were significantly correlated with scores of negative trauma-related cognitions and measures of anxiety, depression, and traumatic stress symptoms, as expected. This finding is consistent with the Ehlers and Clark (2000) model, which suggests that the posttraumatic cognitions serve to increase anxiety and other symptoms. These symptoms may then exacerbate the perception of the overall negative impact of cancer on an individual's life.

The mediating effect of trauma-related cognitions on predictors of the impact of cancer

The regression analysis demonstrated that both age and social support explained small but significant amounts of variance in the perception of negative impact. These contributions became non-significant when posttraumatic cognitions were added to the model. Therefore, trauma-related cognitions mediated the relationship between social support and the perception of negative impact, and also mediated the relationship between age and the negative impact of

cancer. This suggests that both age and social support may influence the perception of negative impact through their effect on appraisals of the trauma and beliefs about the self and the world. As described earlier, age may influence trauma-related cognitions through the expectation of ill-health during older years (Klauer, Ferring, & Filipp, 1998). It is possible that cancer diagnosis at a younger age is more unexpected and so is more likely to challenge one's beliefs about the world as a safe place. Younger patients may also have less experience of coping through adversity and so be more susceptible to negative cognitions around their ability to cope. For social support, a number of authors have speculated about ways that social context may influence cognitions and beliefs about the self or the world. For example, supportive others can help to maintain a sense of self-esteem during a serious illness by validating their experiences and affirming that they are loved and esteemed (Albrecht & Adelman, 1987). This is in line with Taylor's (1983) theory that individual's search for meaning in order to regain a sense of self-esteem. Good social support, which helps to maintain self-esteem would lead to a reduced need to search for meaning. This study supports this theory.

Clinical Implications

This study highlights the importance of using measures that assess both the positive and negative psychological outcomes for cancer patients in posttraumatic growth research, because those who report positive outcomes are more likely to report greater negative impact and higher levels of distress. Therefore, those assessed only for the perception of growth may provide a biased presentation and neglect the presence of symptoms of PTSD or other disorders.

The trauma-related cognitions that predict severity of PTSD symptoms also predict benefit finding in breast cancer patients. This suggests that the Ehlers and Clark (2000) model of PTSD may be a useful place to begin in the understanding of the process of PTG. This study indicates that the separation of positive and negative reactions in the literature so far has failed to recognise their integration as a whole psychological reaction to cancer and other traumas.

Taylor (1983) suggested that cognitive appraisals are important in the development of PTG, which is adaptive in improving mental health outcomes. This study supports the view that trauma-related cognitions have an important role in the process. However, this cross-sectional design also indicated that PTG tends to naturally occur alongside symptoms of posttraumatic stress, depression and anxiety. Therefore, it is unclear whether benefit finding has an adaptive function for mental health outcomes. Longitudinal methods are required to establish the adaptive nature of this cognitive process before interventions are developed with the aim of facilitating benefit finding in cancer patients.

That younger people experience more distress and require more psychological adjustment highlights the need for younger breast cancer patients to be closely monitored and carefully assessed for such disorders as PTSD. Lepore and Ituarte (1999) found that among women with breast cancer, greater optimism about recovery was associated with fewer negative reactions from others when patients talked about their cancer. In response to social demands, patients may feel a need to identify and express to others (including medical staff) a list of

benefits and positive expectations for the future. In follow-up appointments with nursing staff, this may mask the existence of clinically significant symptoms of distress.

Limitations

The cross-sectional design was useful to establish a relationship between trauma-related cognitions and benefit finding. However, it does limit the conclusions that can be drawn about the nature of these relationships over time. The design also precludes any conclusions about causation.

General measures of PTG neglect a range of benefits found specifically by cancer patients, such as a new appreciation and sense of heightened importance of the body (Hefferon, Grelay, & Mutrie, 2009). Therefore, the use of a cancer-specific tool was considered an advantage for use with a sample of breast cancer patients. However, this restricts the generalisability of the model to other types of trauma. In addition, the use of self-report measures for both independent and dependent variables introduces the possibility of reporting bias, such as a tendency to provide mainly negative responses. However, the association between negative scores and positive scores suggests that this was not a significant issue.

Linked with this is the finding that a curvilinear relationship between distress and PTG was not identified in this study, as it has been in previous research (e.g. Lechner, Carver, & Antoni, 2006). The self-selection process for this sample may have biased this result. It is possible that those patients experiencing the highest levels of distress or PTSD may have

chosen not to participate (perhaps due to avoidance symptoms), leaving a biased sample. In-depth interviews may have been a more reliable and informative method.

Another unexpected result was the non-significant relationship between social support and posttraumatic stress symptoms on the Impact of Event Scale. However, this measure is not a diagnostic tool for PTSD as it does not include the full range of symptoms required for a PTSD diagnosis. While a short measure was practical for the design of this study, a more in depth diagnostic tool might have displayed more significant relationships with other variables.

Conclusions and suggestions for future research

This study has demonstrated that trauma-related cognitions, which predict the severity of PTSD symptoms, also predict PTG in breast cancer patients. It is concluded that Ehlers and Clark's (2000) model of PTSD can be used to understand the development of PTG. Negative trauma-related cognitions serve to create a sense of threat, increasing levels of distress, and leading to a search for meaning and benefit in the experience. This study also showed that, while there was no evidence that social support and age directly influence PTG, they have a protective influence on negative psychological outcomes through their impact on cognitive processes. This in turn, reduces the need to search for meaning and benefit. Future research on this complex relationship would benefit from a longitudinal design, which would provide further information about the adaptive nature of benefit finding, by observing change in variables over time. The cancer population may provide the opportunity to explore changes in cognitive appraisals and beliefs between pre-diagnosis appointments and completion of treatment. Due to the difficulties of generalising these findings to other types of trauma, a

useful avenue for future research is to establish the role of trauma-related cognitions for patients of other chronic illnesses and more acute traumas such as road traffic accidents and violent crime.

Knowledge of maladaptive reactions to trauma is much more established than our understanding of posttraumatic growth and so the use of robust models such as that by Ehlers and Clark (2000) prove highly informative when integrated into the investigation of benefit finding. These seemingly different reactions may be instead integrated and require a model that understands trauma reactions as a whole, rather than two separate phenomena.

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Appendices

Appendix 1: Notes for Contributors: Psychological Bulletin

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- critical assessments of the strengths and weaknesses in past research; and
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doi: 10.1037/0278-6133.24.2.225
Authored Book:
Mitchell, T. R., & Larson, J. R., Jr. (1987). *People in organizations: An introduction to organizational behavior* (3rd ed.). New York, NY: McGraw-Hill.
Chapter in an Edited Book:
Bjork, R. A. (1989). Retrieval inhibition as an adaptive mechanism in human memory. In H. L. Roediger III & F. I. M. Craik (Eds.), *Varieties of memory & consciousness* (pp. 309–330). Hillsdale, NJ: Erlbaum.

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Publication policies. APA policy prohibits an author from submitting the same manuscript for concurrent consideration by two or more publications. APA requires authors to reveal any possible conflict of interest in the conduct and reporting of research (e.g., financial interests in a test or procedure, funding by pharmaceutical companies for drug research).

Ethical Principles. It is a violation of APA Ethical Principles to publish "as original data, data that have been previously published" (Standard 8.13). In addition, APA Ethical Principles specify that "after research results are published, psychologists do not withhold the data on which their conclusions are based from other competent professionals who seek to verify the substantive claims through reanalysis and who intend to use such data only for that purpose, provided that the confidentiality of the participants can be protected and unless legal rights concerning proprietary data preclude their release" (Standard 8.14). APA expects authors to adhere to these standards. Specifically, APA expects authors to have their data available throughout the editorial review process and for at least 5 years after the date of publication. Authors are required to state in writing that they have complied with APA ethical standards in the treatment of their sample, human or animal, or to describe the details of treatment.

Submission. All efforts should be undertaken to submit manuscripts electronically to the editor. Files can be sent in Microsoft Word, or as a PDF file. The version sent should be consistent with the complete APA-style printed version. General correspondence may be directed to the Editor's Office.In addition to addresses and phone numbers, please supply electronic mail addresses and fax numbers, if available, for potential use by the Editorial Office and later by the Production Office. Keep a copy of the manuscript to guard against loss.

Masked review policy. The identities of authors will be withheld from reviewers and will be revealed after determining the final disposition of the manuscript only upon request and with the permission of the authors.
Authors are responsible for the preparation of manuscripts to permit masked review. Manuscripts submitted electronically should include all author names and affiliations, as well as the corresponding author's and co-authors' contact information, in the box labeled "cover letter," not in the manuscript file.

Every effort should be made to ensure that the manuscript itself contains no clues to the authors' identities, including deletion of easily identified self-references from the reference list.

Appendix 2: Notes for Contributors: British Journal of Health Psychology

The aim of the British Journal of Health Psychology is to provide a forum for high quality research relating to health and illness. The scope of the journal includes all areas of health psychology across the life span, ranging from experimental and clinical research on aetiology and the management of acute and chronic illness, responses to ill-health, screening and medical procedures, to research on health behaviour and psychological aspects of prevention. Research carried out at the individual, group and community levels is welcome, and submissions concerning clinical applications and interventions are particularly encouraged.

The types of paper invited are:

- papers reporting original empirical investigations;
- theoretical papers which may be analyses or commentaries on established theories in health psychology, or presentations of theoretical innovations;
- review papers, which should aim to provide systematic overviews, evaluations and interpretations of research in a given field of health psychology; and
- methodological papers dealing with methodological issues of particular relevance to health psychology.

Circulation. The circulation of the Journal is worldwide. Papers are invited and encouraged from authors throughout the world.

Length. Papers should normally be no more than 5000 words (excluding the abstract, reference list, tables and figures), although the Editor retains discretion to publish papers beyond this length in cases where the clear and concise expression of the scientific content requires greater length.

Editorial Policy. The Journal receives a large volume of papers to review each year, and in order to make the process as efficient as possible for authors and editors alike, all papers are initially examined by the Editors to ascertain whether the article is suitable for full peer review. In order to qualify for full review, papers must meet the following criteria:

- the content of the paper falls within the scope of the Journal
- the methods and/or sample size are appropriate for the questions being addressed
- research with student populations is appropriately justified
- the word count is within the stated limit for the Journal (i.e. 5000 words)

Submission and reviewing. All manuscripts must be submitted via our online peer review_system. The Journal operates a policy of anonymous peer review. Authors must suggest three reviewers when submitting their manuscript, who may or may not be approached by the Associate Editor dealing with the paper.

Manuscript requirements. Contributions must be typed in double spacing with wide margins. All sheets must be numbered. Tables should be typed in double spacing, each on a separate page with a self-explanatory title. Tables should be comprehensible without reference to the text. They should be placed at the end of the manuscript with their approximate locations indicated in the text. Figures can be included at the end of the document or attached as separate files, carefully labelled in initial capital/lower case lettering with symbols in a form consistent with text use. Unnecessary background

patterns, lines and shading should be avoided. Captions should be listed on a separate sheet. The resolution of digital images must be at least 300 dpi. For articles containing original scientific research, a structured abstract of up to 250 words should be included with the headings: Objectives, Design, Methods, Results, Conclusions. Review articles should use these headings: Purpose, Methods, Results, Conclusions. For reference citations, please use APA style. Particular care should be taken to ensure that references are accurate and complete. Give all journal titles in full. SI units must be used for all measurements, rounded off to practical values if appropriate, with the imperial equivalent in parentheses. In normal circumstances, effect size should be incorporated. Authors are requested to avoid the use of sexist language. Authors are responsible for acquiring written permission to publish lengthy quotations, illustrations, etc. for which they do not own copyright. For guidelines on editorial style, please consult the APA Publication Manual published by the American Psychological Association.

Publication ethics. All submissions should follow the ethical submission guidelines outlined the Ethical Publishing Principles Guideline for Authors, and the Code of Ethics and Conduct (2006).

Supplementary data. Supplementary data too extensive for publication may be deposited with the British Library Document Supply Centre. Such material includes numerical data, computer programs, fuller details of case studies and experimental techniques. The material should be submitted to the Editor together with the article, for simultaneous refereeing.

Copyright. On acceptance of a paper submitted to a journal, authors will be requested to sign an appropriate assignment of copyright form. To find out more, please see ourCopyright Information for Authors.

Appendix 3: University of Southampton Ethics Committee Approval

Your Ethics Form approval

Psychology.Ethics.Forms@ps2.psy.soton.ac.uk [Psychology.Ethics.Forms@ps2.psy.soton.ac.uk]

Sent: 12 March 2009 13:12
To: moore j. (jm5v07)

Project Title: The impact of cancer, social support and psychological distress for survivors of breast cancer
Study ID : 788
Approved Date : 2009-03-12 13:12:45

This email is to confirm that your ethics form submission for the above title has been approved by the ethics committee

If you haven't already submitted the Research Governance form for indemnity insurance and research sponsorship along
with your ethics application please be aware that you are now required to fill in this form which can be found online at the link below.

Please note that you cannot begin your research before you have had positive approval from the University of Southampton Research Governance Office (RGO).

You should receive this by email in a maximum of two working weeks.
If you experience any delay beyond this period please contact Barbara Seiter.

More information about Research Governance can be found at the link below.
http://www.soton.ac.uk/corporateservices/rgo/index.html

Appendix 4: Salisbury Hospital Ethics Committee Approval

NHS
National Research Ethics Service
Wiltshire Research Ethics Committee
Room 11
John Apley Building
Royal United Hospital
Combe Park
Bath
BA1 3NG

Telephone: 01225 824255
Facsimile: 01225 825725
email: kirsten.peck@ruh-bath.swest.nhs.uk

24 August 2009

Miss Julie Moore
182 Christchurch Road
Ringwood
Hampshire
BH24 3AS

Dear Miss Moore

Study Title:	**An examination of the relationship between social support, trauma-related cognitions, and Post-traumatic Stress Disorder in survivors of Breast Cancer**
REC reference number:	**09/H0104/40**
Protocol number:	**2**

Thank you for your letter of 17 July 2009, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

For NHS research sites only, management permission for research ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research governance arrangements. Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk. *Where the only involvement of the NHS organisation is as a Participant Identification Centre, management permission for research is not required but the R&D office should be notified of the study. Guidance should be sought from the R&D office where necessary.*

Sponsors are not required to notify the Committee of approvals from host organisations.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	*Version*	*Date*
Investigator CV	Dr Anke Karl	
Participant Information Sheet	3	17 July 2009
Brief introduction to questionnaire	1	17 July 2009
Debriefing sheet	1	02 March 2009
Participant Consent Form	1	02 March 2009
Letter of invitation to participant	1	02 March 2009
Questionnaire: Impact of Cancer		
Compensation Arrangements		06 April 2009
Letter from Sponsor		07 April 2009
Covering Letter		28 May 2009
Protocol	2	02 March 2009
Investigator CV	Julie Moore	28 May 2009
REC application		28 May 2009

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Service website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators

- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk.

REC reference 09/H0104/40	**Please quote this number on all correspondence**

Yours sincerely

Kirstie Peck

pp **Mrs Helen Wallace**
Chair
Wiltshire Research Ethics Committee

Enclosures: "After ethical review – guidance for researchers"

Copy to: Dr Martina Prude Head of Research Governance Corporate Services Highfield Campus University of Southampton SO17 1BJ

Appendix 5: Cover letter for participants recruited through charities

Hello,

I would like to invite you to take part in a research study. I am a trainee Clinical Psychologist at the University of Southampton and I am conducting this research as part of my doctoral thesis. The study is aimed at improving our understanding of the complex experience of breast cancer so that psychologists may better identify patient needs and effectively support those needs in the future.

Before you decide whether or not to take part please take the time to ensure that you meet the following criteria:

1. You must be over 18 years
2. You must have undergone treatment for breast cancer a **minimum of 6 months previous to the participation** (there is no maximum time limit)
3. You must not be in current treatment (ongoing hormone therapy not considered treatment for this study i.e. Tamoxifen)
4. You must be able to read and understand the information provided on the participant information sheet before you decide to participate

If you fulfil the above criteria please turn the page and read the 'Participant Information Sheet'. This provides you with information on the nature of the study and what is required by you.

Participation is voluntary and you can choose not to, by simply throwing this pack away. If you do not wish to complete all of the questionnaires you can just complete the first 3 or 4 and return those in the pre-paid envelope provided.

If you think you have already taken part in this study please throw this pack away. For any further questions please do not hesitate to call me on 0784 301 5165 at any time.

Kind Regards

Julie Moore, Trainee Clinical Psychologist

University of Southampton

Appendix 6: Letter of Invitation

Dear patient,

I would like to invite you to take part in a research study. Before you decide whether or not to take part please take the time to read the 'Patient Information Sheet' on the following page. This provides you with information on the nature of the study and what is required by you. Participation is voluntary and you can choose not to participate by simply throwing this pack away. If you wish to consider taking part please turn to the next page and carefully read the information provided.

For any further questions please do not hesitate to call me on 0784 301 5165 at any time.

Kind Regards,

Julie Moore

Trainee Clinical Psychologist
University of Southampton
Supervised by Dr Kate Jenkins
Salisbury District Hospital

Appendix 7: Participant Information Sheet

Participant Information Sheet

Please take time to read this information carefully before deciding whether or not to take part in this study. If you have any questions please call Julie Moore on 07843015165.

Study Title: The relationship between the impact of cancer, social support, and psychological distress for women with experience of breast cancer.

Researcher: Julie Moore, trainee clinical psychologist, University of Southampton.

What is the research about? This study aims to examine the complex experiences of women who have been treated for breast cancer. It specifically looks at the impact that cancer may have on different areas of life, the types of social support that women perceive to be available, and the level of distress experienced one year or more after treatment. It will also explore the patterns and relationships between these things.

What is the purpose of the study? The researcher is a trainee Clinical Psychologist and is conducting this research as part of a doctoral thesis. This study is aimed at improving our understanding of the complex experience of breast cancer so that psychologists may better identify patient needs and effectively support those needs in the future.

Do I have to take part? No. It is up to you to decide. This information sheet describes what is required. The following sheet is a consent form which you can sign if you agree to take part. You are free to withdraw at any time, without giving a reason. Simply throw this pack away.

What will happen to me if I take part? If you choose to participate in this study the next step is to read and sign the consent form. You may then complete the enclosed questionnaires. This should take between 30 and 45 minutes. Once complete simply place all the questionnaires in the pre-paid envelope provided and post back to me. Nothing more is required of you. The number for the researcher is provided at the top of this page so that you may call her if you have concerns or feel upset after completing the questionnaires. The information you provide will be kept confidential and used to examine the factors described above. The results of the study may be published in the future. However, the publication will contain no identifying information.

Are there any benefits in my taking part? Some individuals may be interested to know the findings of this research. If you wish to be sent information on the results of the study please contact the researcher on the number provided. Any personal contact details kept until this time will be destroyed after the information has been sent to you.

What are the disadvantages of taking part? The time taken to complete the questionnaires may be an inconvenience to some people. There is a small risk that you may feel discomfort or upset by completing the questionnaires. If so you can stop at any time and use the number provided to call the researcher who will be happy to talk with you and offer support.

The researcher will offer to call you back in order to cover the costs of the telephone call. If you wish to express concern or complaint about this study you can contact Dr Martina Prude, Head of Research Governance at the University of Southampton. She is independent of this project. She may be

contacted at the following address: Research Governance Office, Corporate Services, Building 37, Level 4, Room 4055, University of Southampton, Highfield Campus, Southampton, SO17 1BJ. Tel: 0238059 (2)5058. Email: mad4@soton.ac.uk.

Will my participation be confidential? Yes. We will follow ethical and legal practice and all information about you will be kept confidential. No identifying information will be printed in the published report. All identifiable information will be stored in a locked cabinet at all times and destroyed when no longer needed. The data that is transferred to a computer will be anonymised.

What happens if I change my mind? After sending your questionnaires you are free to change your mind at any time. Simply call the researcher and she will destroy your data.

Who is organising and funding the research? The researcher is a trainee Clinical Psychologist funded by Taunton and Somerset NHS Trust. The costs of the research are funded by the University of Southampton.

Who has reviewed the study? The research has been independently reviewed by an ethics committee at the University of Southampton to protect your safety, rights and wellbeing.

Where can I get more information? For more information or to withdraw from the study contact Julie Moore, trainee Clinical Psychologist on 07843015165.

Please keep this information sheet and one copy of the consent form for your reference.

Thank you for taking time to read this and consider your participation.

Appendix 8: Consent Form

Consent Form

Project title: The relationship between the impact of cancer, social support, and psychological distress for survivors of breast cancer

Name of researcher: Julie Moore (07843015165). Supervised by Dr Kate Jenkins, clinical psychologist (01722 425105)

Please initial in each box

1. I confirm that I have read and understood the information sheet (dated 21/02/2009, version 1) for the above study. I have had the opportunity to consider the information, ask questions and have these answered. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected. ☐

3. I understand that information given during this study may be looked at by individuals from the research team. ☐

4. I agree to take part in the above study. ☐

Print name: _____

Sign: _____

Date: _____

I wish to be contacted by the clinical psychology department if my results indicate I may benefit from some support Yes ☐ No ☐

Appendix 9: Demographic Information sheet

Demographic Information

Name	
Address	
Age	
Marital Status (please circle)	Single Married Divorced Cohabiting Other
Employment Status (please circle)	Unemployed Employed Self-employed Full-time parent/caregiver Other
Job title	
Length of time since the **end** of treatment	
Type of treatment received (please circle)	Radiotherapy Chemotherapy Mastectomy and breast reconstruction Mastectomy without reconstruction Local Excision (lumpectomy) Clinical trial Other_____
Professional support used (please circle)	None Support groups Individual counselling

Thank you.

The next step is to turn the page and begin completing the first questionnaire.

Appendix 10: Impact of Event Scale

Impact of Event Scale (IES)

On (date):_____
You experienced (life event): breast cancer

Below is a list of comments made by people after stressful life events. Please check each item, indicating how frequently these comments were true for you **during the past seven days**. If they did not occur during that time, please mark the "not at all" column.

	Frequency			
	Not at all	**Rarely**	**Sometimes**	**Often**
1. I thought about it when I didn't mean to.				
2. A avoided letting myself get upset when I Thought about it or was reminded of it.				
3. I tried to remove it from memory.				
4. I had trouble falling asleep, because of The pictures and thoughts about it that Came into my mind.				
5. I had waves of strong feelings about it.				
6. I had dreams about it.				
7. I stayed away from reminders of it.				
8. I felt as if it hadn't happened or it wasn't Real.				
9. I tried not to talk about it.				
10. Pictures about it popped into my mind.				
11. Other things kept making me think about it.				
12. I was aware that I still had a lot of feelings About it, but I didn't deal with them.				
13. I tried not to think about it.				
14. Any reminder brought back feelings about it.				
15. My feelings about it were kind of numb.				

Appendix 11: Posttraumatic Cognitions Inventory

PTCI

We are interested in the kind of thoughts which you may have had after a traumatic experience. Below are a number of statements that may or may not be representative of your thinking.

Please read each statement carefully and tell us how much you AGREE or DISAGREE with each statement.

People react to traumatic events in many different ways. There are no right or wrong answers to these statements.

1	2	3	4	5	6	7
Totally Disagree	**Disagree Very Much**	**Disagree Slightly**	**Neutral**	**Agree Slightly**	**Agree Very Much**	**Totally Agree**

____ 1. The event happened because of the way I acted.

____ 2. I can't trust that I will do the right thing.

____ 3. I am a weak person.

____ 4. I will not be able to control my anger and will do something terrible.

____ 5. I can't deal with even the slightest upset.

____ 6. I used to be a happy person but now I am always miserable.

____ 7. People can't be trusted.

____ 8. I have to be on guard all the time.

____ 9. I feel dead inside.

____ 10. You can never know who will harm you.

____ 11. I have to be especially careful because you never know what can happen next.

____ 12. I am inadequate.

____ 13. I will not be able to control my emotions, and something terrible will happen.

____ 14. If I think about the event, I will not be able to handle it.

____ 15. The event happened to me because of the sort of person I am.

____ 16. My reactions since the event mean that I am going crazy.

____ 17. I will never be able to feel normal emotions again.

____ 18. The world is a dangerous place.

____ 19. Somebody else would have stopped the event from happening.

____ 20. I have permanently changed for the worse.

____ 21. I feel like an object, not like a person.

____ 22. Somebody else would not have gotten into this situation.

____ 23. I can't rely on other people.

____ 24. I feel isolated and set apart from others.

____ 25. I have no future.

____ 26. I can't stop bad things from happening to me.

____ 27. People are not what they seem.

____ 28. My life has been destroyed by the trauma.

____ 29. There is something wrong with me as a person.

____ 30. My reactions since the event show that I am a lousy coper.

____ 31. There is something about me that made the event happen.

____ 32. I will not be able to tolerate my thoughts about the event, and I will fall apart.

____ 33. I feel like I don't know myself anymore.

____ 34. You never know when something terrible will happen.

____ 35. I can't rely on myself.

____ 36. Nothing good can happen to me anymore.

Appendix 12: Perceived Social Support Scale

PERCEIVED SOCIAL SUPPORT SCALE

DIRECTIONS: The statements which follow refer to feelings and experiences which occur to Most people at one time or another in their relationships with their **FAMILIES.** For each statement there are three possible answers**: YES, NO, DON'T KNOW.**

Please choose your answer by ticking the relevant box for each item.

	YES	NO	DON'T KNOW
1. My family gives me the moral support I need.			
2. I get good ideas about how to do things or make things from my family.			
3. Most other people are closer to their family than me.			
4. When I confide in the members of my family who are closest to me, I get the idea that it makes them uncomfortable.			
5. My family enjoys hearing about what I think.			
6. Members of my family share many of my interests.			
7. Certain members of my family come to me when they have problems or need advice.			
8. I rely on my family for emotional support.			
9. There is a member of my family I could go to if I were just feeling down, without feeling funny about it later.			
10. My family and I are very open about what we think about things.			
11. My family is sensitive to my personal needs.			
12. Members of my family come to me for emotional support.			
13. Members of my family are good at helping me solve problems.			
14. I have a deep sharing relationship with a number of members of my family.			
15. Members of my family get good ideas about how to do things or make things for me.			
16. When I confide in members of my family, it makes me uncomfortable.			
17. Members of my family seek me out for companionship.			
18. I think my family feel that I'm good at helping them solve problems.			
19. I don't have a relationship with a member of my family that is as close as other people's relationships with family members.			
20. I wish my family were much different.			

PERCEIVED SOCIAL SUPPORT SCALE CONTINUED

DIRECTIONS: The statements which follow refer to feelings and experiences which occur to Most people at one time or another in their relationships with their **FRIENDS.** For each statement there are three possible answers: **YES, NO, DON'T KNOW.**

Please choose your answer by ticking the relevant box for each item.

	YES	NO	DON'T KNOW
1. My friends give me the moral support I need.			
2. I get good ideas about how to do things or make things from my friends.			
3. Most other people are closer to their friends than me.			
4. When I confide in friends who are closest to me, I get the idea that it makes them uncomfortable.			
5. My friends enjoy hearing about what I think.			
6. My friends share many of my interests.			
7. My friends come to me when they have problems or need advice.			
8. I rely on my friends for emotional support.			
9. There is a friend I could go to if I were just feeling down, without feeling funny about it later.			
10. My friends and I are very open about what we think about things.			
11. My friends are sensitive to my personal needs.			
12. My friends come to me for emotional support.			
13. My friends are good at helping me solve problems.			
14. I have a deep sharing relationship with a number of my friends.			
15. My friends get good ideas about how to do things or make things for me.			
16. When I confide in my friends, it makes me uncomfortable.			
17. My friends seek me out for companionship.			
18. I think my friends feel that I'm good at helping them solve problems.			
19. I don't have a relationship with a friend that is as close as other people's relationships with friends.			
20. I wish my friends were much different.			

Appendix 13: The Impact of Cancer Scale

IMPACT OF CANCER SCALE

EMPLOYMENT

1. Are you fully retired from paid employment?

_____ 1 Yes ***go to NEXT SECTION***
_____ 2 No

2.Were you employed and earning income at some time during the last 12 months?
_____ 1 Yes _____ 2 No ***go to NEXT SECTION***

We are interested in knowing about your personal views or perspectives on life. Given your life as it is now, how much do you agree or disagree with each of the following statements?

Please indicate which statement best described how much you agree or disagree with the statement.

STRONGLY DISAGREE DISAGREE NEUTRAL AGREE STRONGLY AGREE

3. I am concerned about not being able to work if I were to become ill again
4. Concerns about losing health insurance keep me in the job I have now
5. I worry about being forced to retire or quit work before I am ready

LIFE OUTLOOK

We are interested in knowing about your personal views or perspectives on life. Given your life **as it is now**, how much do you agree or disagree with each of the following statements?

1. Because of cancer I live each day one at a time
2. I feel grateful to be alive
3. I feel like time in my life is limited
4. I learned something about life because of having had cancer
5. Having had cancer makes me feel unsure about my future
6. I worry about my future
7. I am afraid to die
8. I can accept my mortality, that I am going to die someday
9. I feel like time in my life is running out
10. Having had cancer has made me realize that time is precious
11. Having had cancer has strengthened my religious faith or my sense of spirituality

YOUR BODY AND YOUR HEALTH

We are interested to know how having had cancer **NOW** affects your body and your health, if at all.

1. I do not take my body for granted since the cancer
2. Having had cancer has made me more concerned about my health
3. I am more aware of physical problems or changes in my body since having had cancer
4. Other health problems not related to cancer bother me more than having had cancer
5. I worry about my health
6. I accept the changes my body has gone through as a result of cancer and its treatment
7. I worry about the cancer coming back or about getting another cancer
8. New symptoms (aches, pains, getting sick or the flu) make me worry about the cancer coming back
9. Having had cancer makes me feel uncertain about my health
10. I am concerned that my energy has not returned to what it was before I had cancer
11. I am bothered that my body cannot do what it could before having had cancer
12. I worry about how my body looks
13. I feel disfigured
14. I sometimes wear clothing to cover up parts of my body I don't want others to see
15. Having had cancer has made me take better care of myself (my health)
16. Having to pay attention to my physical health interferes with my life
17. I am unable to think or remember things like I used to

FEELINGS ABOUT CANCER

Given your life as it is **NOW**, how do you feel about having had cancer?

1. I consider myself to be a cancer survivor
2. I feel a sense of pride or accomplishment from surviving cancer
3. I learned something about myself because of having had cancer
4. I am angry about having had cancer
5. I feel guilty for somehow being responsible for getting cancer
6. I feel that I am a role model to other people with cancer
7. As time goes on, having had cancer becomes less important to me
8. Having had cancer has made me feel old
9. I feel guilty today for not having been available to my family when I had cancer
10. My sense of myself as a cancer survivor has lessened over time
11. My life would be better today if I had not had cancer
12. Having had cancer has been the most difficult experience in my life
13. Having had cancer has not been as big a deal as other things that have happened in my life.
14. I view having had cancer as a private experience
15. I wish to forget about having had cancer
16. I am constantly reminded that I had cancer
17. Something good has come from having had cancer
18. I think the doctors should have done a better job treating my cancer
19. Now that my treatment has ended I feel like my cancer doctors are not interested in my well-being

MEANING OF CANCER
Given your life as it is now, how much do you agree or disagree with each of these statements about cancer?

1. I wonder why I got cancer
2. It is important for me to know why I got cancer
3. Having had cancer turned into a reason to make changes in my life
4. Because of cancer I have become better about expressing what I want
5. Because of cancer I have more confidence in myself
6. Having had cancer has given me direction in life
7. I feel like cancer runs my life
8. Because of having had cancer I feel that I have more control of my life
9. I have financial problems that are related to having had cancer
10. Within the past year I have had difficulty getting my health insurance to pay some of my medical bills

ACTIVITIES AND RELATIONSHIPS
This section includes questions about your social activities and about important relationships in your life.

1. I place a higher value on my relationships with family or friends than I did before having had cancer
2. I feel a special bond with people with cancer
3. Because I had cancer I am more understanding of what other people may feel when they are seriously ill
4. Having had cancer has made me more willing to help others
5. I feel that I should give something back to others because I survived cancer
6. I worry about friends dying from cancer
7. Having had cancer has made me feel alone
8. Having had cancer has made me feel like some people (friends, family, co-workers) do not understand me
9. I am concerned about my children getting cancer
10. Uncertainty about my future affects my decisions to make plans (examples: work, recreation/travel, get married, get involved in relationships, have a family, go to school)
11. Having had cancer has motivated me to make plans for dying (get my affairs in order)
12. Having had cancer keeps me from doing activities I enjoy (examples: travel, socializing, recreation, time with family)
13. On-going cancer-related or treatment-related symptoms (for example bladder or bowel control, lymphedema, hair loss, scars, infertility, premature menopause, lack of energy, impotence/sexual problems, aches, pain or physical discomfort) interfere with my life

14. Are you currently married, living together as married, or in a significant relationship?

_____ 1 Yes *go to* ***QUESTION 19***
_____ 2 No

Given your life as it is now, how much do you agree or disagree with each of the following statements?

15. Uncertainties about my health or my future have made me delay getting married or getting involved in a serious relationship
16. I wonder how to tell a potential spouse, partner, boyfriend, or girlfriend that I have had cancer
17. I am concerned about how to tell a spouse, partner, boyfriend, or girlfriend that I may not be able to have children
18. I worry about not having a spouse, partner, boyfriend, or girlfriend

STOP HERE

Please answer the following questions ONLY if you are **currently married, living together as married, or in a significant relationship. Otherwise, please stop.**

1. I am open and willing to discuss my cancer with my spouse/partner
2. My spouse/partner is open and willing to discuss my cancer with me
3. Uncertainty about my health has created problems in my relationship with my spouse/partner
4. I worry about my spouse/partner leaving me if I were to become ill again

Appendix 14: Table of Correlations

	PIOC	NIOC	Time	PSSS	PTCI	PTCI self	PTCI world	PTCI blame	Age	HAD	IES
PIOC	1										
NIOC	.219*	1									
Time	.010	-.278*	1								
PSSS	.086	-.446**	.035	1							
PTCI	.288**	.673**	-.144	-.453**	1						
PTCIself	.314**	.720**	-.172	-.409**	.948**	1					
PTCIworld	.193	.534**	-.210	-.426**	.913**	.806**	1				
PTCIblame	.196	.711**	-.209	-.454**	.739**	.733**	.552**	1			
Age	-.201	-.311**	.265	.021	-.360**	-.393**	-.298**	-.367**	1		
HAD	.213*	.782**	-.207	-.367**	.723**	.793**	.564**	.625**	-.335**	1	
IES	.218*	.592**	-.338**	-.138	.521**	.581**	.410**	.512**	-.338**	.644**	1

Note. PIOC, positive impact of cancer; NIOC, negative impact of cancer; Time, time since completion of treatment; PSSS, perceived social support scale; PTCI, posttraumatic cognitions inventory; PTCIself, cognitions about the self; PTCIworld, cognitions about the world; PTCIblame, cognitions of self blame, Age, age of participant; HAD, hospital anxiety and depression scale; IES, impact of events scale.
* $p < .05$; ** $p < .01$