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**An Exploration of Gender Differences in Posttraumatic Growth in Survivors of Colorectal Cancer**

by

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# ABSTRACT

FACULTY OF SOCIAL AND HUMAN SCIENCES

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## AN EXPLORATION OF GENDER DIFFERENCES IN POSTTRAUMATIC GROWTH IN SURVIVORS OF COLORECTAL CANCER

Katie Joanne Redwood

This thesis commences with a review of the literature into the role of social support and cognitive processing in posttraumatic growth (PTG) following a cancer diagnosis. Extensive evidence was found for the role of social support in facilitating PTG, particularly support from family and cancer specific social support. However, social support is a complex construct and further research would be beneficial to further understanding of the role of variables that may influence this relationship such as social constraint. The review also provided some evidence for the role of cognitive processes such as rumination, re-evaluation of core beliefs and searching for meaning in PTG. The evidence supports social-cognitive processing theories of PTG and suggests that social support has an important role in promoting cognitive processing. Limitations of the research, clinical implications and areas for future research are identified.

The empirical paper describes a study which used a cross-sectional questionnaire design to explore gender differences in self-reported PTG in 123 survivors of colorectal cancer (CRC). It also examined the role of social support and cognitive processing as mediators in the relationship between gender and PTG. Significant gender differences in PTG, distress and cognitive processing were found. Social support, distress and cognitive processing were positively correlated with PTG. Regression analysis showed that female gender, having greater social support and engaging in more deliberate rumination predicted increasing levels of PTG. Deliberate rumination was found to mediate the relationship between gender and PTG. The findings provide evidence for gender differences in PTG in survivors of CRC and suggest that social support and cognitive processing have a vital role in facilitating PTG. Limitations, clinical implications and areas for future research are discussed.

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# DECLARATION OF AUTHORSHIP

I, Katie Redwood declare that this thesis entitled '**An exploration of gender differences in posttraumatic growth in survivors of colorectal cancer'** and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission

Signed: .....

Date: .....

# Acknowledgements

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# Chapter 1: Literature Review

## The Role of Social Support and Cognitive Processing in Posttraumatic Growth Following Cancer

### 1.1 Introduction

Cancer is a prevalent life-threatening disease that will affect more than one in three people in the UK during their lifetime (Cancer Research UK, 2013). The term 'cancer' describes over 200 different diseases resulting from uncontrolled cell growth. The cancerous cells can invade and destroy healthy tissue impacting on normal functioning (Cancer Research UK, 2015a). Symptoms of cancer can vary considerably and each type of cancer has its own method of diagnosis and treatment.

The experience of receiving a cancer diagnosis, undergoing treatment and surviving cancer can often have a significant psychological impact (Salsman, Segerstrom, Brechting, Carlson, & Andrykowski, 2009). Individuals diagnosed with cancer can experience difficulties regarding diagnosis and prognosis, undergoing surgery, coping with treatment and aversive treatment side effects, fatigue, loss of function and fears of cancer recurrence. Cancer can disrupt many aspects of life, such as relationships and social roles (Miller & Caughlin, 2013; Stanton, Bower, & Low, 2006), and can necessitate major changes in lifestyle and goals (Carboon, Anderson, Pollard, Szer, & Seymour, 2005). A cancer diagnosis can also lead people to wonder why cancer has happened to them (Jim & Jacobson, 2008), which can challenge an individual's core beliefs about the world, their relationships and identity, forcing them to confront their own vulnerability and fragility (Janoff-Bulman, 1992).

Over the last 40 years there have been considerable advances in treatment of cancer and the number of individuals surviving cancer has doubled. More than 50% of individuals diagnosed with cancer are now predicted to survive 10 or more years (Cancer Research

UK, 2014a). It has been highlighted that individuals who survive cancer are likely to experience different health and psychological needs compared to individuals at diagnosis and those undergoing treatment (Khan, Harrison, Rose, Ward, & Evans, 2012), whereby many individuals experience heightened levels of distress upon completion of treatment and into survivorship (Knott, Turnbull, Oliver, & Winefield, 2011). Conversely, a growing body of evidence suggests that experiencing a stressful and traumatic experience such as cancer can also be a catalyst for positive psychological changes (Tedeschi & Calhoun, 2004). Understanding the longer-term psychological impacts and the process of adjustment following cancer is therefore vital (Lepore, 2001).

Cognitive processing and social support have been identified as two important factors which may lead individuals to experience positive changes following cancer, such as posttraumatic growth (PTG, Tedeschi & Calhoun, 1995). This review will consider the role of social support and cognitive processing in facilitating PTG after cancer. It will firstly discuss the psychological impact of cancer. Secondly, the theoretical background to understanding PTG following cancer will be discussed. The empirical evidence for the role of cognitive processing and social support in PTG following cancer will then be examined using a systematic search. Finally, the limitations, theoretical and clinical implications will be considered.

### 1.1.1 Cancer and Post-Traumatic Stress Disorder

Traumatic events are events that involve actual or threatened death or serious injury (Zoellner & Maercker, 2006). Post-Traumatic Stress Disorder (PTSD) is a potential outcome of exposure to traumatic experiences. PTSD is characterised by clinically significant distress or impairment in social interactions, capacity to work or other important areas of functioning. Individuals may also experience symptoms such as re-experiencing, avoidance, negative cognitions and mood, and arousal (APA, 2013). The

threat to life and physical wellbeing associated with cancer has been recognised as a traumatic event, which can evoke fear, devastation and feelings of a lack of control (Lethborg et al., 2000). However, the cancer experience is different to acute trauma experiences and involves a chronic extreme stressor (Mehnert & Koch, 2007), and an internal rather than external threat (Koopman et al., 2002).

The cancer experience exposes individuals to a range of stressors from diagnosis through to survivorship. Individuals may have to face changes to body image or functioning, hair loss, fatigue, surgery, invasive treatment and aversive side effects, and a cancer diagnosis may impact on roles and relationships. The cancer experience can thus have a traumatic quality which can result in some individuals experiencing symptoms of PTSD such as intrusive thoughts, avoidance and heightened arousal (e.g. Koopman et al., 2002; Manne, 1999). These symptoms may be displayed as worry, irritability, anger, fears of recurrence or nightmares about their illness and treatment (Bush, 2009; Kwekkeboom & Seng, 2002). It is well documented that cancer survivors commonly report negative symptoms in relation to their cancer diagnosis and prevalence rates of psychological distress in cancer survivors have been reported to be between 29.6% and 43.4% (Salsman et al., 2012), with 35% of individuals experiencing symptoms of PTSD (National Cancer Institute, 2012), highlighting the longer-term impact of cancer.

### 1.1.2 Posttraumatic Growth

The term ‘adjustment’ is often used in the psycho-oncology literature (Brennan, 2001) and refers to “the psychological processes that occur over time as an individual, and those in their social world, manage, learn from and adapt to the multitude of changes which have been precipitated by the illness and its treatment” (Brennan, 2001) resulting in an individual maintaining or re-establishing their emotional equilibrium (Lepore, 2001). Whereas, PTG refers to the “positive psychological change experienced as a result of the

struggle with highly challenging life circumstances" (Tedeschi & Calhoun, 2004, p. 1). It has been argued that PTG is more than just adjustment to a traumatic event (Oginska-Bulik, 2013), whereby individuals undergo a transformation in response to a trauma, resulting in them reaching levels of functioning higher than prior to trauma, resulting in a 'new normal' (Tedeschi & Calhoun, 2004).

Despite the negative impact of cancer it has been widely reported that experiencing a stressful and traumatic event such as cancer can be a catalyst for positive change (Joseph & Linley, 2008; Tedeschi & Calhoun, 1995). Facing a cancer diagnosis often forces people to confront their own mortality and cancer treatment can often disrupt routine for a prolonged period of time, which can lead people to re-examine priorities, relationships and the self, prompting opportunities for positive psychological change (Cordova, 2008; Jim & Jacobsen, 2008).

It has been suggested that experiencing cancer can result in PTG, whereby individuals change the meaning of the trauma to maintain positive assumptions about the world and themselves (Jim & Jacobsen, 2008). PTG is frequently reported in the cancer survivorship literature (e.g. Connerty & Knott, 2013; Helgeson, Reynolds, & Tomich, 2006) and refers to positive changes in the perception of the self, social relationships, life priorities and a greater appreciation of life (Calhoun & Tedeschi, 2001). Individuals may report altered perceptions of the self, increased strength, self-reliance, enhanced interpersonal relationships, increased emotional expression and compassion for others, a greater appreciation of life, re-evaluation of priorities, stronger spiritual beliefs and wisdom.

Given that cancer is different to acute traumas and involves an ongoing threat to life, it has been suggested that the experience of PTG following cancer is unique to cancer and different from other traumas (Sumalla, Ochoa, & Blanco, 2009). It is therefore important to

understand more about PTG following cancer. Empirical evidence suggests that not everyone reports experiencing PTG following cancer (Stanton et al., 2006), and it is therefore vital that we further understand the processes and mechanisms which may help individuals to experience PTG.

### 1.1.3 Cognitive Processing and PTG

Cognitive processing has been recognised as a central process of PTG (Tedeschi & Calhoun, 2004) and two important factors have been identified to facilitate PTG. Firstly, the degree to which the experience challenges core beliefs (Janoff-Bulman, 1992) and secondly, the degree to which the experience initiates cognitive processes that focus on the traumatic experience and its impact (Cann et al., 2011). These cognitive processes have been argued to be how an individual attempts to understand the experience and to rebuild their core beliefs to enable them to appreciate how they have changed through the experience of a significant life event (Cann et al., 2011; Janoff-Bulman, 2006).

Cognitive processing following a significant life stressor can play an important role in the impact of the event on the individual (Cann et al., 2011). Rumination has been identified as an important process to enable individuals to experience the changes in beliefs, goals, behaviours and identity associated with PTG (Salsman et al., 2009). Although the term rumination is widely used in the clinical literature on depression to describe repetitive negative thinking (Nolen-Hoeksema, 2000), which is often associated with negative experiences, it has been argued that not all rumination is negative (Cann et al., 2011). In the PTG literature the term ‘rumination’ has been used to describe the cognitive processes experienced in the aftermath of a major life stressor.

Two forms of rumination have been identified in the PTG literature: intrusive and deliberate. Intrusive rumination has been defined as “unsolicited invasions of one’s cognitive world-thoughts about an experience that one does not choose to bring to mind”

(Cann et al., 2011). Intrusive rumination has been identified as a normal initial reaction to a trauma that generally consists of unresolved concerns about the trauma, and refers to the uncontrolled thoughts and images that are often associated with distress. Deliberate rumination is engaged in more voluntarily and refers to purposeful attempts to try to understand events and their implications (Cann et al., 2011). Deliberate rumination generally occurs later in the process as core beliefs are rebuilt through making sense of the experience and refers to thoughts that are intentional, brief, more adaptive and less distressing (Greenberger, 1995). It has been proposed that intrusive and deliberate rumination play different roles in influencing outcomes following traumatic experiences (Cann et al., 2011), whereby intrusive rumination is associated with continued distress, while deliberate processing of a traumatic experience is more likely to decrease distress and increase potential for PTG (Calhoun & Tedeschi, 1998).

Cognitive avoidance is commonly identified as a means of coping with cancer (Watson et al., 1988), whereby individuals attempt to push away cancer related thoughts (Cordella & Poiani, 2014). It has been suggested that not suppressing intrusive memories about the experience so that memories can be processed is an essential component of cognitive processing following a traumatic experience (Greenberger, 199; Horowitz, 1986).

Searching for a reason as to why the experience happened can also help individuals assimilate information into their processing, which can help them find meaning in the experience (Taylor, 1983). Processing can also occur through attempting to understand thoughts, feelings and emotional reactions to the trauma, either individually or through discussion with others (Pennebaker, 1990).

### 1.1.4 Social Support and PTG

Coping with cancer involves the mutual influence of the individual and members of their support network as they negotiate the stressors posed by the illness (Lepore & Revenson, 2007). Social support has been identified as an important catalyst that may lead individuals to experience PTG following cancer (Tedeschi & Calhoun, 2004). Social support facilitates successful confrontation of difficulties during times of stress, such as facing a cancer diagnosis (Lofti-Kashani et al., 2004), and has been found to increase tolerance of problems encountered by individuals with cancer (Chang, Molassiotis, Yam, Chang, & Lam, 2001). It has been suggested that disclosing inner feelings and fears in a supportive social context can facilitate PTG through emotional support, thus promoting cognitive processing (Silva, Crespo, & Canavarro, 2012). Social support may also help provide alternative views of the negative experience (Calhoun & Tedeschi, 1998; Weiss, 2004).

Social support is a complex multifaceted construct, with different aspects yielding different effects on adjustment (Lepore & Revenson, 2007; Uchino, 2004). A range of different types of social support have been identified such as emotional support, instrumental support and cancer specific support. Instrumental social support describes the tangible help or assistance during a time where normal routines are disrupted (Morris & Shakespeare-Finch, 2011), whereas emotional support refers to support consisting of empathy, love, trust and care (Bottomley & Jones, 1997). Cancer specific social support has also been identified as a form of informational support that may enable the individual to gain advice, suggestions and information that they can use to solve problems. It has been suggested that the type of social support may have differential effects on adjustment following cancer (Schroevers, Hegleson, Sandeman, & Rancor, 2010). It has also been highlighted that it is important to distinguish between perceived and actual social support and to consider satisfaction with social support when considering the role of social support

in facilitating PTG (Schroevers et al., 2010). Social support is a complex construct and further understanding into its relationship with PTG would therefore be beneficial.

### 1.1.5 Models of PTG

PTG has been conceptualised as both a coping process (e.g. Davis, Nolen-Hoeksema, & Larson, 1998; Park & Folkman, 1997; Taylor, 1983) and an outcome of the struggle with traumatic events (Schaefer & Moos, 1992; Tedeschi & Calhoun, 1995, 2004). There are a number of theoretical models of PTG, but existing theories have mainly focused on growth following acute traumas rather than cancer. This review will therefore consider two of the most influential models in explaining the role of social support and cognitive processing in facilitating PTG following cancer.

**1.1.5.2 Revised Model of Posttraumatic Growth.** Tedeschi & Calhoun (1995, 2004) proposed an influential model of PTG (see Figure 1), based on Jannoff-Bulman's (1992) concept of the shattered assumptive world, whereby the process of PTG is set in motion by the experience of a major life crisis that challenges an individual's core beliefs about the self, the world and others. They suggest that initially individuals must engage in coping responses to manage the overwhelming emotions and initial distress, but intense cognitive processing of the experience also occurs, initially through intrusive rumination. They highlight that the extent to which an individual is engaged cognitively, through rumination, appears to be crucial in the process of PTG. They propose that a persistent cognitive processing of the situation is needed to disengage, or give up on basic assumptions whilst simultaneously building new schemas, goals and meanings. They also suggested that social support systems are a vital factor in the facilitation of PTG as disclosure of difficulties may help to alter perceptions about the changes that have occurred by offering new perspectives that can be integrated into schemas, enabling the

construction of new narratives and schemas, resulting in the individual gaining general life wisdom. Moreover, they suggest that empathic responses to disclosure may be vital.

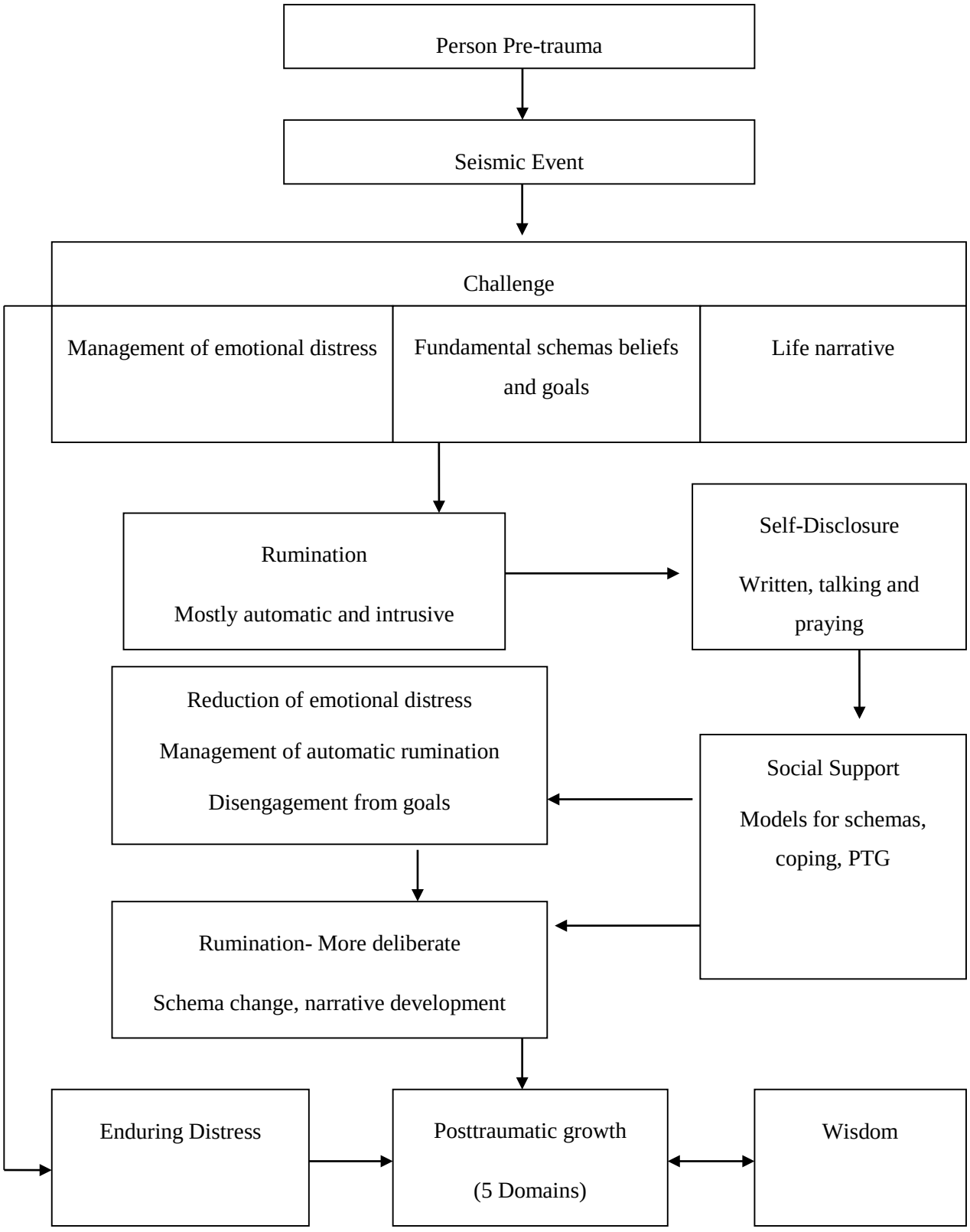


Figure 1*: A model of PTG proposed by Calhoun & Tedeschi, 1998*

Although the model is extremely influential it is descriptive rather than explanatory. The model does not explicitly describe which type of social support is most beneficial for the development of PTG (Schroevers et al., 2010). The model fails to distinguish between perceived availability of social support, the actual amount of support received and satisfaction with actual received support. Furthermore, it does not differentiate between different forms of social support, which may differentially influence PTG (Schroevers et al., 2010).

#### 1.1.5.3 Social-Cognitive Processing Model of Emotional Adjustment to Cancer.

Lepore (2001) noted the importance of interpersonal relationships, particularly the availability of social support, to adjustment following cancer and proposed a social-cognitive processing model of emotional adjustment to cancer. Lepore (2011) highlighted that social-contextual variables such as social support and social constraints on disclosure can account for much of the variance in adjustment following cancer by altering how people talk, think and feel about their cancer, self and relationships (Lepore & Revenson, 2007).

Lepore (2001) argues that social interactions play a significant role in facilitating cognitive processing. Supportive social interactions that consist of empathic listening and validation and which encourage acceptance may increase an individual's ability to process the traumatic experience. Supportive social environments may help individuals to tolerate cancer related thoughts and concerns. Furthermore, by allowing disclosure others can increase exposure to cancer related thoughts which may enable habituation to difficult thoughts and feelings. Cognitive processing may also be facilitated by support networks suggesting new and sometimes positive perspectives on the cancer experience. Social interactions may facilitate the creation of a 'narrative' of the cancer experience, reducing the need for further processing (Lepore & Revenson, 2007). However, the emotional benefits of talking may be moderated by social responses of others. Supportive, receptive

or noncritical social responses may facilitate adjustment; whereas unsupportive, unreceptive, or critical social responses may inhibit adjustment, preventing PTG. It has therefore been suggested that refraining from or modifying disclosure of stress and trauma related thoughts, feelings or concerns may affect an individual's ability to achieve PTG (Lepore & Revenson, 2007).

### 1.1.6 Aim and Scope of the Literature Review

The key aim of this literature review was to establish if social support and cognitive processing facilitate PTG following cancer. Empirical evidence for the role of social support and cognitive processing in PTG following cancer will be examined. The review aims to examine the different aspects of social support and cognitive processing to further understanding of their influence on PTG. It also aims to highlight any gaps in the literature which may require further research. To date, to the researcher's knowledge, no review has specifically examined the evidence for the role of social support and cognitive processing in PTG following cancer.

## 1.2 Method

### 1.2.1 Search Strategy

A systematic search of the literature was conducted, covering January 2000 to January 2015, using the bibliographic databases Web of Science, PsychInfo (through EBSCO) and Medline (Ovid). It was felt that this would identify all of the relevant articles as the first study exploring PTG in individuals diagnosed with cancer was conducted in 2001. Abstracts were screened and full-text articles for relevant studies were reviewed for eligibility.

The following search terms were used 'posttraumatic growth' or 'post-traumatic growth' or 'post-traumatic NEAR/4 growth' or 'posttraumatic NEAR/4 growth' and

‘Neoplasms’ or ‘Neoplasm*’ or ‘cancer*’ or ‘Oncolog*’ or ‘Carcinog*’ and ‘social support’ or ‘processing’. The electronic search was followed by a manual search of publications cited in the papers that met the search criteria.

### 1.2.2 Inclusion and Exclusion Criteria

Relevant articles were included if they were in English language, looked at the construct of PTG and social support or cognitive processing in adults who have had cancer and in the quantitative studies had used a validated scale to measure PTG, such as the Posttraumatic Growth Inventory (PTGI, Tedeschi & Calhoun, 1996). Articles were excluded if they had not looked at the construct of PTG (i.e. ‘benefit finding’ or ‘stress-related growth’), they had used a non-cancer population, had looked at carers or spouses of individuals with cancer rather than the individual, if participants were <18 years old, if individuals had a terminal diagnosis or if they had not examined either cognitive processing or social support. Review papers, duplications, unpublished work and dissertations were also excluded.

## 1.3 Data Synthesis and Extraction

The initial search yielded 153 publications and after removing duplicate publications 120 abstracts were screened. Of these 88 publications were excluded, identifying 33 potentially relevant publications. Full-text articles of these 33 publications were reviewed and a further two publications were excluded because they looked at the construct ‘benefit finding’ rather than PTG. Three additional articles were identified from the references. A flow chart of the search process is presented in Figure 2.

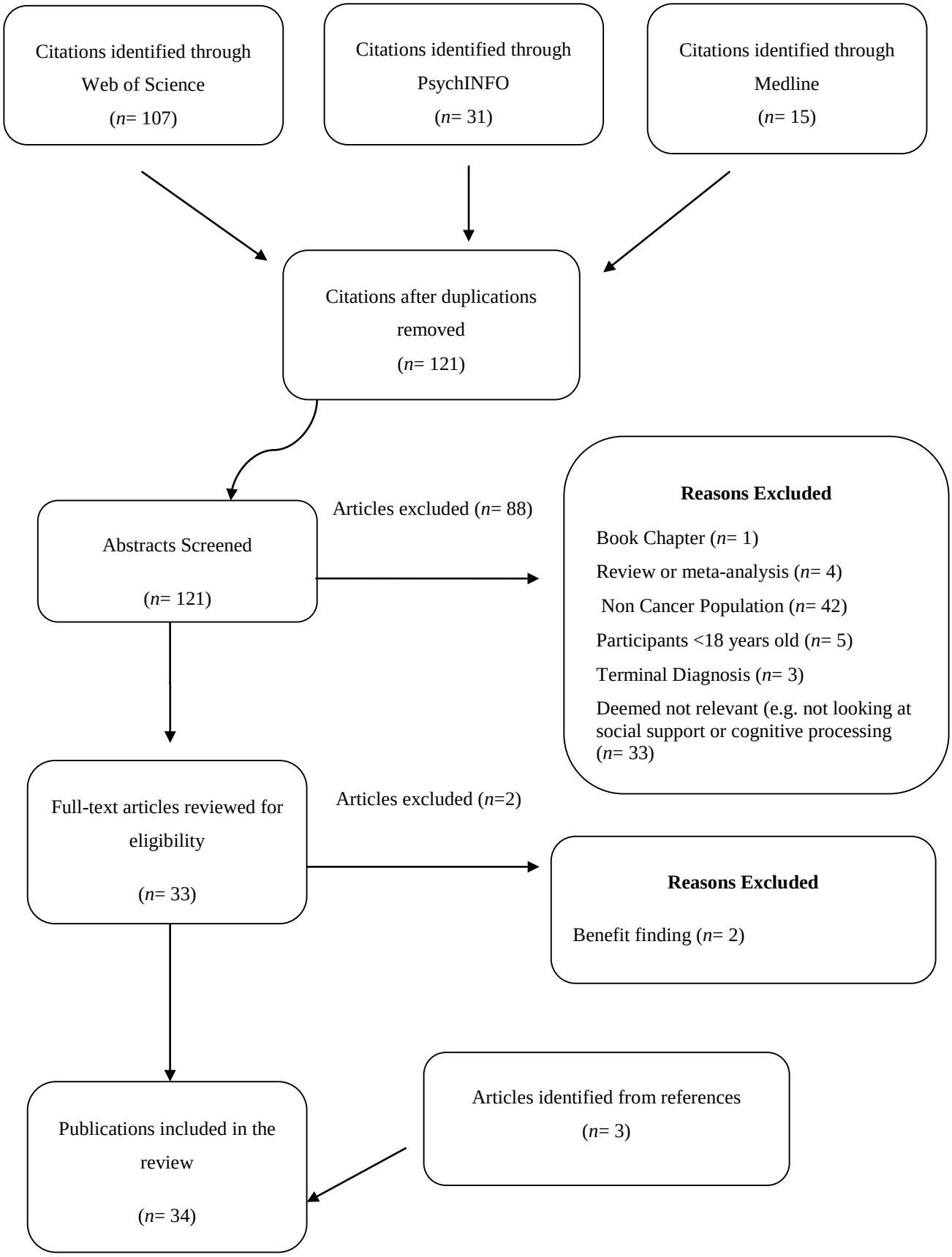


Figure 2*: A flow chart of the search strategy employed*

### 1.3.1 Design

The articles accepted for inclusions in the review consisted of both quantitative and qualitative papers and were considered in terms of a) social support and PTG and b) cognitive processing and PTG, in adults who had been treated for cancer. Of the 34 articles reviewed one article was a controlled comparison, five were qualitative studies, 16 articles were cross-sectional and 12 were longitudinal studies.

### 1.3.2 Study Characteristics

Table 1 provides detailed characteristics of the studies included in the review, 15 studies looked specifically at individuals who had breast cancer, 10 studies looked at mixed cancer diagnoses, two at prostate cancer, six at haematological cancer, and one at colorectal cancer.

The number of participants in each study varied considerably and ranged between 25 and 886 in the quantitative studies and six and 28 in the qualitative studies. The mean age of participants ranged between 37.21 and 70.17 years. There were considerable differences in the time at which PTG was assessed. Some of the studies assessed PTG at the time of diagnosis whereas others reported their data on time since completion of treatment.

Table 1

*Characteristics of the studies included in the review*

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Bozo, Gundogdu and Buyukasik-Colak (2009) | Cross-sectional | 104 | 46.28 | Breast cancer | 29.15 months since diagnosis | Life Orientation Test-Revised<br>Multidimensional Scale of Perceived Social Support<br>PTGI | PTG was significantly correlated with global social support (*r*=.42 *p*<.01), support from family (*r*=.35 *p*<.01) and from friends (*r*= .36, *p*<.01).<br>Those high on dispositional optimism and perceived social support are more likely to develop PTG. Among the different sources of social support, support perceived from a private person moderated the dispositional optimism-PTG relationship. | Cross-sectional design, cannot infer causal relationships.<br>Only looked at different sources of social support not different types.<br>Answers obtained orally, responses may have been biased by social desirability. |
| Bussell and Naus (2010) | Longitudinal | 24 | 50 | Breast Cancer | T1- whilst undergoing treatment<br>T2- approximately 14 months later | Demographics<br>Brief COPE<br>Profile of mood states<br>BDI<br>BAI<br>Brief fatigue Inventory<br>Symptoms checklist<br>Perceived Stress Scale<br>PTGI | Instrumental social support at T2 was related to PTG (*r*= .463, *p*= .023). Using emotional support was also related to PTG (*r*= .531, *p* =.008)<br>Religion, positive reframing, instrumental and emotional support all related to PTG at 2 year follow up. | Limited number of participants completed follow-up.<br>Questions raised about the validity and reliability of the PTGI.<br>Correlational design, cannot infer causation. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Carboon et al. (2005) | Longitudinal | 62 | 43.4 | Haematological cancer | Baseline37 days post diagnosis, whilst undergoing primary treatment and T2- soon after completion of treatment (184 days post diagnosis) | PTGI<br>World Assumptions Scale<br>State-Trait Anxiety Inventory Form<br>BDI<br>Re-experiencing subscale of the PTSD Checklist<br>Cognitive avoidance subscale of the Mini Mental Adjustment to cancer scale<br>European Organisation for Research and Treatment of cancer-QoL Questionnaire | Mean PTGI total= 55.1<br>Assumptions did not change between T1 and T2.<br>Cognitive avoidance positively predicted growth.<br>There was no association between intrusions and growth. | Newly diagnosed cancer.<br>Limited sample. |
| Cohen and Numa (2011) | Cross sectional | 84 | 59.26 (volunteer)<br>58.68 (non volunteers) | Breast cancer | Completed treatment at least 3 years earlier. Volunteers average 12 year post diagnosis<br>Non volunteers average 7 years post diagnosis | Demographic<br>PTGI (Hebrew Version)<br>Emotional expression and processing scale<br>The cognitive processing scale<br>The multidimensional scale of perceived social support | No significant differences between the two groups. Mean PTGI scores of volunteers 69.86 and non volunteers 70.72. Higher PTG was related to better health in the non-volunteer group only. Cognitive processing was significantly associated with PTG ($p$<.001). Social support was significantly associated with PTG ($p$<.05). | Response rate of volunteers (52.5%) and non volunteers (31%) which limits generalisability.<br>Did not explore motives for volunteering. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Connerty and Knott (2013) | Qualitative-group interviews | 15 | 63.57 | Mixed (Prostate, Breast, Bowel, Skin, Head and neck, brain and non-hodgkins lymphoma) | 15 years since diagnosis | Short Sociodemographic and medical survey<br>Question guide developed to explore topics such as experiences following treatment, the experience of positive/negative changes or experiences | Participants described positive changes with their relationships, perceptions of self and life in general and spirituality. Various modifiable factors were identified as enabling participants to experience growth including social support. | Limited generalisability of findings.<br>Participants had a high level of cognitive engagement with the experience (all volunteers in cancer related work). |
| Cordova, Cunningham, Carlson, and Andrykowski (2001) | Controlled comparison | 70 | 54.7 | Breast cancer | 23.6 months post treatment completion | Demographics and physical health<br>Duke-UNC Functional Social Support Questionnaire<br>CES- Depression Scale<br>Ryff's Well Being Scale<br>Cancer patient behaviour scale<br>PTGI<br>IES<br>Measure of talking about cancer<br>Measure of cancer as a traumatic stressor | Breast cancer group experienced greater PTG. Total PTGI total for breast cancer was 64.1 compared to 56.3 in healthy controls.<br>PTGI score was significantly correlated with prior talking about cancer $r = .25 < .05$. PTG was unrelated to social support $r = .13$. | Cross-sectional design limits conclusions that can be drawn regarding both temporal and causal relationships among variables.<br>Retrospective reports of talking-more detailed accounts of cancer related disclosure would be preferable. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Dahan and Auerbach (2006) | Qualitative (grounded theory) | 6 | Median age 57 | Multiple Myeloma | Completed transplant treatment at least 3 months earlier | 'I would like to learn about your story of having myeloma from the beginning...' | Five theoretical constructs emerged (diagnosis, treatment, networks of safety, recuperation and reflection and new existence). Social factors play an important role and participants recognised the importance of social support. Participants described feelings of isolation and social withdrawal but also overwhelming social support. Being able to relate to others with cancer played a strong role in coping. | Aspects of experience may have been missed.<br>Limited sample, cannot generalise findings.<br>Small sample size.<br>Participants from similar backgrounds. All recruited from same cancer centre.<br>Concerns of re-traumatisation.<br>Social desirability may have influenced interviews. |
| Danhauer et al. (2013) | Longitudinal | 653 | 54.9 | Breast cancer | Surveys completed within 8 months of diagnosis, 6, 12 and 18 months later | Demographic<br>Medical variables<br>PTGI<br>The RAND Social Support Scale measured<br>FACIT-Sp<br>Brief COPE inventory<br>Health status questionnaire<br>Self-report life orientation test<br>Illness intrusiveness rating scale | Total PTGI scores increased over time, mostly within first few months (PTGI Mean at baseline 54.03- at 18-24 months-58.14). Greater PTGI scores were associated with education level, longer time since diagnosis, greater baseline levels of intrusiveness, increases in social support, spirituality, use of adaptive coping strategies and mental health. | Limited diversity of sample.<br>PTGI subjective.<br>Cannot draw causal conclusions about relationships between variables-PTG could precede increases in social support, mental health and active coping. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Kent et al. (2013) | Longitudinal, | 604 | Age range 40-64 | Breast cancer | Baseline (3-12 months after diagnosis), and two follow ups (approximately 30 months after diagnosis and 39 months after diagnosis) but growth only measured at one time point | HRQOL<br>Demographics<br>Duke religion index<br>PTGI | Mean PTGI score of 48.8.<br>Support programme participation ($p$<.0001) and confiding in health care providers ($p$<.0001) were associated with higher PTG. | Cross-sectional design, difficult to assess pathways by which support seeking may influence PTG.<br>PTGI measures perceived growth rather than an objective measure of actual growth.<br>Limited age range.<br>Did not assess actual or perceived availability of access to support groups. |
| Lelorain, Tessier, Florin, and Bonnaud-Antignac (2011) | Qualitative | 28 | 46.4% < 60years,<br>46.4% aged 60-70 years<br>7.1% > 70 years. | Breast cancer survivors | Diagnosed 5-15 year | 'Could you please tell me about the way you experienced cancer', 'Do you have the feeling that this cancer has changed something in your life or in yourself...' | PTG was specific to women with high coping and social support. | Results obtained remain the product of the researcher.<br>Limited sample of relatively wealthy women treated in a cancer centre with lots of resources. |
| Lofti-Kashani, Vaziri, Akbari, Kazemi-Zanjani, and Shamkoeyan (2014) | Cross-sectional | 95 | Age range 14-72 years | Mixed | 6-7 months from diagnosis | PTGI<br>General self-Efficacy Scale<br>Multidimensional Scale of Perceived Social Support (MSPSS) | Mean PTGI total- 74.02,.<br>Positive correlations were found between perceived social support and PTG ($p$.01) Self efficacy and perceived social support explain significantly PTG. | Cross-sectional.<br>Did not specify cancer diagnosis.<br>Participants aged 14-72, impact of cancer in a 14 year old likely to differ to 72 year old. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Manne et al., (2004) | Longitudinal | 162 | 49 | Breast cancer (and their partners) | Measures given at baseline, mean time since diagnosis 4 ½ months , 9 months later and 18 months later | PTGI<br>IES<br>Search for meaning<br>Positive re-appraisal-COPE subscale<br>Emotional processing subscale<br>Dyadic Adjustment Scale | PTG increased for both partners during the study (Patient T1 mean- 49, T2- 52.8, T3- 55.7) (Partner T1 mean- 33.8, T2- 40.9, T3- 39.7). Patient PTG was predicted by younger age, contemplating reason for cancer and more emotional expression at the time.<br>Patient growth is associated with the significant other's cognitive and emotional processing of cancer. | All measures self-report so subject to biases.<br>Relatively high rate of refusal.<br>Small number of same sex couples. |
| McDonough, Sabiston, and Wrosch (2014) | Longitudinal | 173 | 55.4 | Breast cancer | Measures given at baseline, mean 11.37 months post diagnosis, 3 months later and 6 months later | Demographic<br>Social support survey<br>Perceived stress scale<br>Assessment of survivor concerns questionnaire<br>PTGI<br>Ryff's psychological wellbeing scale | Breast cancer specific social support and stress predicted increasing levels of PTG. Improvements in subjective wellbeing were predicted by higher levels of general social support and lower levels of general stress. | Limitations of internal consistency of breast cancer specific social support and subjective wellbeing measures. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| McDonough, Sabiston, and Ullrich-French (2011) | Qualitative | 17 | 51.24 | Breast cancer | 4.06 years post diagnosis | IPA (semi structured interviews conducted on 5 occasions with individuals who have signed up for a dragon boating team) | Themes of social support and changes in social relationships and support and outcome of participation emerged. Participants who had positive social relationships and support also reported enhanced PTG. Findings suggest social support as a mechanism for PTG in dragon boaters. | Lack of time 5 data for all participants. Social pressure to report positive outcomes. Unrepresentative sample mainly Caucasian women with a high socioeconomic status. |
| Morris and Shakespeare-Finch (2011a) | Cross-sectional-survey mailed to everyone treated for cancer | 313 | 62.41 | Variety of cancers (breast, prostate, haematological and colorectal) | 2.92 years post diagnosis | Diagnosis severity likert scale<br>PTGI<br>IES-R<br>COPE Inventory (emotional and instrumental social support scales) | Mean PTGI score- 59.26. PTG was positively correlated with intrusive rumination ($p$ <.001), deliberate rumination ($p$ <.001), life purpose rumination ($p$ <.001) and social support ($p$ <.001).<br>SEM provides statistical testing of Calhoun & Tedeschi's model. Three components of rumination identified, intrusive rumination, deliberate of benefits and life purpose rumination. Suggests content of rumination is important. Deliberate rumination on benefits and social support was directly related to PTG. | Cross-sectional-causal relationships cannot be inferred (rumination may influence seeking social support).<br>Participants with a variety of diagnoses-factors such as disease severity, type and invasiveness of treatment and disease trajectory may contribute differently to adjustment. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Morris, Shakespeare-Finch, and Scott (2007) | Cross-sectional (surveys e-mailed to everyone who had been treated for cancer) | 335 (150 male and 185 female) | 62.99 | Various (Breast, prostate, Haematological, Colorectal, Gynae, Lung, Head & Neck & Gastric. | Not reported | PTGI<br>COPE Inventory | Mean PTGI scores- 59.29. Females reported a significantly higher PTG score (63.92) compared to men (53.60).<br>Age had a small significant correlation with PTG ($r$= -.14, $p$<.05).<br>Positive reframing is positively correlated with PTG. Focusing on/ venting emotions, social support engagement and active coping are associated with new possibilities and relating to others. | Relied on self-report.<br>Cross-sectional design prevents identification of causality. |
| Morris, Campbell, Dwyer, Dunn, and Chambers (2010) | Qualitative | 27 | 49.82 | Breast cancer | 6.39 years post diagnosis | Socio-demographic and disease related factors<br>Semi-structured interviews prior to the Amazon Heart Thunder ride and post ride. | Important elements of the peer-support environment included a safe network of other survivors, which provided understanding and acceptance. Overcoming challenges during the event and the opportunity to bond with positive role models promoted PTG. For some participants, a shift in identity was evident with a newfound positive identification with the term BC survivor. | Findings may not generalise to other peer contexts.<br>Impact of researcher in interpretation of results. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Morris, Chambers, Campbell, Dwyer, and Dunn (2012) | Cross sectional (questionnaires given pre and post participation in a 1,000 mile group motorcycle ride) | 51 | 49.82 | Breast cancer | 6.39 years post diagnosis | Measure of social identify<br>The Identification-Contrast Scale<br>IES-R<br>PTGI | Cancer related distress scores significantly decreased after the ride. Mean PTGI scores pre ride-75.68 and post ride 71.87-may have been due to a ceiling effect on the measure or that participants had already experienced a significant amount of PTG.<br>Upward identification with role models was positively related to post ride PTG. | Cannot generalise to other cancers.<br>Skewed variables of distress may have impacted on the lack of correlates found in the study.<br>Limited generalisability to other peer contexts-cancer survivors attracted to this event may not represent all cancer survivors. |
| Nenova, DuHamel, Zemon, Rini, and Redd (2013) | Cross-sectional (Used baseline data from an RCT of a cognitive behavioural intervention) | 49 (26 Female and 23 Male) | 49.57 | Distressed HSCT survivors with a spouse or partner | 21.1 months since transplant | Sociodemographic and<br>clinical characteristics<br>The Karnofsky Performance Status-self report<br>PTGI<br>Emotional and instrumental support subscale of the partner responses to cancer inventory<br>Adapted version of the Social Constraints Scale<br>BSI-GSI and PCL-C | Mean PTGI Total- 62.22. Both emotional ($r$=0.301, $p$= 0.034) and instrumental social support ($r$= 0.353, $p$=0.013) were positively correlated with PTG and social constraint on disclosure was not associated with PTG. | Relatively small sample size.<br>Only looked at individuals who are married.<br>Limited range of emotional and social support and negatively skewed (most participants had good social support).<br>Cross-sectional design and demographic homogeneity of the sample. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Salsman, Segerstrom, Brechting, Carlson and Andrykowski (2009) | Longitudinal questionnaires | 55 | 65.9 | Colorectal cancer | 1.07 years after diagnosis. Measures given approximately 13 months after diagnosis at baseline and 3 months later | Demographic and clinical information<br>Social desirability (MC-C)<br>IES<br>The Rumination Scale<br>PTGI<br>MHI<br>PCL-C | Mean PTG scores as baseline were 43.8 and 51.5 at three month assessment.<br>Reports of PTG were independent of social desirability responding, which suggests that reports of PTG are more than impression management.<br>Higher cancer related intrusions were positively associated with PTSD symptomatology. | Limited sample size.<br>Short follow up- does not tell us much about the adjustment trajectory |
| Schmidt, Blank, Bellizzi, and Park (2012) | Cross-sectional (advertised online) | 54 | 52.8 | Various- majority breast and prostate cancer survivors | 4.5 years since diagnosis | Demographic Information<br>Disease-related information<br>PTGI<br>MAQ<br>Brief COPE<br>Medical outcome survey Social support survey | Secure attachment was significantly associated with active coping, positive reframing and religion and these were associated with PTG. Insecure types of attachment and social support were unrelated to PTG. | Small sample size.<br>Lack of diversity in participants.<br>Participants may have been willing to volunteer because they had previously recognised positive outcomes- may be unrepresentative.<br>Cross-sectional design. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Schroevers and Teo (2008) | Cross-sectional | 113 | 51.78 | Mixed (Breast- 36.3% Nasopharyngeal- 15.9% Colorectal- 15% Lung- 7.1%) | 45 months since diagnosis | PTGI<br>Brief COPE<br>Two subscales of the Symptoms Check List | Mean PTGI total= 73.12.<br>PTG was positively correlated with emotional support $p<.001$ and instrumental support $p<.001$.<br>Instrumental social support, positive reframing and humour were significant predictors of PTG. | Cross-sectional design.<br>Questions about cultural validity of measures.<br>Participants recruited through a complimentary cancer centre- limits generalisability.<br>Use of self-report measures- may prompt some people to exaggerate reports of PTG. |
| Schroevers, Helgeson, Sanderman and Ranchor, (2010) | Longitudinal | 206 | 61.9 | Mixed (50% breast cancer, 22% colorectal, 19 Gynae, 4% lung and 2% other) | Measures completed 3 months, 15 months and 8 years after diagnosis | Silver lining questionnaire<br>Social support list<br>Perceived problem focused emotional support<br>Lack of received problem focused emotional support<br>Illness uncertainty | A significant association of emotional support at 3 months and PTG ($r= 0.20$, $p<.001$). Those who received more social support from family and friends experienced more PTG. | Half of original sample dropped out.<br>Did not examine other stressful life events.<br>Retrospective accounts of PTG may represent biased, self-protecting, self-enhancing illusions rather than actual improvements. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Scrignaro, Barni and Magrin (2011) | Longitudinal | 41 | 50 | Mixed (Breast 65%, gastroentric 27%) | Measures completed at time of medical examination and 6 months later | PTGI<br>Need Satisfaction in Relationship Scale<br>Interpersonal Support Evaluation List<br>Brief COPE | There was no significant different in PTG scores at T1 and T2. Mean PTG reported at T1- 4 and T2 5.71. Regression analyses showed that autonomy-supportive caregivers and a problem focused strategy of coping significantly predicted greater PTG at T2. | Small sample size- limits interpretation and generalisation.<br>Mixed cancer diagnoses.<br>Reported mean PTGI score's rather than a total score. |
| Silva, Crespo and Canavarro (2012) | Longitudinal | 50 | 52.1 | Breast cancer | Assessed at time of surgery (average 1.36 months after diagnosis), during adjuvant treatment and 6 months after the end of treatment | Brief COPE<br>PTGI<br>WHOQOL<br>HADS | Mean total posttraumatic growth scores at T1- 62.1 T2-63.3.<br>Greatest impact on adjustment occurred at T1.<br>Coping through seeking support and using cognitive strategies at T1 were linked to QOL and depression at T3 via PTG dimension of personal resources and skills at T2. | Relatively small sample.<br>T1 data collected day before breast surgery which makes it difficult to draw conclusions about anxiety.<br>Only focused on support seeking and cognitive coping- would have been good to have looked at rumination and social support satisfaction. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Smith, Samsa, Ganz and Zimmerman (2014) | Cross-sectional questionnaire (surveys e-mailed to people on the database) | 886 (74% respons e rate) | 62.9 | Non-Hodgkin Lymphoma (at least 2 years post diagnosis) | 10.2 years since diagnosis | Demographic<br>Medical Outcome Study<br>Appraisal of life threat and treatment intensity questionnaire<br>Social Support Survey<br>PCL-C<br>PTGI | Mean PTGI score- 60.5. No significant association between PTSD and PTG scores.<br>Female gender ($p$<0.05) and greater social support were independently associated with greater PTG ($p$<.001). | Participants only recruited from two large cancer centres- limits generalisability.<br>Cross-sectional design- cannot infer causation.<br>Did not consider confounding variables of other traumas. |
| Svetina and Nastram (2012) | Cross-sectional- recruited through Oncology patient society of Solvenia | 190 | 61.7 | Breast cancer | At time of study 46% of women had been in remission at least 5 years, 24% were undergoing treatment and 6% had experienced recurrence | PTGI (Slovenian adaption)<br>FACES IV (self report measure of family relationships)<br>Coping response inventory<br>Demographic data | Mean PTGI scores 70.15. Furthers understanding of PTG within a family context. Communication or satisfaction with relationships contributed to PTG. Communication appears to mediate the relationship between satisfaction and PTG. Family satisfaction negatively predicted PTG after family communication was controlled for. | Cross-sectional design cannot infer causation. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Tallman, Shaw, Schultz and Altmaier (2010) | Longitudinal | 25 (12 men and 13 women) | 37.21 | Haematological cancer | Measures completed prior to treatment and 9 years later | Life Orientation Test-Revised<br>Medical Outcomes Study Social Support Survey<br>FACT-G<br>Centre for Epidemiological Studies Depression Scale<br>PTGI and two open ended questions | Mean PTGI score of 74.2. Survivors reported PTG in several domains.<br>Higher rates of growth were related to gender and age. Women reported more PTG. PTG and wellbeing after treatment were predicted by dispositional optimism and social support. | Small sample size.<br>Could not complete formal regressions.<br>Perceptions of PTG may have a self-enhancement bias.<br>Ongoing medical or stressful life events were not assessed. |
| Tanriverd, Savas and Can (2012) | Cross-sectional- recruited through attendance at the hospital. | 105 (46 men and 74 women) | 46.26 | Various | Not reported | PTGI<br>Demographic<br>MSPSS | Mean PTGI score- 57.14.<br>Mean social support score was 65.90.<br>Participants reported relatively high levels of PTG and social support. Social support was significantly positive associated with PTG ($p$<.01). | Various cancer diagnoses.<br>Majority of participants were female.<br>Did not mention length of time since diagnosis. |
| Thombre, Sherman and Simonton (2010) | Cross-sectional | 61 | 55.7 | Non metastatic breast, lung or head and neck cancer | 11.3 months since diagnosis<br>Questionnaires completed within six months of starting treatment | PTGI<br>Illness appraisals<br>Meaning-focused coping<br>Core Belief Inventory<br>Demographic and Clinical Variables | Mean PTGI total- 34.80. PTG was significantly associated with greater meaning focused coping and with reappraisals of world views ($p$<.01). | Accounts of growth are subject to recall bias. Inclusion of various treatment sites and treatment regimes. Questionnaires given early on in course of treatment. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Thornton and Perez (2006) | Longitudinal | 106 | 60.95 | Prostate cancer and their partners 1 year after surgery | Measures completed pre-surgery, at 3 weeks, 6 months and 1 year post surgery | Demographic<br>PTGI<br>Brief COPE<br>PANAS<br>IES<br>Rand-36 | Mean PTGI scores of patient- 46.6 and partners- 49.73.<br>For survivors coping by using emotional support and positive reframing showed the strongest association with PTG. | Sample predominately Caucasian, highly educated men and their partners.<br>Cannot generalise to single men.<br>Only included men who had surgery.<br>Direction of relationship between coping and PTG cannot be established. |
| Weiss (2004) | Cross-sectional questionnaire | 72 | 54.2 | Married early stage Breast Cancer | 1-5.5 years post diagnosis | PTGI<br>Brief social support Q<br>Quality of relationship inventory<br>Exposure to a model of positive change<br>Stressful of the event question | Mean PTGI score- 57.9. The more women perceived their husbands as supportive, the more they reported PTG ($r$= .24, $p$<.05). Women reporting contact with a breast cancer survivor who perceived benefit from the experience reported significantly greater PTG than the women who did not ($p$=.002). | Multiple evaluations- risk of chance results.<br>Generalisation is limited- lack of racial and socioeconomic diversity and by the use of a self-selected sample.<br>Causality cannot be inferred.<br>Self-report measures- subjective claims of growth cannot be validated. |

| Study | Design | *N* | Mean age (years) | Cancer Type | Mean time assessed | Measures | Findings | Comments |
|---|---|---|---|---|---|---|---|---|
| Widows, Jacobsen, Booth-Jones, and Fields (2005) | Cross-sectional | 72 | 47.26 | Bone marrow transplant | 24.05 months post-transplant | The coping response inventory<br>The interpersonal support evaluation list<br>The profile of mood states<br>Disease and treatment data<br>PTGI<br>6 item trauma experience questionnaire<br>PTSD checklist<br>POMS-SV | Greater PTG was related to younger age, less education, greater use of positive reinterpretation, more stressful appraisals of aspects of the transplant experience and more negatively biased recall of pre-transplant levels of psychological distress.<br>Greater social support was not related to PTG ($p$=.67). | Homogenous sample.<br>Analyses indicated that non participants were significantly younger than participants.<br>Order effects may have influenced recall. |
| Wilson, Morris and Chambers (2014) | Cross-sectional (recruited through a cancer support network) | 514 | 70.17 | Prostate | 7.5 years post diagnosis | Demographic<br>The Connor-Davidson Resilience Scale<br>Stress Appraisal Measure<br>IES<br>Core Belief Inventory<br>Event Related Rumination Inventory<br>Multi-group Ethnic Identity Measure<br>Social Constraints Scale<br>PTG | Mean PTGI score= 50.30. Challenge appraisal, examining core beliefs, intrusive rumination and peer support had significant direct effects on PTG. Resilience, challenge appraisal, distress and examining core beliefs had significant indirect effects on PTG.<br>Additionally, a sense of connection with peers and seeking an understanding of the cancer experience through peers is important for the perception of PTG. | Cross-sectional design- causation cannot be inferred.<br>Participants recruited through a cancer support network- may not be representative of all prostate cancer survivors.<br>Recall biases in those who had participated a long time after diagnosis. |

### 1.3.3 Measures

**1.3.3.1 PTG.** All of the quantitative studies except one used the PTGI (Tedeschi & Calhoun, 1996). The measure is the most widely used measure designed specifically to assess positive outcomes that may occur as a result of experiencing a traumatic experience such as receiving a cancer diagnosis (Linley, Andrews, & Joseph, 2007). The measure contains 21-items which require participants to indicate the degree to which each statement has occurred in their life as a result of being diagnosed with cancer on a scale of 0 to 5 (0 indicating not at all and 5 indicating a very great degree). The inventory assesses five empirically derived domains (relating to others, new possibilities, appreciation of life, personal strength, and spiritual change) and gives a total score (possible total scores range from 0 to 105), with a higher score indicating greater growth. The measure has good internal consistency for cancer survivors (.95) and has alpha ratings from .80 to .89 for subscales (Weiss, 2004).

Four studies used translated versions of the PTGI (Bozo et al., 2009; Cohen & Numa, 2011; Silva et al., 2012; Tanriverd et al., 2012). Cronbach's alpha reliability was reported between 0.81 and 0.93. One study used an adapted version of the PTGI for Indian cancer patients (Thombre et al., 2010) and reported the Cronbach's alpha as 0.75.

Schroevers et al. (2010) used the Silver Lining Questionnaire (SLQ, Sodergren & Hyland, 2000) to assess the positive changes due to the cancer experience. The SLQ is a 38-item self-report questionnaire that measures a wide range of positive changes of illness, including perceptions of oneself, relationships with others and meaning/ appreciation of life on a 5-point scale. Higher scores indicate greater PTG and the Cronbach's alpha score was 0.97.

PTG was also assessed by Tallman et al. (2010) with two open ended questions: "have you experienced any significant life changes since the experience? If so, what would those changes be" and "do you believe that you have gained any benefits from those experiences? If so, what would those benefits be?" Responses were then coded into categories of life perspective, interpersonal relationships, perceptions of self, health, new directions, spiritual and religious, and other.

The construct of PTG was explored in the qualitative studies by asking open ended questions about the experience of cancer and any positive or negative changes that have occurred in their life or in themselves following cancer (Connerty & Knott, 2013; Dahan & Auerbach, 2006; Lelorain et al., 2012).

**1.3.3.2 Social Support.** A range of measures were used to assess social support. Very few measures were standardised, particularly for a cancer population. Some of the studies used subscales of standardised questionnaires and others created their own or adapted scales. A number of the measures used were more than 20 years old. The wide variety of measures of social support measures makes it difficult to compare studies. However, for the purpose of this review different aspect of social support will be considered separately. Table 2 details the measures used in the studies.

Table 2.

*Measures of Social Support*

| Measure | Studies Used | Aspect of Social Support Measured | Type of Measure | Reliability |
|---|---|---|---|---|
| Adapted version of the Multigroup Ethnic Identity Measure (Phinney & Ong, 2007) | Wilson et al. (2014) | Level of connection to peers and the extent to which participants sought an understanding of their cancer through peers | The measure required participants to rate six items on a 5-point Likert scale, with higher scores reflecting a greater level of connection or seeking understanding through peers. | Internal consistency for connection to peers subscale was .80 and for understanding of their cancer through peers was 0.76. |
| Adapted version of the Social Support Survey (Richman, Rosenfeld & Hardy, 1993) | McDonough et al. (2014) | Listening, task challenge, emotional, reality confirmation and tangible assistance and breast cancer specific support | The questionnaire assessed five general types of social support. Participants were also asked four additional questions relating to breast cancer specific social support to determine a breast cancer specific social support score. (i.e. “how many people provide you with support by letting you know that they understand what it is like to have gone through breast cancer”). | Internal consistency of global support was reported as .89 and breast cancer specific support as .68. |
| FACES IV package (Olson et al., 2006) | Svetina and Nastran (2012) | Family relationships | The FACES-IV is a self-report measure of family relationships that consists of 42 items presented on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The measure assesses family cohesion and flexibility, disengagement, enmeshment, rigid and chaotic family relationships. The measure also looks at family communication and family satisfaction. | The reliability as measured by the Cronbach’s coefficient was reported as medium to high (0.73-0.93). |

| Measure | Studies Used | Aspect of Social Support Measured | Type of Measure | Reliability |
|---|---|---|---|---|
| The Brief COPE (Carver, 1997) | Bussell & Naus (2010)<br>Danhauer et al. (2013)<br>Schmidt et al. (2012)<br>Schroevers & Teo (2008)<br>Scrignaro et al. (2011)<br>Silva et al. (2012)<br>Thornton et al. (2006) | Instrumental and emotional social support subscale | Shortened 28 item version of the COPE, to assess coping including the use of emotional and instrumental support. Participants are asked to rate items on a 3 point likert scale. | The measure has been used in a number of health related studies. Bussell & Naus, (2010) reported the Cronbach's alpha as .86 |
| The Brief Social Support Questionnaire (Sarason, Sarason, Shearin, & Pierce, 1987) | Weis (2004) | Perceived general support with a focus on emotional support. | The six item measure yields two scores one for the number of the people in their environment that they can turn to for acceptance and comfort and the other for how satisfied they were with the support. | Alpha co-efficient for number of people in their environment that they can turn to for acceptance and comfort was rated as .91 and satisfaction with social support was .84. The two measures yielded a correlation of .46. |
| The COPE Inventory (Carver, Scheier, & Weintraub, 1989) | Morris et al. (2007)<br>Morris & Shakespeare-Finch (2011a) | The instrumental and emotional social support subscale was used to assess social support. | 60-item inventory assessing a wide range of adaptive and maladaptive coping strategies. Participants are asked to respond to a number of statements on a four point Likert scale. The inventory consists of 15 subscales that assess positive interpretation, behavioural and mental disengagement, focus on/ venting emotions, instrumental and emotional social support, active coping, denial, humour and acceptance. | The COPE Inventory is a widely used measure within the psycho-oncology field that has been found to good internal reliability. |

| Measure | Studies Used | Aspect of Social Support Measured | Type of Measure | Reliability |
|---|---|---|---|---|
| The Duke-UNC Functional Social Support Scale (Duke-SSQ, Broadhead, Gehlbach, De Gruy, & Kaplan, 1988). | Cordova et al. (2001) | Satisfaction with tangible and emotional social support | The measure is an eight-item functional social support questionnaire, which asks participants to rate their satisfaction with tangible and emotional support on a 5-point likert scale. Participants were also asked participants to rate how much they had talked about their breast cancer experience with others on a 7-point scale ranging from 1 (not at all) to 7 (very much). | The measure has good internal consistency in cancer survivors (Andrykowski & Cordova, 1998) and the Cronbach's alpha was reported as .91 for breast cancer survivors. |
| The Emotional and Instrumental Support Subscale of the Partner Response to Cancer Inventory (Manne & Schnoll, 2001). | Nenova et al. (2013) | Received social interactions from a partner (Emotional and instrumental support) | The scale consists of eight items rated on a 4-point Likert scale to measure received support interactions from a partner. | Cronbach's alpha for the emotional support items was rated as .77 and .69 for the instrumental support items. |
| The Health-Related Quality of Life (HRQOL, Montazeri, 2008) | Kent et al. (2013) | Access to cancer related support | The measure was used by to assess social support through support groups with other cancer survivors, one to one interactions from other breast cancer survivors, educational groups, practical groups or other support groups. Participants were also asked to rate their satisfaction with their support. Support seeking was also assessed by asking participants how much they could confide in certain members of their support network. | Not reported |

| Measure | Studies Used | Aspect of Social Support Measured | Type of Measure | Reliability |
|---|---|---|---|---|
| The Interpersonal Support Evaluation List (Cohen, Mermelstein, Kamarck & Hoberman, 1985) | Scrignaro et al. (2011) | Emotional support (belonging support, appraisal support, tangible support, and self-esteem) | Self-report questionnaire that uses a 4-point likert scale to assess four different functional components of social support (belonging support, appraisal support, tangible support, and self-esteem). | Internal consistency of the scale was .81. |
| The Interpersonal Support Evaluation List-Short Form (ISEL-SF, Peirce, Frone, Russell, & Cooper, 1996). | Widows et al. (2005) | Tangible support<br>Appraisal support<br>Belonging support | The measure is a 15-item self-report measure that uses a 4-point likert scale to assess tangible support, appraisal support, and belonging support. | Internal consistency was reported as .83. |
| The Medical Outcomes Study Social Support Survey (Sherbourne & Stewart, 1991) | Danhauer et al. (2013)<br>Schmidt et al. (2012)<br>Smith et al. (2014)<br>Tallman et al. (2010) | Emotional/ informational support, tangible support, affective support and positive social interaction. | The measure is a 20-item self-report scale designed for individuals who are chronically ill. The measure asks individuals to indicate how often specific types of support are available to them on a scale of 1 to 5. | The measure has been found to have good internal consistency (Cronbach's alpha= .97) and test-retest reliability (0.78) (Sherbourne & Stewart, 1991). |
| The Multidimensional Scale of Perceived Social Support (MSPSS, Zimet, Dalhem, Zimer & Farley, 1988) | Bozo et al. (2009)<br>Cohen & Numa (2011)<br>Lotfi-Kashani et al. (2014)<br>Tanriverd et al. (2012) | Perceived social support from family, friends and significant others. | The scale is a 12-item self-report scale used to measure perceived social support from family friends and significant others | The scale has been found to have good internal reliability and validity (Lofti-Kashani et al., 2014). |

| Measure | Studies Used | Aspect of Social Support Measured | Type of Measure | Reliability |
|---|---|---|---|---|
| The Need Satisfaction in Relationships Scale (NSRS, La Guardia, Ryan, Couchman & Deci, 2000) | Scrignaro et al. (2011) | Satisfaction with support (autonomy, competence and relatedness) | Self-report questionnaire that uses a 7 point likert scale to assess the degree to which an individual experiences basic needs satisfaction. | Internal consistency was reported as .82. |
| The Social Constraints Scale (Lepore & Revenson, 2007) | Nenova et al. (2013)<br>Wilson et al. (2014) | Social constraint | Participants were asked to measure the extent to which participants perceived they were unable to disclose thoughts and feelings about their cancer to those close to them. Participants were asked to rate each of the 15 items on a 4-point Likert scale based on how often they had experienced each item in the past month. Greater scores indicated higher social constraint. | The internal consistency was reported as 0.80 (Nenova et al., 2013) and 0.93 (Wilson et al., 2014). |
| The Social Support List (SSL, Sondergren, 1991) | Schroevers et al. (2010) | Perceived social support<br>Received emotional support<br>Dissatisfaction with emotional support | The measure is a self-report questionnaire. Schroevers et al. (2010) also used a perceived problem-focused emotional support scale to measure perceived emotional support. A received problem-focused emotional support and a lack of received problem-focused emotional support scale were also used to measure amount of social support received and dissatisfaction with social support. Items were scored on Likert scales. | Cronbach's alpha for perceived social support was 0.88, for received emotional support was 0.89 and for dissatisfaction with received emotional support it was 0.91. |

**1.3.3.3 Cognitive Processing.** A range of measures were used to assess different aspects of cognitive processing and their relationship with PTG (see Table 3.). Three studies looked at rumination using rumination inventories (Morris & Shakespeare Finch, 2011a; Salsman et al., 2009; Wilson et al. 2014). Three studies assessed intrusions (Manne et al., 2004; Salsman et al., 2009; Thornton et al., 2006) and two examined cognitive avoidance (Carboon et al., 2005; Thornton et al., 2006). Two studies assessed how much individuals had attempted to search for meaning following their cancer (Cohen & Numa, 2011; Manne et al., 2004;) and three studies examined the extent to which individuals had examined their core beliefs following cancer (Carboon et al., 2005; Thombre et al., 2010; Wilson et al., 2014).

Table 3.

*Measures of Cognitive Processing*

| Measure | Studies Used | Aspect of Cognitive Processing Measured | Type of Measure | Reliability |
|---|---|---|---|---|
| Cognitive avoidance subscale of the Mini Mental Adjustment to Cancer Scale (MAC, Watson, Law, dos Santos, & Greer, 1994) | Carboon et al. (2005) | Cognitive avoidance | The measure is used to assess participants' intentional efforts to avoid processing of material related to the cancer experience. The subscale consists of four self-descriptive statements and participants are asked to indicate how much the statements apply to them at present. | Not reported |
| Reexperiencing subscale of the PTSD checklist (Weathers, Litz, Huska, & Keane, 1994) | Carboon et al. (2005) | Intrusions | The measure consists of five items and participants are asked to measure the extent to which they have been bothered by symptoms over the past five months on a five-point likert scale. | Not reported |
| The cognitive processing scale (Manne et al., 2004) | Cohen and Numa (2011) Manne et al. (2004) | Search for meaning | The measure contained three items to evaluate how often in the previous month the participants had attempted to search for meaning and reason for cancer. Answers were rated on a five-point likert scale giving a mean total score of cognitive processing. | The measure has been found to have high internal reliability (Cronbach's alpha= 0.83) (Cohen & Numa, 2011). |

| Measure | Studies Used | Aspect of Cognitive Processing Measured | Type of Measure | Reliability |
|---|---|---|---|---|
| The Core Beliefs Inventory (Cann et al., 2010) | Thombre et al. (2010)<br>Wilson et al. (2014) | Examination of core beliefs | The measure is used to assess the degree to which an individual examined their core beliefs following their cancer. The measure consists on nine items rated on a six point Likert scale. Higher scores indicate a greater deal of examination of core beliefs as a result of cancer | The measure is reported to have good reliability and internal consistency (.92) (Wilson et al., 2014). Thombre et al. (2010) used a revised 7-item scale and the coefficient alpha was .76. |
| The Event Related Rumination Inventory (ERRI, Cann et al., 2001) | Wilson, Morris and Chambers (2014) | Rumination | The ERRI is a 20-item measure designed specifically to measure current levels of intrusive and deliberate event-related rumination. | The measure has been found to have excellent psychometric properties with good internal validity and reliability (Cann et al., 2011). Internal consistency was high for intrusive (=.96) and deliberate subscales (.90). |
| The Impact of Events Scale (IES, Horowitz, Wilner & Alvarez, 1979) | Manne et al. (2004)<br>Salsman et al. (2009)<br>Thornton et al. (2006) | Intrusions and avoidance | The IES is a widely used 15-item self-report standardised measure that comprises of two subscales that assess avoidance and cancer-related intrusive thoughts related to traumatic stress. The measure asks participants to rate items on a four-point likert scale with 0 indicating ‘not at all’ and 5 indicating ‘often’, with higher scores indicating greater cancer-related stress. | The measure has been found to have good reliability and validity (alpha 0.78- 0.84) (Joseph, 2000) and has been widely used with cancer patients. |

| Measure | Studies Used | Aspect of Cognitive Processing Measured | Type of Measure | Reliability |
|---|---|---|---|---|
| The Rumination Inventory (RI, Calhoun et al., 2000) | Morris and Shakespeare-Finch (2011a) | Rumination | The RI is a 14-item measure that distinguishes between rumination that occurred soon after the event and more recent rumination. | The measure has been found to have strong internal consistency. |
| The Rumination Scale (Martin, Tesser, & McIntosh, 1993) | Salsman et al. (2009) | Rumination | The measure is designed to measure conscious, repetitive and persistent thoughts. The 10-item measure yields two subscales, one measuring lack of control and distractibility and one measuring cognitive rehearsal and processing. | Coefficient alpha was .47 and .36 for the cognitive distractibility subscale and .69 and .75 for the cognitive rehearsal subscale, at baseline and three-month assessments, respectively. Given the poor reliability for the cognitive distractibility subscale only the cognitive rehearsal subscale was used in analysis. |
| World Assumptions (Janoff-Bullman, 1989) | Carboon et al. (2005) | World views | The measure is a 33 item scale measuring global meaning. The measure has 8 subscales (benevolence of the world, benevolence of people, justice, controllability, randomness, self-worth, self-control and luck). Each item is rated on a 6 point likert scale. High scores indicate stronger endorsement of the belief. | Not reported |

## 1.4 Results

The findings of the search will be presented in terms of each study's contribution to the theoretical model underpinning the research area. The evidence for PTG following cancer will be discussed, followed by the different aspects of social support and their relationship with PTG. The different aspects of cognitive processing and their relationship with PTG will then be discussed. Finally, the evidence for social-cognitive processing theories of PTG will be considered.

### 1.4.1 Posttraumatic Growth

PTG following cancer was consistently reported across the studies. The qualitative studies provided accounts of the positive changes individuals experienced following cancer. Lelorain et al. (2012) conducted 28 open interviews with female breast cancer survivors to explore changes after cancer. They reported positive changes after cancer, resulting in a better appreciation of life, feelings of personal strength and a change in priorities, providing an examination of how PTG emerges in the narrative development of cancer-related changes. However, even if PTG was reported spontaneously, the responses to the change-related question generally focused on negative changes following cancer and positive changes were reported more in response to the final open-ended question. Connerty and Knott (2013) explored the lived experience of PTG in mixed-diagnoses cancer survivors and found that participants reported experiencing positive changes in their relationships, their appreciation of life, and their personal strength. In a qualitative study exploring PTG in multiple myeloma patients Dahan and Auerback (2006) found that although participants could identify self-reliance, most felt that they had not changed in any profound way. However, the authors highlighted that myeloma differs to other cancers as it is currently not curable and has an ongoing nature, which may limit individuals ability to create a narrative of their experience and appreciate any changes.

The extent of PTG reported in the quantitative studies varied. The lowest total mean score was 46.6 (Thornton et al., 2006) and the highest was 74.2 (Tallman et al., 2010). Mean total PTGI scores were reported to increase over time in five of the longitudinal studies (Danhauer et al., 2013; Manne et al., 2004; Salsman et al., 2009; Scrignaro et al., 2011; Silva et al., 2012), which supports theories that suggest PTG develops over time. It was found that PTG increased most in the first year following diagnosis (Danhauer et al., 2013), which is consistent with theories that suggest that this is the time where core beliefs are most challenged (Janoff-Bullman, 1992).

### 1.4.2 Social Support

Social support was examined in 31 of the studies (Bozo et al., 2009; Bussell & Naus, 2010; Cohen & Numa, 2011; Connerty & Knott, 2013; Cordova et al., 2001; Dahan & Auerbach, 2006; Danhauer et al., 2013; Kent et al., 2013; Lelorain et al., 2012; Lofti-Kashani et al., 2014; Manne et al., 2014; McDonough et al., 2011; Morris & Shakespeare-Finch, 2011a; Morris et al., 2010; Morris et al., 2011; Nenova et al., 2013; Schmidt et al., 2012; Schroevers & Teo, 2008; Schroevers et al., 2010; Scrignaro et al., 2011; Silva et al., 2012; Smith et al., 2014; Svetina & Nastram, 2012; Tallman et al., 2010; Tanriverd et al., 2012; Thornton et al., 2006; Weiss, 2004; Widows et al., 2005; Wilson et al., 2007; Wilson et al., 2014).. The findings from the qualitative studies gave rich information about the role of social support in adjustment following cancer. Connerty and Knott (2013) reported that participants highly valued the practical and emotional support they received from family friends and partners at different stages of their journey, which helped them to reflect on their experience. Dahan and Auerbach (2006) also reported that the importance of having a strong social support system was brought up in each narrative. Participants experienced isolation when significant others were not there for them as much as they had expected. These findings were supported by Lelorain et al. (2012) who reported that PTG depended to a great extent on the level of social support received. They found that the women who reported less PTG

and whose narratives focused more on the disease and treatment period had low coping and social support. The authors suggested that women without psychological and social resources remain 'trapped' in their cancer experience and thus cannot process their experience to obtain benefit from it.

Significant positive associations were found between perceived social support and PTG in 17 of the quantitative studies (Bozo et al., 2009; Bussell & Naus, 2010; Cohen & Numa, 2011; Danhauer et al., 2013; Lofti-Kashani et al., 2014; Morris & Shakespeare-Finch, 2011a; Nenova et al., 2013; Schroevers & Teo, 2008; Schroevers et al., 2010; Scrignaro et al., 2011; Silva et al., 2012; Tallman et al., 2010; Tanriverd et al., 2012; Thornton et al., 2006; Smith et al., 2014; Wilson et al., 2007; Wilson et al., 2014). Five of the studies were using a breast cancer population, seven mixed cancer diagnoses, three haematological cancer and two prostate cancer survivors. In the first study examining PTG following cancer Cordova et al. (2001) failed to find an association between social support and PTG in 70 women following breast cancer. Conversely, they found that the amount participants had talked about their cancer experience was positively associated with PTG. However, such findings should be interpreted with caution as they used a homogenous sample that was limited in size which limits the conclusions that can be drawn. It is also important to note that the measure of social support used looked more at satisfaction with tangible and emotional support rather than actual amount of social support received. Two further studies, Widows et al. (2005), who looked at PTG in 72 individuals following bone marrow transplants and Schmidt et al. (2012), who looked at PTG in 54 individuals following various cancers, also failed to find an association between PTG and social support. However, these studies also used relatively small samples which limits the ability to detect true effects, thus impacting on reliability.

**1.4.2.1 Instrumental Social Support.** Five studies examined the relationship between instrumental social support and PTG (Bussell & Naus, 2010; Nenova et al., 2013;

Schroevers & Teo, 2008; Scrignaro et al., 2011; Thornton & Perez, 2006). The findings into the relationship between instrumental social support and PTG were mixed. Thornton and Perez (2006) reported that instrumental social support was not found to be a significant predictor of PTG in 106 prostate cancer survivors. Whereas, Scrignaro et al. (2011) reported that seeking instrumental social support correlated with PTG during treatment in 41 individuals with mixed cancer diagnosis. However, instrumental social support was not found to be a significant predictor of PTG six months later. Schroevers and Teo (2008) conducted a study of 113 Malaysian patients with mixed cancers and found that coping through emotional and instrumental social support was positively correlated with PTG, however regression analysis found that only instrumental support predicted growth. Similar findings were reported by Bussell and Naus (2010) who found that using instrumental social support was related to PTG, and by Nenova et al. (2013) who reported that instrumental social support was the only unique predictor of PTG in 49 distressed haematological cancer survivors. The authors suggested that individuals receiving more instrumental social support are able to engage in more cognitive processing due to greater availability of psychological resources and more time. However, the sample consisted of emotionally distressed participants, with a minority reporting functional impairments or physical symptoms, which may have increased their likelihood to have needed and thus benefited from instrumental support from their partner. The study also had a relatively small sample size which prevented certain analyses and thus limits the conclusions that can be drawn. The sample also only consisted of individuals who were married or in a relationship and the ranges of instrumental and emotional support were negatively skewed, indicating that few participants were lacking in support, which limits the generalisability of findings to those who are single or who are lacking in social support.

**1.4.2.2 Family Support.** Ten of the studies examined PTG within the context of family relationships (Bozo et al., 2009; Connerty & Knott, 2013; Dahan &

Auerbach, 2006; Lelorain et al., 2012; Manne et al., 2004; Schroevers et al., 2010; Scrignaro et al., 2011; Svetina & Nastram, 2012; Tanriverd et al., 2012; Weiss, 2004). Themes of family support were reported in the qualitative studies. Dahan and Auerbach (2006) reported that all of the participants had described extensive support received from family, particularly spouses. Connerty and Knott (2013) also reported that participants highly valued support from partners, family and friends. Consistent with this, Lelorain et al. (2012) reported that support from others, particularly family was beneficial; however, they also found that survivors worried for their relatives and tried not to be a burden on them.

Three studies found significant associations between the amount of social support from family and friends and PTG (Bozo et al., 2009; Schroevers et al., 2010; Tanriverd et al., 2012). Scrignaro et al. (2011) also found significant associations between autonomy supportive caregivers and PTG, whereby patients who were supported by their caregiver in their psychological needs of autonomy, competence and relatedness reported more PTG at 6-month follow up, which suggest that being helped to feel independent and achieving a sense of mastery is important in PTG.

Svetina and Nastram (2012) explored the role of family related factors in PTG in 190 breast cancer patients. They found that the presence of family members or marital status alone did not account for difference in PTG; however, factors such as satisfaction and communication significantly contributed to PTG. Cohesion and flexibility were not found to be related to PTG. Such findings suggest that it is emotional support rather than instrumental support or the presence of family members which contribute to PTG, through opportunities for disclosure.

Two studies explored PTG in breast cancer patients and their partners (Manne et al., 2004; Weiss, 2004). Weiss (2004) explored social context variables associated with PTG in 72 married breast cancer survivors. They found that the more women perceived their

husband as supportive, the more they reported PTG, which suggests that a supportive husband may facilitate adjustment through allowing conversation about the experience which may promote cognitive processing. In line with this, Manne et al. (2004) examined PTG among 162 breast cancer patients and their partners and found that patient growth was associated with emotional expression and their significant other's cognitive and emotional processing of breast cancer, which suggests that patient growth is not solely an individual activity and that perhaps a more expressive partner may facilitate more open communication, promoting more growth.

**1.4.2.3 Cancer Specific Support.** The role of cancer specific social support in PTG following cancer was highlighted in seven of the studies (Connerty & Knott, 2013; Dahan & Auerbach, 2006; Kent et al., 2013; Lelorain et al., 2012; McDonough et al., 2014; Morris et al., 2011; Weiss, 2004). Connerty and Knott (2013) reported that participants had found attending support groups helpful, particularly being able to talk to others who have had a similar experience, which fostered a deeper understanding of the cancer experience in a social atmosphere. Participants also reported searching for information to gain knowledge about the experience and several participants had achieved this through attending support groups. A number of participants identified that helping others in similar situations, through volunteer work and completing projects contributed to the development of positive change. The authors concluded that supportive relationships, gaining knowledge and the support of others, provided understanding and communication whilst encouraging self-exploration and engagement with the experience. They also suggested that volunteering gave meaning and a sense of purpose which is likely to cultivate positive changes. However, all of the participants were purposively recruited through a cancer council and were thus involved in volunteer work and were likely to be more engaged with their experience and may not be representative of all cancer survivors. Similar findings were reported by Lelorain et al. (2012) who concluded that support from individuals with a history of cancer can be

particularly important in facilitating PTG through empathic listening, which enables survivors to make emotional disclosures. Furthermore, individuals who have successfully survived cancer can become models of PTG with whom women can identify with and thus themselves develop (Morris et al. 2011). In line with this, Dahan and Auerbach (2006) found that most patients felt that being able to relate to other patients who were going through similar experiences played an important role in coping and PTG.

Three studies looked at breast cancer specific social support (Kent et al., 2013; McDonough et al., 2014; Weiss, 2004). McDonough et al. (2014) demonstrated that breast cancer specific social support predicted increasing levels of PTG in 173 women. In line with this, Kent et al. (2013) found that participating in support programmes and confiding in health care providers was positively associated with PTG. This is consistent with the findings of Weiss (2004) who found that women who reported contact with a breast cancer survivor who perceived benefit from the experience reported significantly greater PTG than the women who did not. Although such findings suggest that breast cancer specific social support can be beneficial in facilitating PTG they do not tell us about the impact of cancer specific support on PTG in other cancers.

Cohen and Numa (2011) looked at cancer specific volunteering and its relationship with PTG. They explored the relationship between volunteering and PTG in cancer patients and found that both volunteers and non-volunteers reported experiencing considerable levels of PTG and that cognitive and emotional processing were significant predictors of growth. The authors suggested that volunteering may promote opportunities for growth through emotional and cognitive processing, however different trajectories may occur.

**1.4.2.4 Social Support through Physical/ Challenge Based Interventions.** Three studies looked at the impact of social support through physical or challenge based activities on PTG in breast cancer survivors (McDonough et al., 2011; Morris et al., 2010;

Morris et al., 2012). Morris et al. (2010) conducted a qualitative investigation to understand the lived experience of breast cancer survivors participating in peer-support programme based on a challenge event (1,000 mile motorcycle ride). They found that important elements of the peer-support environment included a safe network of other survivors which provided understanding and acceptance. They also found that an opportunity to bond with positive role models promoted PTG, which suggests that such programmes have the potential to extend social support by providing an alternative forum for social support. Morris et al. (2012) provided support for their findings by investigating the role of social comparison and social identity based on group membership on PTG and distress in 51 breast cancer survivors who participated in a group motorcycle ride. They found that upward identification with positive role models was positively related to post ride PTG, which suggests that breast cancer survivors interacted and identified with other women who were displaying positive behaviours and cognitions, which promoted PTG. It is however important to note that overall levels of PTG did not significantly increase during the ride, which may be explained by a ceiling effect of the measure as participants reported relatively high levels of PTG prior to participation, or because participants had already experienced a significant amount of positive changes since their diagnosis. McDonough et al. (2011) supported such findings by exploring the development of social relationships, social support and PTG in 17 breast cancer survivors participating in a dragon boating programme. They found that participants who had positive social relationships and support reported enhanced PTG. They also reported that when relationships and support were disrupted, PTG was limited. The authors suggested that having opportunities to discuss concerns with breast cancer survivors and to interact with survivors who role model PTG can facilitate growth. They also found that providing support for others can play a role in PTG. Although the findings suggest social support through positive role models can influence PTG, they may not generalise to other peer contexts, particularly given that the cancer survivors who may be attracted to challenge

type events may not represent all cancer survivors. Further research is therefore needed to examine the prevalence and strength of the different social support constructs and PTG.

**1.4.2.5 Social Constraint.** Two of the studies examined the influence of social constraint on PTG (Nenova et al., 2013; Wilson et al., 2014). Nenova et al. (2013) looked the relationship between aspects of the social context and PTG in 49 distressed stem cell transplant survivors who had a spouse or a partner. They reported that social constraint on disclosure was not associated with PTG. However, they used a relatively small sample size and only looked at individuals who were married, which limits the reliability and generalisability of findings. Wilson et al. (2014) also failed to find an association between PTG and social constraints within close relationships in 514 prostate cancer survivors; however, cancer related distress and intrusive rumination were related to social constraints. Their findings may be explained by the length of time since diagnosis (>7 years), whereby such factors may be less relevant with increasing time since diagnosis or may be subject to recall bias. Furthermore, the sample consisted solely of males, which limits generalisability, particularly given that there may be gender differences in the level and impact of social constraint on PTG.

**1.4.2.6 Satisfaction with Social Support.** Four of the studies considered satisfaction with social support (Cordova et al., 2001; Kent et al., 2013; Schroevers et al., 2010; Scrignaro et al., 2011). Kent et al. (2013) reported high rates of satisfaction with support programme attendance; however, they did not report whether this was associated with PTG scores. Cordova et al. (2001) failed to find an association between satisfaction with tangible and emotional support and PTG. These findings were supported by Schroevers et al. (2010) who examined social support in 206 long-term cancer survivors of various cancers and found that satisfaction with emotional support was not significantly related to PTG. Scrignaro et al. (2011) also failed to find an association between satisfaction with social support and PTG in 41 mixed cancer survivors, using a longitudinal design.

### 1.4.3 Cognitive Processing

Cognitive Processing was examined in eight of the studies (Carboon et al., 2005; Cohen & Numa, 2011; Manne et al., 2004; Morris & Shakespeare-Finch, 2011a; Salsman et al., 2009; Thombre et al., 2010; Thornton et al., 2006; Wilson et al., 2014), providing some emerging evidence for the role of cognitive processing in PTG.

**1.4.3.1 Rumination.** Rumination was investigated in three of the studies (Manne et al., 2004; Morris & Shakespeare-Finch, 2011a; Wilson et al., 2014). Morris and Shakespeare-Finch (2011a) tested a statistical model of PTG in 313 participants diagnosed with a variety of cancers. They completed a principal component analysis of the RI and revealed three components; intrusive rumination, deliberate rumination of benefits and life purpose rumination. The results indicated that the content of rumination was an important factor in PTG, rather than the timing of rumination as originally suggested. Deliberately ruminating on benefits was associated with PTG, whereas intrusive rumination and ruminating on the purpose of life were associated with distress. Such findings are consistent with those found by Manne et al. (2004) who found that cancer patients experience different types of rumination and that intrusive cancer thoughts do not predict PTG. However, Wilson et al. (2014) found that deliberate rumination was not directly related to PTG but intrusive rumination had a small positive impact on PTG.

**1.4.3.2 Intrusions.** Three studies examined the relationship between intrusions and PTG (Manne et al., 2004; Salsman et al., 2009; Thornton et al., 2006). Manne et al. (2004) found that intrusions were not related to growth in 162 women with breast cancer and their partners. In line with this, Thornton et al. (2006) found that cancer specific intrusions were not significant predictors of PTG for prostate cancer survivors or their partners. Similarly, Salsman et al. (2009) examined cognitive processes in 55 colorectal cancer survivors and found that frequency of cancer related intrusions did not reliably predict PTG; however, more intentional effortful processing was weakly associated with higher

levels of PTG, through cognitive rehearsal. They also found that reports of PTG were independent of social desirability. The authors highlighted that the assessment was conducted several months after the diagnosis and therefore may not have captured adequate variability in adjustment and an extended time range of assessment would have been beneficial to fully understand the process of PTG following cancer. The authors also suggested that the IES may have captured a general stress response rather than a true cognitive coping mechanism. It is also important to note that the sample was limited to a relatively small number of colorectal cancer survivors. The study reported lower mean PTGI scores compared to studies examining PTG in other cancer survivors, particularly breast cancer survivors, which may be explained by gender differences, nevertheless findings should be interpreted with caution.

**1.4.3.3 Cognitive Avoidance.** Two studies considered the role of cognitive avoidance in PTG (Carboon et al., 2005; Thornton et al., 2006). Thornton et al. (2006) failed to find a relationship between cognitive avoidance and PTG in prostate cancer survivors; however, higher avoidance symptoms in the patients partners were significantly related to higher partner PTG. Carboon et al. (2005) explored cognitive predictors of PTG in 62 individuals undergoing treatment for newly diagnosed haematological cancer. Interestingly, they found a positive effect of cognitive avoidance on growth, which provides some evidence against the notion that intentional cognitive processing of an experience is a vital mechanism for growth. It is however important to note that avoidance was measured whilst individuals were undergoing treatment, in the midst of the experience, whereas intentional processing has been identified to occur over longer periods after an event, suggesting that avoidance should be measured longitudinally over an extended period to reliably examine the role of cognitive processing.

**1.4.3.4 Re-evaluation of Core Beliefs.** Four of the studies considered the relationship between re-evaluation of core beliefs or world views and PTG (Carboon et al.,

2005; Connerty & Knott, 2013; Thombre et al., 2010; Wilson et al., 2014). Carboon et al. (2005) provided limited evidence that PTG was related to major changes in world views. They examined the links between PTG and world assumptions shortly after diagnosis and following completion of treatment in 61 individuals with haematological cancer and found that world assumptions did not change over the two time points, which suggests that schema revision is not necessarily a precursor of growth. Such findings should however be interpreted with caution, as world assumptions were measured over a short time period and were not measured prior to diagnosis, making it difficult to conclude whether a cancer diagnosis changes world assumptions. Their study focused on the content of core beliefs, rather than the extent to which these beliefs had been challenged and re-evaluated in response to cancer. Studies that looked more specifically at challenges to beliefs provided support for the relationship between PTG and alteration in core beliefs. Connerty and Knott (2013) reported that participants were forced to confront the notion of death and vulnerability, which challenges their assumptions and world beliefs, resulting in them feeling as though they must reassess their beliefs and perceptions of the world. Such findings were supported by Thombre et al. (2010) who examined PTG and its cognitive correlates in 61 Indian patients with various cancer diagnoses. They found that PTG was significantly associated with greater meaning focused coping, such as sense making, and with re-appraisals of the world view. However, world views may vary across cultures which limits generalisation. It is also important to note that they used an adapted version of the PTGI, which may limit variability in scores and thus reliability of their findings. Wilson et al. (2014) provided support for these findings by testing a theoretical model of PTG in 514 men who had a diagnosis of prostate cancer and found that examining core beliefs had a moderate positive relationship with PTG, which supports the view that disrupting fundamental beliefs and realigning core beliefs to accommodate a new reality is associated with growth.

**1.4.3.5 Searching for Meaning.** Three studies provided support for the role of searching for meaning in facilitating PTG (Cohen & Numa, 2011; Manne et al., 2004; Thombre et al., 2010). Manne et al. (2004) found that women who contemplated more the reasons why they may have developed breast cancer and women who engaged in more attempts to search for meaning experienced more PTG, which is consistent with existing theories of PTG that suggest that the more an individual actively tries to make sense of an experience the greater the chance of PTG. They did not find an association between intrusions, searching for a cause of their cancer or positive reappraisal and PTG, which suggests that not all cognitive processes facilitate PTG. Thombre et al. (2010) found that PTG was significantly associated with greater meaning focused coping, such as sense making, and with re-appraisals of the world view. Cohen and Numa (2011) also found that women who had engaged more in cognitive processes through searching for meaning had experienced greater PTG.

### 1.4.4 Cognitive Processing Through Social Support

Four of the studies considered the relationship between cognitive processing and social support (Cordova et al., 2001; Lelorain et al., 2012; Manne et al., 2004; Shroevers et al., 2010), providing some evidence for social-cognitive processing theories of PTG that imply social support facilitates cognitive processing. Lelorain et al. (2012) found that cognitive processing was closely related to support system. Manne et al. (2004) found that PTG was associated with significant others cognitive and emotional processing of cancer, which suggests that PTG is not solely an individual activity and social support from a partner may facilitate processing, prompting growth. Such findings were supported by Cordova et al. (2001) who asked breast cancer survivors to rate how much they had talked about cancer prior to the research and found that scores were significantly associated with PTG. The authors suggested that talking with others may reflect opportunities to engage in cognitive, affective and interpersonal processes which promote positive changes. Talking with others

may also enable re-appraisal and integration of the cancer experience, facilitating revision of world assumptions. However, they used a single-item, retrospective report of talking, which does not give a detailed account of cancer related disclosure, limiting the conclusions that can be drawn. Nevertheless, their findings were supported by Schroevers et al. (2010) who examined social support and PTG in 206 mixed diagnoses long-term cancer survivors. They reported that individuals who actually received more emotional and social support from family and friends experienced more PTG, compared to individuals who perceived others to be available, which suggests that the actual amount of social support received is important. Such findings support social-cognitive processing theories and suggest that talking to others may facilitate cognitive processing, enabling PTG.

### 1.4.5 Statistical Models

Two of the studies developed structural equation models to identify factors associated with PTG (Morris & Shakespeare-Finch, 2011a; Wilson et al., 2014). Morris and Shakespeare-Finch (2011a) found that deliberately ruminating on benefits and social support was directly related to PTG. Wilson et al.'s (2014) findings support the view that appraisal of cancer, disruption of fundamental beliefs, and experience of intrusive cancer-related rumination are associated with PTG. A sense of connection with peers and seeking an understanding of the cancer experience through peers is also important for the perception of PTG.

## 1.5 Discussion

### 1.5.1 Summary of Findings

This literature review aimed to explore the role of social support and cognitive processing in PTG following a diagnosis of cancer. The review draws together a large body of both qualitative and quantitative evidence for PTG following cancer. A considerable

number of the studies reviewed found a significant association between social support and PTG. Three of the studies failed to find an association between the two, but these studies had used relatively small samples which may limit reliability of the findings. Some evidence was found for the role of instrumental social support in PTG. The findings suggest that instrumental social support may be more beneficial for individuals undergoing treatment, but a number of the studies did not differentiate between instrumental and emotional social support, limiting the conclusions that can be drawn. The findings suggest that social support from family and cancer specific social support, particularly from cancer survivors may have a role in facilitating PTG. The review found limited evidence for a relationship between social constraint and PTG and between satisfaction with social support and PTG. However, relatively few studies had examined these factors and further research is warranted. It is also important to consider that the inconsistencies in the findings may be explained by additional unmeasured moderating variables.

A limited number of studies were identified that specifically examined the role of cognitive processing in PTG. The evidence provides some support for the role of rumination, particularly deliberate rumination in PTG. Associations were also found between PTG and re-evaluation of core beliefs, but only in studies assessing changes to core beliefs. Evidence was provided for the role of searching for meaning and PTG. Further research would be beneficial to further understand the influence of the different aspects of cognitive processing on PTG.

A minority of the studies considered cognitive processing through social support. Studies that considered both factors provided evidence for social-cognitive processing theories of PTG, which suggest that utilising social support can facilitate cognitive processing, promoting PTG; however, further research into this relationship would be beneficial.

### 1.5.2 Limitations of the Literature

Although a relatively large body of literature was reviewed in order to explore the role of social support and cognitive processing in PTG following cancer, a number of methodological issues were identified which may have influenced the findings, thus making it difficult to draw a firm conclusion.

**1.5.2.1 Measures.** A key limitation of the quantitative studies was the reliance on retrospective self-report measures which may be subject to bias or distortions, but self-report measures are a popular, readily available, low-cost option and are easy to administer in busy clinical environments. Few studies measured if changes reported were actually evident, which limits reliability of the findings. The studies also failed to consider the influence of confounding variables such as other traumatic or stressful experiences which may have influenced findings.

A majority of the studies used the PTGI, which focuses on five areas of growth identified from the research (Tedeschi & Calhoun, 1995). It has been argued that the use of this measure neglects the unique and positive changes reported by survivors (Park & Lechner, 2006) and thus research may be neglecting important aspects of the PTG process. The construct of PTG itself has been criticised and it has been suggested that PTG could reflect a response shift, whereby internal standards for judgements or quality of life change (Manne et al., 2004). Further research using additional measures designed specifically for the cancer population may therefore be beneficial.

It is difficult to conclude on the relationship between social support and PTG due to the use of different measures of social support, at different times since diagnosis, across different cancer diagnoses (Schroevers et al., 2010). The measures used were generally dated and were not all standardised, particularly for a cancer population. Various measures of

cognitive processing were also used at different stages, which again limits the conclusions that can be drawn.

**1.5.2.2 Participant Characteristics.** A key limitation of the studies was the reliance on relatively homogenous samples, generally from middle class backgrounds, recruited from the same hospitals, which challenges the generalisability of findings. The studies included were predominately based on individuals with breast cancer, which although they can tell us about adjustment following breast cancer, limit the generalisation of findings to other types of cancer. Studies examining breast cancer had all used female participants, which does not tell us about PTG in men who may be less likely to engage in coping behaviours such as seeking support from others (Thornton & Perez, 2006). Moreover, breast cancer patients are often younger than other types of cancer patients, which may influence PTG, particularly given that age has been identified as a predictor of PTG, whereby younger participants have been found to experience greater growth (Koutrouli, Anagnostopoulos, & Potamianos, 2012). Finally, research evidence has demonstrated that individuals with breast cancer have more access to support during their treatment compared to other types of cancer (Morris & Shakespeare-Finch, 2011b), which may influence adjustment.

It is also important to note that some of the studies had recruited individuals with mixed diagnoses, which may have influenced findings, particularly given that treatment regimes and the impact of different cancers vary considerably. Such studies make it difficult to conclude on PTG across specific cancer diagnoses.

All of the studies used convenience samples to recruit participants, which may limit the reliability of the findings. The type of people who complete questionnaires may not be representative of all individuals who have had cancer and individuals may have been more likely to respond if they have experienced positive changes. It is also important to note that

there were high rates of non-responders in a number of the studies and the final samples may not be representative of all cancer survivors.

The number of participants in the articles varied considerably, which makes it difficult to draw firm conclusions. A number of the studies used a small sample size of less than 100 participants, which limits the statistical power and the type of analysis.

It is also important to consider that participants may have been subject to demand characteristics, particularly if the research was conducted in the hospital that they had been treated at.

**1.5.2.3 Study Design.** The review consisted of both qualitative and quantitative articles, of both cross-sectional and longitudinal designs and although the findings are influential, each method has its own limitations.

An imperative limitation is the lack of longitudinal and experimental studies. A significant proportion of the studies reviewed were cross-sectional and the extent to which we can draw causal inferences about the direction of effects or the temporal course of PTG is therefore limited. For example, relatively few studies examined the predictive value of cognitive processing, particularly the type and timing needed to facilitate PTG. Further research directly testing the theoretical assumptions of PTG would therefore be beneficial. A number of the studies reviewed used a longitudinal design; however, these studies had considerable variability in the timing of assessment of PTG and had high rates of drop-out. Only one study used a control group, which makes it difficult to conclude whether PTG stemmed from the cancer experience or was the normal effect of time passing. Further research using control groups would therefore be beneficial.

The timing of assessment of PTG varied considerably across the studies, which limits conclusions that can be drawn about the process of PTG, particularly given that a meta-analysis of research in the general PTG literature has demonstrated greater adjustment and

higher levels of PTG when assessments were conducted more than two years after the traumatic event (Helgeson, Reynolds, & Tomich, 2006). A number of the studies included in the review assessed individuals either during or shortly after completion of treatment and individuals may have therefore been exposed to a number of additional stressors. Further research into the long-term process of PTG would therefore be beneficial.

There are also a number of important limitations to the qualitative studies. The studies cited used limited samples and larger samples would have been preferential for ensuring the validity of the data. Lelorain et al. (2012) used a sample of relatively wealthy women treated in a cancer centre providing a lot of resources for coping and an extensive support system, which limits the generalisation of findings to other contexts, particularly given that PTG seems very dependent on social resources. Dahan and Auerbach (2006) used a sample recruited through the same cancer centre, from similar backgrounds, which may have contributed to the commonalities of experiences. Connerty and Knott (2013) conducted group interviews which may have influenced findings. Participants were purposively recruited through a cancer council, so all participants were actively involved in cancer related volunteer work, which may limit generalisation of the findings. The participants had a high level of cognitive engagement with the experience and therefore may have been more motivated to engage in the research and thus may not be representative of all cancer survivors. It is also important to consider the influence of the researcher and to be aware that prior knowledge of cancer related PTG research may have influenced interpretation of themes. Aspects of patients' experiences may have also been missed, which limits the conclusions which can be drawn (Dahan & Auerbach, 2006).

It is also paramount to consider the possibility for halo effects. Participants generally reported extensive praise for the institutions and their staff, which may have been a result of a desire to please the investigator (Dahan & Auerbach, 2006).

### 1.5.3 Limitations of the Review

The review was fairly comprehensive; however, specific search terms were used which may not have identified all of the relevant articles. Few studies looked at the relationship between cognitive processing and social support, which makes it difficult to draw firm conclusions into the relationship between the two factors.

This review only looked at PTG which is a particular paradigm of positive change (Carboon et al., 2005). Considering other constructs of change such as benefit finding (Tennen & Afleck, 2002) and stress related growth (Park & Fenster, 2004) may further understanding of adjustment following cancer.

### 1.5.4 Implications of the Literature Review

This review has drawn together the literature examining the role of social support and cognitive processing in PTG following cancer. The findings have provided support for social-cognitive processing theories of PTG following cancer; however, further research is needed, particularly exploring different aspects of social support such as social constraint and satisfaction with social support. It would also be beneficial for further research to examine a range of cancers, other than breast cancer, to further understanding of the role of social support and cognitive processing in PTG across cancer diagnoses. Such research would tell us more about adjustment in males and whether there are any gender differences in PTG, and the role of social support and cognitive processing in mediating any differences.

Research studies using a control group of participants with another chronic illness such as diabetes would also be beneficial to see if PTG is unique to the cancer experience (Scrignaro et al., 2011). Additionally more research with age matched controls may be beneficial to further understanding of PTG following cancer. It would also be beneficial to conduct further studies that do not solely rely on self-report measures. Such studies could use a diary method to measure actual support received.

The findings of this review have a number of imperative clinical implications. The findings provide evidence that PTG exists following cancer and clinicians should therefore consider PTG when supporting individuals with cancer. The review indicates that social support is an important factor in PTG. Moreover, cancer specific support can be particularly beneficial and although this is readily available for individuals with breast cancer, the findings indicate that individual with other types of cancer may benefit from similar support. Individuals with few social resources may benefit from a psychosocial group intervention to provide support and an opportunity to discuss cancer related worries and thoughts. The findings also suggest that family support can be an important factor in PTG and thus highlight the importance of involving the family in the treatment and adjustment process. The review also provided evidence for the role of cognitive processing in PTG and it is therefore vital that individuals are provided with the appropriate support to facilitate these processes.

### 1.5.5 Conclusions and Further Directions

This review has drawn together a large body of research to examine the role of social support and cognitive processing in PTG following cancer. The review provided extensive evidence for the role of social support in facilitating PTG, particularly support from family and cancer specific social support. The review also provided some evidence for the role of cognitive processes such as rumination, re-evaluation of core beliefs and searching for meaning. The evidence supports social-cognitive processing theories of PTG; however, further research is warranted to draw clear conclusions and to further understanding into the effects of different aspects of social support on adjustment and to further understanding into the different cognitive processes and their relationship with PTG.

# Chapter 2: Empirical Paper

An Exploration of Gender Differences in Posttraumatic Growth in Survivors of Colorectal Cancer

## 2.1 Introduction

Colorectal cancer (CRC) has been reported to be the third most common form of cancer in the UK (McCaughan, Prue, Parahoo, Mclifatrick, & McKenna, 2012) and the second biggest cause of cancer mortality (Beating Bowel Cancer, UK). CRC refers to cancers of the colon, rectum or anus. More than 80% of bowel cancers are diagnosed in people aged 60 or over (Cancer Research UK, 2014b), however CRC can affect anyone at any age (Beating Bowel Cancer, 2015). CRC can affect both males and females, with a male to female incidence ratio of 13:10 (Cancer Research UK, 2015b). If diagnosed at an early stage CRC can be successfully treated in over 90% of cases (Beating Bowel Cancer, 2015). Treatment for early CRC typically involves surgery to remove the cancer. Some individuals will also be required to have chemotherapy or radiotherapy. Individuals facing a diagnosis of CRC can face a range of emotional and practical challenges and receiving a diagnosis and undergoing treatment for CRC can thus have significant psychological impacts.

### 2.1.1 Cancer Survivorship

Over the last 30 years there have been considerable advances in treatments for CRC (Cancer Research UK, 2013) and individuals who survive CRC now constitute the second largest group of European cancer survivors (McCaughan et al., 2012), with a reported five year survival rate of 57.6% (Allemani et al., 2013). CRC can have a long-term impact. Most individuals experience side effects following treatment for CRC. CRC and its treatment can cause physical changes to the body and bowel functioning and some

individuals may be left with a stoma. Individuals may also experience fatigue, changes to body image, difficulties re-establishing intimate relationships, fear of cancer recurrence, anxiety, depression, sleeping difficulties, financial difficulties, relationship difficulties and difficulties associated with returning to work (Cancer Research UK, 2015c). Females may also experience infertility (Spanos, Mamopoulos, Tsapas, Syrakos, & Kiskinis, 2008). It has been highlighted that the long-term consequences of CRC treatment can persist for five or more years after diagnosis (Denlinger & Barsevick, 2009). It is therefore important to know more about the longer-term impacts and the process of psychological adjustment following CRC.

### 2.1.2 Psychological Distress and Cancer

Receiving a cancer diagnosis is a highly distressing experience (Dunn et al., 2013). It is well documented that cancer survivors commonly report negative symptoms in relation to their cancer diagnosis (Deimling, Kahana, Bowman, & Schaefer, 2002). The prevalence rates of psychological distress in cancer survivors have been reported to be between 29.6% and 43.4% (Salsman, Segerstrom, Brechting, Carlson, & Andrykowski, 2012), with 35% of individuals experiencing symptoms of PTSD (National Cancer Institute, 2012). A recent study into the trajectories of psychological distress in 1966 individuals following CRC (Dunn et al., 2013) reported high levels of psychological distress (32- 44%). They found that younger men, who had late stage disease, low education and poor social support were more likely to experience constant high distress. They also reported greater overall distress in males compared to females, which suggests that male CRC survivors are more vulnerable to distress. Moreover, the prevalence of high overall distress following CRC was found to persist over a five year trajectory. Similar findings were found by Goldzweig et al. (2009) who found higher rates of distress in middle and older-aged male CRC patients and their spouses, compared to females. However, there are inconsistencies in the literature on gender differences in distress and a

meta-analysis investigating distress in couples coping with cancer found that women consistently reported more distress (Hagedoorn et al., 2008). Other studies such as Deimling et al. (2002) found no significant gender differences in distress in 180 older adult, long-term cancer survivors. Such findings highlight the need to further investigate the longer-term impact of CRC and any gender differences in distress.

### 2.1.3 Posttraumatic Growth

Despite the negative impact of cancer it is widely reported that experiencing a stressful and traumatic event such as cancer can be a catalyst for positive change (Joseph & Linley, 2008; Tedeschi & Calhoun, 1995). Facing a cancer diagnosis often forces people to confront their own mortality. Cancer treatment can often disrupt routine for a prolonged period of time, which can lead people to re-examine priorities, relationships, and the self, prompting opportunities for positive psychological change (Cordova, 2008; Scrignaro, Barni, & Magrin, 2011).

Posttraumatic growth (PTG) is a term coined by Tedeschi and Calhoun (2004) and refers to "positive psychological change experienced as a result of the struggle with highly challenging life circumstances" (Tedeschi & Calhoun, 2004, p. 1). It has been suggested that experiencing cancer can result in PTG, as individuals change the meaning of the trauma to maintain positive assumptions about the world and themselves (Jim & Jacobsen, 2008). PTG is frequently reported in the cancer survivorship literature (e.g. Connerty & Knott, 2013; Helgeson, Reynolds, & Tomich, 2006; Mols et al., 2009) and refers to positive changes in the perception of the self, social relationships, life priorities and a greater appreciation of life (Calhoun & Tedeschi, 2001).

Cancer can be argued to be different to acute traumas as it involves an ongoing threat to life. It has therefore been suggested that the experience of PTG following cancer is unique to cancer and different from PTG following other traumas (Sumalla, Ochoa, &

Blanco, 2009). It is therefore important to understand more about PTG following cancer. PTG has been documented in the CRC literature (e.g. Jansen, Hoffmeister, Chang-Claude, Brenner, & Arndt, 2011; Salsman et al., 2009); however, empirical evidence suggests that not everyone reports experiencing PTG following cancer (Stanton et al., 2006), and reported rates of PTG in CRC survivors appear to be lower than those for other cancers such as breast cancer (e.g. Morris & Shakespeare-Finch, 2011b). It is therefore vital that we further understand the processes and mechanisms which may enable individuals to experience PTG following CRC.

### 2.1. 4 Gender Differences in PTG

Gender has been identified as a factor which may influence PTG, whereby women have been found to experience greater PTG than males (Vishnevsky et al., 2010). Studies examining PTG following trauma have demonstrated that gender is a significant predictor of PTG (Linley & Joseph, 2004; Swickert & Hittner, 2009). A meta-analysis of 70 studies of PTG following a range of events found a small to moderate gender difference, whereby women reported more growth than men, which suggests that gender differences exist in self-reported PTG (Vishnevsky et al., 2010). However, these findings were based on a range of events and therefore tell us little about gender differences in PTG following cancer.

There has been limited research into gender differences in PTG following cancer and the existing research has failed to consistently establish a relationship. Mixed-cancer diagnoses studies have generally found that females report higher levels of PTG than men (e.g. Bellizzi, 2004; Foley et al., 2006; Morris & Shakespeare-Finch, 2011b; Smith et al., 2014; Tallman et al., 2010). However, a number of studies have failed to establish a gender difference in PTG (e.g. Lechner et al., 2003; Schulz & Mohamed, 2004; Widows et al., 2005), which highlights the need for further research. The majority of the research has

focused on breast and prostate cancer survivors, which does not enable a direct comparison of gender within diagnostic groups (Morris & Shakespeare-Finch, 2011b). Morris and Shakespeare-Finch (2011b) found a gender difference in levels of PTG in 235 cancer survivors; however, when gender was analysed as a covariate between type of cancer and post-diagnostic psychological adjustment the findings were no longer significant, which suggests that further research is needed into this relationship. Qualitative research has demonstrated that breast cancer survivors have more access to support during their treatment compared to other forms of cancer, which may explain the reported higher levels of PTG in females (Morris & Shakespeare-Finch, 2011b).

### 2.1.5 Theoretical Background

Tedeschi & Calhoun (1995, 2004) proposed an influential model of PTG whereby the process of PTG is initiated by the experience of a major life crisis, that challenges individual's core beliefs about the self, the world and others. They suggest that initially individuals must engage in coping responses to manage the overwhelming emotions and initial distress, but intense cognitive processing of the experience also occurs, initially through intrusive rumination. They highlight that the extent to which an individual is engaged cognitively, through rumination, appears to be crucial in the process of PTG. They propose that a persistent cognitive processing of the situation is needed to disengage from, or give up on, assumptions about the self, world, and others, whilst simultaneously building new schemas goals and meanings. They also suggested that social support systems are a vital factor in the facilitation of PTG as disclosure of difficulties may help to alter perceptions about the changes that have occurred by offering new perspectives that can be integrated into schemas, enabling the construction of new narratives and schemas, resulting in the individual gaining general life wisdom.

### 2.1.6 Social Support

Social support has been identified as an important factor that may help individuals to experience PTG following cancer (Tedeschi & Calhoun, 2004). Findings from qualitative studies exploring PTG have highlighted the role of social support in adjustment following cancer, whereby participants consistently highlight the importance of having a strong social support system (e.g. Connerty & Knott, 2013; Lelorain et al., 2012). An array of empirical evidence has also demonstrated a positive association between social support and PTG in individuals following a variety of cancer diagnoses (e.g. Bozo et al., 2009; Bussell & Naus, 2010; Cohen & Numa, 2011; Danhauer et al., 2013; Lofti-Kashani et al., 2014; Morris & Shakespeare-Finch, 2011a; Nenova et al., 2013; Schroevers & Teo, 2008; Schroevers et al., 2010; Scrignaro et al., 2011; Silva et al., 2012; Tallman et al., 2010; Tanriverd et al., 2012; Thornton et al., 2006; Smith et al., 2014; Wilson et al., 2007; Wilson et al., 2014). However, to the author's knowledge, to date, no study has specifically looked at the role of social support in PTG following CRC. There are also inconsistencies in the existing literature and a number of studies have failed to establish consistent relationships between social support and PTG (e.g. Cordova et al., 2001; Schmidt et al., 2012; Widows et al., 2005); however, these studies used relatively small samples, which limits the ability to detect true effects thus impacting on reliability. Existing studies have used a range of measures to assess various aspects of social support, of which very few have been standardised, particularly for a cancer population. It is therefore difficult to draw clear conclusions about the role of social support in PTG following cancer due to the use of different definitions, measures, different cancer diagnoses and different points in time since diagnosis. Inconsistencies in the findings may also be explained by gender differences in social support, particularly given that existing research has identified gender differences in support seeking behaviour in individuals treated for cancer (e.g. Clarke, Booth, Velikova, & Hewison, 2006).

Research in the trauma field has demonstrated that social support mediates the relationship between gender and PTG (Swickert & Hitner, 2009). Swickert and Hitner (2009) examined the relationship between gender, social support and PTG in 221 college students and found that females tended to report higher levels of PTG following trauma than males. Gender was significantly associated with both social support and PTG and social support was found to be a partial mediator in the relationship between gender and PTG. Such findings were extended in a more recent study of 156 college students following a stressful life event (Swickert, Hittner, & Foster, 2012). The results indicated that both social support and empathy significantly mediated the association between gender and PTG, with females reporting greater levels of social support and empathy, which predicted higher levels of PTG. Although the findings are of interest they do not tell us about the role of social support as a mediator in the relationship between gender and PTG in individuals following cancer. Further research is therefore needed to explore the role of social support in promoting PTG following cancer.

### 2.1.7 Cognitive Processing

Cognitive processing has also been recognised as an important factor in PTG (Tedeschi & Calhoun, 2004). Two important factors have been identified to facilitate PTG. Firstly, the degree to which the experience challenges core beliefs (Janoff-Bulman, 1992), and secondly, the degree to which the experience initiates cognitive processes focusing on the traumatic experience and its impact (Cann et al., 2011). It has been argued that these cognitive processes are how an individual attempts to understand the experience and rebuild their core beliefs. This may then enable them to appreciate how they have changed through the experience of a significant life event (Cann et al., 2011; Janoff-Bulman, 2006).

Rumination has been identified as an important process by which individuals experience the changes in beliefs, goals, behaviours and identity, associated with PTG

(Salsman et al., 2009). Two forms of rumination have been identified in the literature: intrusive and deliberate (Cann et al., 2011). Intrusive rumination is a common initial reaction to a trauma that generally consists of uncontrolled thoughts and images of unresolved concerns about the trauma and is often associated with distress (Cann et al., 2011). Deliberate rumination generally occurs later as core beliefs are rebuilt through making sense of the experience and refers to thoughts that are intentional, brief, more adaptive and less distressing (Greenberger, 1995). It has been suggested that deliberate processing of a traumatic experience may decrease distress and increase potential for PTG (Calhoun & Tedeschi, 1998). Morris and Shakespeare-Finch (2011a) provided evidence for such theories and reported that deliberate rumination about benefits was associated with PTG in 313 individuals diagnosed with a variety of cancers, whereas intrusive rumination and ruminating on the purpose of life were associated with distress. Such findings are consistent with those found by Manne et al. (2004) who found that breast cancer patients experience different types of rumination and that intrusive thoughts about the cancer did not predict PTG. In contrast, Wilson et al. (2014) examined PTG in 514 prostate cancer survivors and found that deliberate rumination was not directly related to PTG but intrusive rumination had a small positive impact on PTG. Such findings highlight the need for additional research to further understanding the role of rumination in PTG following cancer.

It has been suggested that gender differences in PTG may be mediated by the tendency for women to engage in more rumination than men (Treynor, Gonzalez & Nolen-Hoeksema, 2003). A meta-analysis of gender differences in rumination (Johnson & Whisman, 2013) found that women were significantly more likely to ruminate, brood and reflect than men; however, the meta-analytic review focused on depression-related rumination and therefore limits the conclusions that can be drawn about gender differences in the more adaptive ‘deliberate’ form of rumination identified in the trauma literature. Further research into this relationship is therefore warranted. To date, there has been no

research specifically exploring gender differences in PTG in survivors of CRC and the role of cognitive processing as a mediator.

### 2.1.8 Rationale of the Current Study

Research into PTG following cancer is in its infancy and currently little is known about gender differences and the mechanisms that may lead men and women to perceive growth differently. Few studies have examined PTG in CRC survivors and little is therefore known about the psychological adjustment for this population (Salsman et al., 2009; Jansen et al., 2011). Findings from the existing literature have not conclusively established a consistent relationship between gender and PTG following cancer (Vishnevsky et al., 2010). Although Dunn et al. (2013) and Goldzweig et al. (2009) found that men with CRC report higher levels of distress than women, and distress is usually correlated with PTG (Shakespeare-Finch & Lurie-Beck, 2014), studies of PTG following cancer have usually found more PTG in women than men (e.g. Bellizi, 2004; Foley et al., 2006; Morris & Shakespeare-Finch, 2011; Smith et al., 2014; Tallman et al., 2010)Gender differences in support seeking behaviour and cognitive processing have been identified and it is therefore likely that increased social support and cognitive processing may explain the reported higher levels of PTG in females compared to males. Further research is therefore needed to explore these relationships.

### 2.1. 9 Research Aims

The present study aimed to explore gender differences in self-reported PTG in survivors of CRC. Given that cognitive processing and social support have been identified as important factors in PTG and gender differences have been found in both support seeking behaviour (e.g. Clarke et al., 2009) and rumination (e.g. Johnson & Whisman, 2013) the study also aimed to explore the role of social support and cognitive processing as mediators of the relationship between gender and PTG.

### 2.1. 10 Hypotheses

Based on previous theoretical and empirical work, it was hypothesised that:

1. There will be significant gender differences in levels of self-reported distress, self-reported PTG, social support and cognitive processing (intrusive and deliberate rumination).
2. Social support will be a significant mediator in the relationship between gender and PTG.
3. Cognitive processing will be a significant mediator in the relationship between gender and PTG.

## 2.2. Method

### 2.2.1 Design

A cross-sectional questionnaire design using a convenience sample was employed to examine gender differences in distress, self-reported PTG, social support and cognitive processing in survivors of CRC. The relationship between gender, cancer specific distress, perceived social support, deliberate and intrusive rumination and PTG was evaluated using correlational analyses. Regression analysis was used to identify predictors of PTG. The PROCESS method (Preacher & Hayes, 2004, 2008) was used to determine the role of cognitive processing and perceived social support as mediators in the relationship between gender and PTG.

### 2.2.2 Participants

125 individuals who had been treated for CRC were recruited through one of two methods. Participants were recruited from Salisbury District Hospital at their post-treatment follow-up appointments. Participants were also recruited by advertising through

a number of UK cancer charities who were approached to advertise the study on their forums, discussion boards and social media pages.

Individuals were considered suitable to participate if they were aged 18 years or over, were not currently undergoing treatment for cancer of any type, and had completed treatment for CRC a minimum of six months prior to participation.

Participants were recruited between August 2014 and February 2015. A total of 125 participants completed the survey. Two individuals were excluded from data analysis as they were still undergoing treatment. Although it was advertised that participants needed to have completed treatment a minimum of six months prior to participation, four participants who had completed treatment less than six months ago completed the questionnaires. Their data was included in the analysis. 48 participants were recruited through Salisbury District Hospital (28 males and 20 females) and 77 participants completed the questionnaires online (21 males and 56 females). For the participants recruited from Salisbury District Hospital the response rate was 60%.

Demographic information is displayed in Table 4. Of those 123 participants 40% were male and 60% were female. The majority of participants (80.2%) were married. The mean age of participants was 62, with the youngest participant aged 26 and the oldest 93. Mean time since completion of treatment was 35.8 months (35.7 months for males and 35.9 months for females). Most of the participants (96.7%) had undergone surgery and a large proportion of the participants had not accessed any professional support (67.5%).

Table 4.
*Demographic Characteristics*

| | | *N* | Frequency | Mean (*SD*) | Range |
|---|---|---|---|---|---|
| Gender | | | | | |
| | Male | 49 | 39.8% | | |
| | Female | 74 | 60.2% | | |
| Marital Status | | | | | |
| | Single | 7 | 5.7% | | |
| | Married | 99 | 80.5% | | |
| | Divorced | 5 | 4.1% | | |
| | Cohabiting | 6 | 4.9% | | |
| | Other | 6 | 4.9% | | |
| Type of treatment received | | | | | |
| | Surgery | 119 | 96.7% | | |
| | Chemotherapy | 61 | 49.6% | | |
| | Radiotherapy | 20 | 16.3% | | |
| | Clinical Trial | 5 | 4.1% | | |
| | Other | 4 | 3.3% | | |
| Stoma | | | | | |
| | No | 92 | 74.8% | | |
| | Permanent | 23 | 18.7% | | |
| | Temporary | 8 | 6.5% | | |
| Professional support Accessed | | | | | |
| | None | 83 | 67.5% | | |
| | Well being Group | 10 | 8.1% | | |
| | One to one support | 16 | 13% | | |
| | Psychological therapy | 15 | 12.2% | | |
| | Other | 11 | 8.9% | | |
| Length of time since completion of treatment (Months) | | | | 35.82 (36.65) | 1-273 |
| Age | | | | 61.93 (14.99) | 26-93 |

### 2.2.3 Materials

All variables were measured using self-report questionnaires. The outcome variable was the amount of PTG. Predictor and mediator variables included gender, social support from friends and family, distress, intrusive and deliberate rumination.

**2.2.3.1 Demographic Information.** Participants were asked to complete a demographic questionnaire (see Appendix A), which included questions on age, gender, marital status, nature of cancer, treatment received, support received and length of time since completion of treatment. Participants were also asked to rate how distressing they had found their overall cancer experience on a scale of 0-10, with 0 indicating no distress and 10 indicating very distressing. There was also a space to detail any additional comments in relation to their cancer experience.

**2.2.3.2 Posttraumatic Growth Inventory (PTGI, Tedeschi & Calhoun, 1996).** Posttraumatic growth was measured using the PTGI (see Appendix B), which is the most widely used measure designed specifically to asses positive outcomes that may occur as a result of experiencing a traumatic experience such as receiving a cancer diagnosis (Linley, Andrews, & Joseph, 2007). The measure contains 21 items and participants were asked to indicate the degree to which each statement has occurred in their life following their cancer diagnosis on a scale of 0 to 5 (0 indicating not at all and 5 indicating a very great degree). The measure has good internal consistency for cancer survivors (.95) and has alpha ratings from .80 to .89 for subscales (Weiss, 2004). In this study Cronbach's alpha for the total scale was .93.

**2.2.3.3 Hospital Anxiety and Depression Scale (HADS, Zigmond & Snaith, 1983).** The HADS was used to measure distress and is a brief measure designed to indicate the severity of both anxiety and depression symptoms in both general hospital and

out-patient settings. It consists of seven items related to anxiety symptoms and seven related to depression symptoms. Each item is rated from 0-3, with a maximum possible score of 21 indicating greater severity of symptoms. Scores above 8 on each subscale are indicative of possible depression or anxiety. The measure has been found to have good reliability (0.92 for the depression scale and 0.89 for the anxiety scale) (Zigmond & Snaith, 1994) and has been found to have good diagnostic accuracy for screening distress in cancer patients (Vodermaier & Millman, 2011). In this current study Cronbach's alpha was .85 for the depression subscale and .88 for the anxiety subscale.

#### 2.2.3.4 The Impact of Events Scale (IES, Horowitz, Wilner, & Alvarez, 1979).

The IES (Appendix C) was used to measure current levels of cancer-specific distress. The IES is a widely used 15-item self-report standardised measure that comprises of two subscales that assess avoidance and cancer-related intrusive thoughts related to traumatic stress. The measure asks participants to consider the last week and rate items on a four-point likert scale with 0 indicating 'not at all' and 5 indicating 'often', with higher scores indicating greater cancer-related stress. The measure has been found to have good reliability and validity (alpha 0.78- 0.84) (Joseph, 2000) and has been widely used to measure distress with cancer patients. In this current study Cronbach's alpha was .91.

#### 2.2.3.5 Perceived Social Support Scale (PSSS, Procidano & Heller, 1983).

Social support was measured using the PSSS (Appendix D), which is a forty-item self-report questionnaire designed to measure perceived social support. The measure consists of two subscales, measuring social support from friends and perceived social support from family. Scores range from 0-20 on each subscale with a higher scale indicating greater social support. The measure has been found to have good internal consistency (Cronbach's alpha of 0.88 for friends subscale and 0.92 for family subscale) across a range of clinical and non-clinical samples (Lyons, Perotta, & Hancher-Kvam, 1988). In this study

Cronbach's alpha was .93 for total social support, .89 for support from friends and .92 for support from family.

#### 2.2.3.6 The Event Related Rumination Inventory (ERRI, Cann et al., 2011).

The ERRI (Appendix E) was used to measure cognitive processing after experiencing cancer. The ERRI is a 20-item measure designed specifically to measure current levels of intrusive and deliberate event-related rumination. The measure has been found to have excellent psychometric properties with good internal validity and reliability (Cann et al., 2011). In this study Cronbach's alpha was .96 for the intrusive rumination subscale and was .90 for the deliberate rumination subscale.

### 2.2.4 Procedure

Ethical approval was obtained from the University of Southampton School of Psychology Ethics Committee and Research Governance (see Appendix F) and from NHS ethics (see Appendix G) and the NHS trust Research and Development team (see Appendix H).

Participants were recruited from Salisbury District Hospital with the support of the clinical nurse specialist. Participants were given information about the study by the specialist cancer nurse during their routine follow-up clinic appointment. All attendees of the clinic who met the inclusion criteria were given an information sheet (see Appendix I) to read detailing the study prior to consenting. Participants were given an opportunity to ask questions and if they were happy to participate they approached the researcher and signed the consent form (Appendix J), which informed participants that they have the right to withdraw at any stage and that this would not affect their treatment. The form also included an option to tick a box to indicate that they would like to be offered an assessment by the Clinical Psychologist, if their results suggest that they may benefit from support (participants accessing the clinic are routinely referred to psychology if needs are flagged

up during clinic appointments). Questionnaires were completed by participants with the support of the researcher or they were given the option to take them home to complete and then post back to the researcher. Once all questionnaires had been completed participants were given a debrief form (see Appendix K) and a further opportunity to ask questions or for support if they had become upset during completion of the questionnaires.

Participants recruited through UK cancer charities (Cancer Research UK and Beating Bowel Cancer) were given the link to the online survey after the researcher obtained permission to advertise the study on their patient forums. Participants were advised to participate only if they meet all of the inclusion criteria. Participants were also recruited through social media (Bowel cancer UK, Lynch Syndrome, Colostomy Association, the Semi-Colons, Cornwall Bowel Cancer Support Group), whereby the researcher contacted the administrator of the Facebook group and asked them to post a link to the online survey on their page.

All participants were offered the opportunity to receive a summary of the results and had the option to be entered into a prize draw to win one of two £25 Marks and Spencers vouchers.

### 2.2.6 Data Analysis

Data analysis was conducted using the Statistical Package for the Social Sciences (IBM SPSS; version 22). The PROCESS macro (Hayes, 2012) was used to undertake bootstrapped mediation analysis, as recommended by Field (2013). This method does not require normal distribution and has been recognised as having superior power when testing for indirect effects (Hayes, 2008). The recommended minimum sample size for mediation analysis with 0.8 power and a medium effect size was identified as 74-90 (Fritz & MacKinnon, 2007). The minimum sample size required for multiple regression analysis

with six predictors, was calculated using G power (Faul, Erdfelder, Buchner, & Lang, 2009) to be 117 with 0.8 power, 5% significance and a medium effect size (0.15).

## 2.3 Results

### 2.3.1 Data Preparation

Total and subscale scores were calculated for each variable using the scoring criteria recommended for each of the measures. Descriptive statistical analyses were conducted to assess for data entry errors, to examine the distributions and identify any outliers. Total PTGI scores (for both males and females) were normally distributed so parametric tests were used to explore gender differences in PTG. Overall distress of the cancer experience scores and total social support scores, and the friends and family subscale scores were slightly negatively skewed. Current level of distress scores and intrusive rumination scores were slightly positively skewed. Deliberate rumination scores were relatively normally distributed. Log, reciprocal and square root transformed variables were computed and although they improved the distribution of some of the variables slightly, they did not meet the recommended criteria of skewness and kurtosis recommended by Field (2013). The transformed variables also caused problems with some of the regression assumptions, particularly the linear relationship assumption. Given the relatively large sample size, bootstrapping (Efron & Tibishirani, 1993) was therefore used for all analysis to ensure the robustness of the statistical analysis.

In order to complete *t*-test analyses homogeneity of variance was assessed using Levene's test. Current distress scores did not meet the assumption of homogeneity of variance, therefore the Welch-Satterthwaite method (Welch, 1947) was applied to the *t*-test results.

Examination of scatterplots indicated that there were no non-linear relationships. In order for predictors of PTG to be identified using a multiple regression, regression diagnostics and assumptions were verified. Linearity and collinearity criteria were met with variance inflation factors (VIF) <10 and tolerance statistics greater than 0.2, the correlation matrix was also examined and no predictors correlated too highly with each other, $r$ >.09 (Field, 2013). Plots of the standardised residuals against the regression standardised predicted values were inspected and revealed that the residuals were normally distributed and showed homoscedasticity. Standardised residuals were examined and no outliers were identified.

### 2.3.2 Descriptive Statistics

Data from 123 participants were included in the reported analyses. The mean, standard deviations and range of the questionnaire measures are shown in Table 5.

Table 5.

*Means and standard deviations of the measures*

| Scale and Subscale | *N* | Mean | *SD* | Range |
|---|---|---|---|---|
| PTGI | 123 | 54.82 | 21.52 | 1- 102 |
| IES Total | 123 | 19.61 | 17.37 | 0-73 |
| Distress Scale | 123 | 6.39 | 2.86 | 0-10 |
| PSSS Total | 123 | 27.64 | 9.23 | 0-40 |
| PSSS Friends | 123 | 13.00 | 5.28 | 0-20 |
| PSSS Family | 123 | 14.64 | 5.56 | 0-20 |
| ERRI Intrusive | 123 | 1.23 | .91 | 0-3 |
| ERRI Deliberate | 123 | 1.40 | .74 | 0-3 |
| HADS Anxiety | 123 | 6.17 | 4.56 | 0-19 |
| HADS Depression | 123 | 3.47 | 3.57 | 0-18 |

Two forms of distress were examined in this research, current levels of distress (measured by the IES) and overall distress of the cancer experience (rated on a scale of 0-10, with higher scores indicating greater distress). Table 5 shows that mean current levels of distress reported by participants using the IES was below the recommended clinical cut off of 26 (Horowitz et al., 1979), however 30.9% of participants had scored above the recommended clinical cut off. The mean score for overall distress of the cancer experience was 6.39, which indicates that participants generally reported finding the cancer experience distressing. The mean social support score was 27.64, which suggests participants had relatively good social support. The mean score for social support from friends was lower than perceived social support from family. Participants reported less intrusive rumination than deliberate rumination. Mean scores on the anxiety and depression subscale fall below the recommended clinical cut-off of 8 (Zigmond & Snaith, 1983); however 33% of participants had scored above the clinical cut-off for anxiety and 14.6% scored above the clinical cut off for depression.

**2.3.2.1 PTG.** In line with existing studies participants reported experiencing PTG. Mean PTG subscale scores are displayed in Table 6. Mean total PTGI scores were 54.82 (*SD* = 21.52), lower than some breast cancer studies who have reported mean scores ranging between 48.8 and 70.72 (e.g. Cohen & Numa, 2011; Cordova et al., 2001; Danhauer et al., 2013; Kent et al., 2013), but higher than other CRC studies such as Salsman et al. (2009), who reported average scores of 51.5 at three-month follow up. Participants recruited online reported greater PTG (*M*= 61.01, *SD* = 17.69) than those recruited through Salisbury District Hospital (*M*= 45.15, *SD* = 23.51).

Participants scored highest in the appreciation of life subscale and the relating to others subscale and lowest on the spiritual changes subscale. Females scored higher than men on all of the subscales.

Table 6.
*Means and Standard Deviations for PTG (N=123) (Range 0-5)*

| | Mean (*SD*) | | |
|---|---|---|---|
| PTG Subscales | Total | Males | Females |
| New possibilities | 1.85 (1.30) | 1.44 (1.20) | 2.12 (1.3) |
| Relating to others | 3.04 (1.12) | 2.60 (1.18) | 3.33 (.98) |
| Personal Strength | 2.86 (1.23) | 2.20 (1.26) | 3.29 (1.0) |
| Appreciation | 3.38 (1.27) | 2.88 (1.39) | 3.72 (1.07) |
| Spiritual Changes | 1.39 (1.67) | 1.01 (1.53) | 1.64 (1.72) |

### 2.3.3 Gender Differences

The study hypothesised that there would be gender differences in PTG, cancer specific distress, social support and cognitive processing. Means for males and females of the questionnaire measures are displayed in Table 7. Females reported greater levels of PTG, distress (both current and overall), social support from both friends and family and intrusive and deliberate rumination. They also reported higher levels of anxiety and depression.

Table 7.

*Means and SD for Males and Females*

| Scale | Mean (*SD*) | | Mean Difference |
|---|---|---|---|
| | Male (*N*= 49) | Females (*N*= 74) | |
| PTG | 44.93 (22.41) | 61.36 (18.30) | 16.43 |
| Current Distress | 13.49 (14.05) | 23.66 (18.24) | 10.17 |
| Overall distress of cancer experience | 5.39 (2.82) | 7.05 (2.71) | 1.67 |
| Total Social Support | 25.84 (9.24) | 28.84 (9.09) | 3.00 |
| Social Support Friends | 11.71 (5.10) | 13.85 (5.25) | 2.14 |
| Social Support Family | 14.12 (5.85) | 14.99 (5.37) | .86 |
| Intrusive Rumination | .86 (.81) | 1.46 (.89) | .60 |
| Deliberate Rumination | 1.12 (.78) | 1.59 (.66) | .47 |
| Anxiety | 4.26 (3.81) | 7.43 (4.61) | 3.17 |
| Depression | 2.59 (3.06) | 4.05 (3.78) | 1.46 |

Gender differences were assessed using a series of *t*-tests. A strict Bonferroni correction *p* value of 0.006 was used to account for multiple *t*-tests. It was felt that this would address any issues relating to type 1 and 2 errors.

**2.3.3.1 Gender Differences in Distress.** To explore gender differences in current self-reported levels of distress *t*-tests were used to compare total scores from the IES. On average, females reported higher levels of distress ($M$ = 23.66, $SE$ = 2.12), than males ($M$= 13.49, $SE$ = 2.01). This difference, 10.17, BCa 95% CI [4.29, 16.01] was significant $t(118.15) = 3.48$ $p$ <.005, and represents a medium-sized effect, $d$=.62.

To explore gender differences in how distressing participants found their overall cancer experience *t*-tests were used to compare scores from the distress scale. On average, females reported higher levels of distress ($M$ = 7.05, $SE$ = .32), than males ($M$= 5.39, $SE$ = .40). This difference, 1.67, BCa 95% CI [.57, 2.67] was significant $t(121) = 3.28$ $p$ <.005, and represents a medium-sized effect, $d$=.60.

**2.3.3.2 Gender differences in PTG.** To explore gender differences in self-reported PTG a *t*-test was conducted. On average, females reported higher levels of PTG (*M* = 61.36, *SE* = 2.13), than males (*M*= 44.94, *SE* = 3.20). This difference, 16.43, BCa 95% CI [8.69, 23.53] was significant *t*(121) = 4.45, *p* <.001, and represents a large-sized effect, *d*=.80.

**2.3.3.3 Gender differences in Social Support.** To explore gender differences in social support a *t*-test was conducted. On average, females reported higher levels of total social support (*M* = 28.84, *SE* = 1.06), than males (*M*= 25.84, *SE* = 1.06). This difference, 3.00, BCa 95% CI [.24, 6.18] was not significant *t*(221) = 1.78, *p* =. 07; however, it represents a small-sized effect, *d*=.32.

On average, females reported higher levels of social support from friends (*M* = 13.85, *SE* = .61), than males (*M* = 11.71, *SE* = .73). This difference, 2.14, BCa 95% CI [.29, 3.94] was not significant *t*(121) = 2.23, *p* = .03; however, it represents a small-medium-sized effect, *d*=.41.

On average, females also reported higher levels of social support from family (*M* = 14.99, *SE* = .62), than males (*M* = 14.12, *SE* = .84). This difference, .86, BCa 95% CI [1.19, 2.93] was not significant *t*(121) = .84, *p* =.40.

**2.3.3.4 Gender differences in Cognitive Processing.** To explore gender differences in intrusive rumination a *t*-test was conducted. On average, females reported higher levels of intrusive rumination (*M* = 1.46 *SE* = .10), than males (*M* = .86, *SE* = .12). This difference, .60, BCa 95% CI [.30, .91] was significant *t*(121) = 3.80, *p* <.00, and represents a medium-sized effect, *d*=.71.

To explore gender differences in deliberate rumination a *t*-test was conducted. On average, females reported higher levels of deliberate rumination (*M* = 1.59 *SE* = .08), than

males (*M* = 1.12, *SE* = .11). This difference, .47, BCa 95% CI [.21, .75] was significant *t*(84.48) = 3.63, *p* <.00, and represents a medium-sized effect, *d*=.65.

The results support the hypothesis that there would be significant gender differences in PTG, distress and cognitive processing. Contrary to predictions no significant gender differences in social support were found.

### 2.3.4 Correlational Analysis

Correlations for study variable were analysed and are shown in Table 8.

Table 8.

*Associations Among Study Variables*

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | PTG | ---- | | | | | | | | | |
| 2. | Current Distress | .32*** | ----- | | | | | | | | |
| 3. | Social Support | .38*** | -.15 | ----- | | | | | | | |
| 4. | Intrusive Rumination | .33*** | .80*** | -.03 | ----- | | | | | | |
| 5. | Deliberate Rumination | .43*** | .65*** | .02 | .71*** | ----- | | | | | |
| 6. | Anxiety | .22* | .71*** | -.16 | .62*** | .50*** | ----- | | | | |
| 7. | Depression | .02 | .53*** | -.39*** | .39*** | .35*** | .69*** | ----- | | | |
| 8. | Overall Distress | .27** | .53*** | -.11 | .60*** | .59*** | .53** | .37*** | ----- | | |
| 9. | Age | -..18 | -.47*** | .02 | -.49*** | -.53*** | -.44*** | -.23* | -.48*** | ---- | |
| 10. | Mean Time since Completion of Treatment | .02 | -.02 | -.16 | -.01 | .03 | 0.2 | .09 | .18 | -.00 | ---- |

*$p < .05$, ** $p < .01$, ***$p < .001$

PTG was significantly and positively associated with distress *r* = .32, 95% BCa CI [.16, .46], *p* =.000, social support *r* = .38, 95% BCa CI [.22, .51], *p* =.000, intrusive

rumination *r* = .33, 95% BCa CI [.16, .47], *p* =.000, deliberate rumination *r* = .43, 95% BCa CI [.27, .57], *p* =.000, anxiety *r* = .22, 95% BCa CI [.04, .41], *p* =.014 and overall distress of the cancer experience *r* = .27, 95% BCa CI [.11, .43], *p* =.003 .

Distress was significantly and positively associated with PTG, which suggests that PTG and distress do not occur in isolation. There was no significant relationship between distress and social support *r* = -.15, *p* =.09. Distress was significantly and positively associated with intrusive rumination *r* = .80, 95% BCa CI [.72, .85], *p* =.000, deliberate rumination *r* = .65, 95% BCa CI [.56, .73], *p* =.000, anxiety *r* = .71, 95% BCa CI [.58, .79], *p* =.000, depression *r* = .53, 95% BCa CI [.38, .67], *p* =.000 and overall distress of the cancer experience *r* = .53, 95% BCa CI [.40, .64], *p* =.000.

Social support was not significantly associated with intrusive rumination *r* = -.03, *p* =.73, deliberate rumination *r* = -.02 *p* =.81, anxiety *r* = -.16, *p* =.08 and overall distress of the cancer experience *r* = -.11 *p* =.22, but was negatively associated with depression *r* = -.39, 95% BCa CI [-.55, -.18], *p* =.000.

Intrusive rumination was significantly associated with deliberate rumination *r* = .71, 95% BCa CI [.63, .78], *p* =.000, anxiety *r* = .62, 95% BCa CI [.47, .74], *p* =.000, depression *r* = .39, 95% BCa CI [.19, .57], *p* =.000 and overall distress of the cancer experience *r* = .60, 95% BCa CI [.49, .70], *p* =.000.

Deliberate rumination was significantly associated with anxiety *r* = .50, 95% BCa CI [.37, .61], *p* =.000, depression *r* = .35, 95% BCa CI [.19, .49], *p* =.000 and overall distress of the cancer experience *r* = .59, 95% BCa CI [.48, .70], *p* =.000.

Age was negatively associated with current distress *r* = -.47, 95% BCa CI [-.62, -.29], *p* = .000, intrusive rumination *r* = -.49, 95% BCa CI [-.63, -.32], *p* =.000, deliberate rumination *r* = -.53, 95% BCa CI [-.66, -.37], *p* =.000, anxiety *r* = -.44, 95% BCa CI [-.57, -.31], *p* =.000, depression *r* = -.23, 95% BCa CI [-.39, -.07], *p* =.03, and overall distress *r* = -.48, 95% BCa CI [-.62, -.32], *p* =.000.

The results revealed significant associations between PTG and distress, PTG and social support and PTG and cognitive processing (deliberate and intrusive rumination)**,** which suggests that those who experience more distress, who have greater social support and engage in more cognitive processing experience greater PTG.

### 2.3.5 Regression Analysis

A multiple regression using the Enter method was performed to examine predictors of PTG (see Table 9). Variables that were significantly related to the PTGI scores were included in the model to determine the independent contribution of these variables to the variance in PTG scores.

Table 9.

*Multiple Regression Analyses to test the effect of predictor variables on PTG. Confidence intervals and standard errors based on 1000 bootstrap samples.*

| | *B* | *SE* | 95% BCa CI | β |
|---|---|---|---|---|
| Variable | | | | |
| Constant | 10.29 | 5.8 | -.64- 22.78 | |
| Gender | 8.43 | 3.67 | 1.68-16.23 | .19* |
| Total Social Support | .87 | .16 | .54- 1.16 | .37*** |
| Current Distress | .24 | .17 | -.10- .55 | .20 |
| Deliberate Rumination | 8.30 | 3.6 | 1.35- 15.40 | .28* |
| Intrusive Rumination | -2.66 | 3.6 | -9.30- 4.83 | -.11 |
| Overall Distress | .37 | .78 | -1.1- 1.97 | .05 |

*Note:* BCa CI= Bootstrapped confidence interval. Total $R^2$ =.37, F (6,116) = 11.53, $p$<.001***
*$p$ < .05, ** $p$ < .01, *** $p$ < .001

Gender, social support, distress and cognitive processing (intrusive and deliberate rumination) accounted for 37% of the variance in PTG. Being female, having greater social support and more deliberate rumination were significant predictors of PTG.

### 2.3.6 Mediation Analysis

Based on previous theoretical (Tedeschi & Calhoun, 1995; 2004) and empirical work (e.g. Swickert & Hitner, 2009; Swickert et al., 2012), mediation analysiswas conducted using the PROCESS method (Hayes, 2013) to explore whether cognitive processing or social support mediated the relationship between gender and PTG.

**2.3.6.1 Social Support as a Mediator in the Relationship between Gender and PTG.** PROCESS (Hayes, 2013) was used to see whether perceived social support mediated gender differences in PTG. Given that the nature of the relationship between social support and PTG was the same for both males and females, mediation analyses was conducted to determine whether social support mediated the relationship between gender and PTG. Figure 3 shows that contrary to predictions, gender did not have an indirect effect on PTG through perceived social support, $b$ = 2.28, bootstrapped $SE$ = 1.48, BCa CI [-.11, 5.82]. This represents a small effect size ($k^2$ = .055, 95% BCa CI [.006, .13].

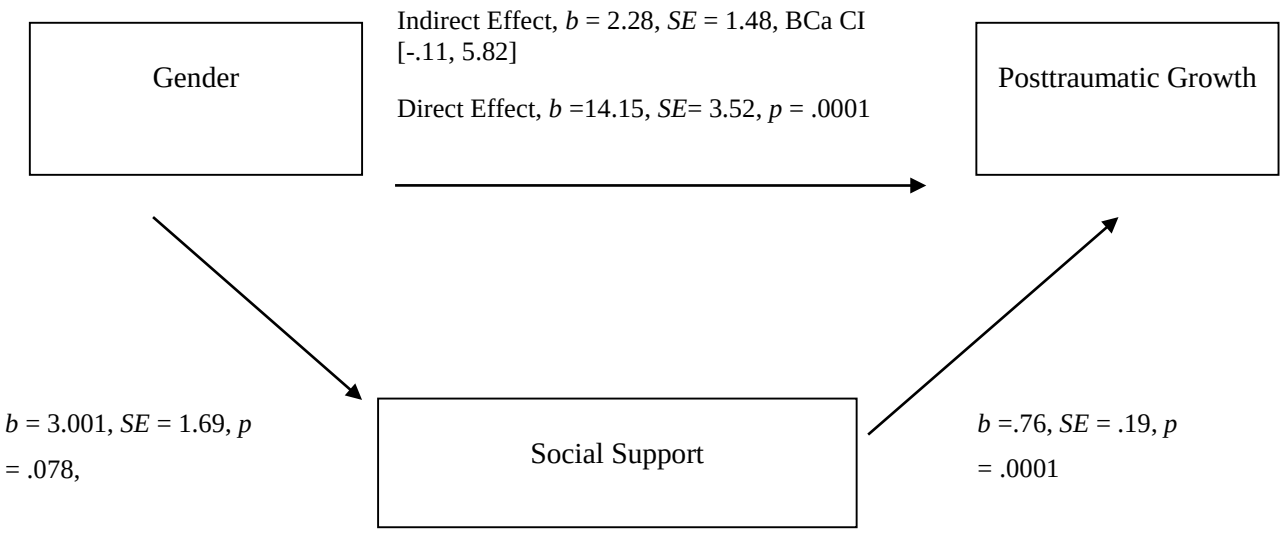


Figure 3: *Social support as a mediator of the relationship between gender and PTG*

**2.3.6.2 Cognitive Processing as a Mediator in the Relationship between Gender and PTG.** PROCESS (Hayes, 2013) was used to see whether deliberate rumination

mediated gender differences in PTG. Given that the nature of the relationship between deliberate rumination and PTG appeared to be the same for both males and females, mediation analyses was conducted to determine whether deliberate rumination mediated the relationship between gender and PTG. Figure 4 shows that the results support this hypothesis and gender had a significant indirect effect on PTG through deliberate rumination, $b$ = 4.76, bootstrapped $SE$ = 1.74, BCa CI [1.99, 9.08]. This represents a medium effect size ($k^2$ =.11, 95% BCa CI [.05, .20].

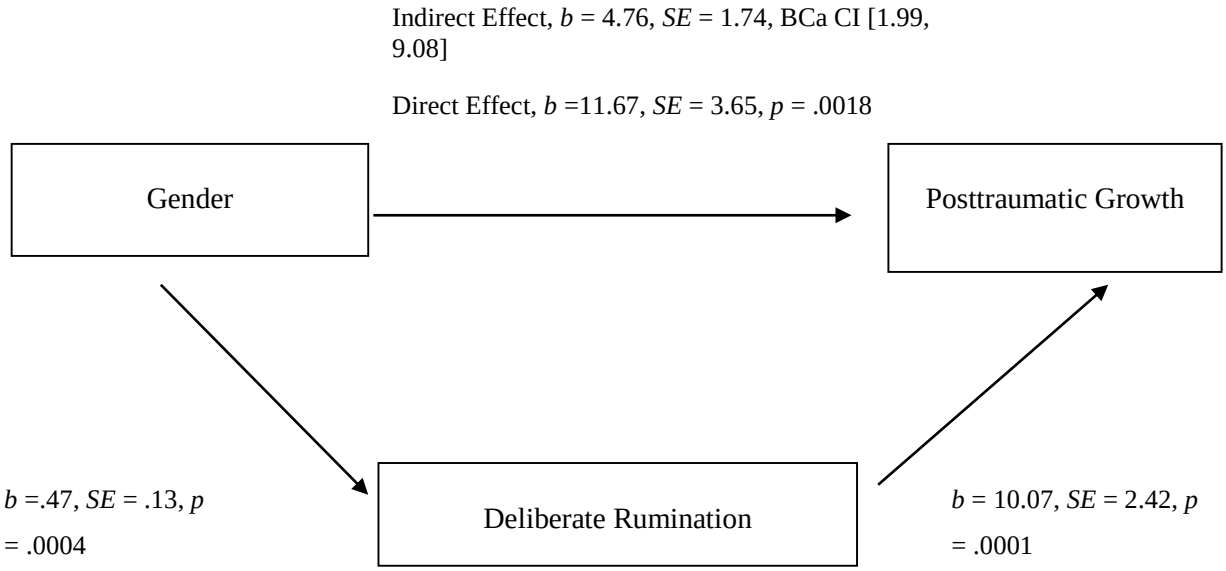


Figure 4: *Deliberate rumination as a mediator of the relationship between gender and PTG*

### 2.3.7 Additional Comments Content

Qualitative analysis was beyond the scope of this research but a number of participants provided comments that the researcher felt to be of relevance in the 'any additional comments' section of the demographic form (see Appendix L). The comments highlighted the benefits of social support in helping the participants adjust to their cancer. Some of the participants had commented on social support from professionals, others on support from family and friends, and others had utilised other forms of social support such as cancer support groups. Some participants highlighted a perceived lack of support,

particularly for younger females. The comments also highlighted gender differences in the impact of cancer, such as loss of fertility in a number of the younger female participants.

## 2.4 Discussion

The primary aim of this study was to investigate gender differences in self-reported PTG in survivors of CRC. The study also aimed to explore both social support and cognitive processing as mediators in the relationship between gender and PTG. The findings will be discussed below. Clinical implications, limitations of the research and areas for future research will also be discussed.

### 2.4.1 PTG

In line with existing studies participants generally reported experiencing positive changes in the domains of relating to others, new possibilities, appreciation of life, personal strength, and spiritual changes, following their cancer diagnosis. The wide range of scores reported on the PTGI suggests that participants varied considerably in their perception of positive changes after their cancer diagnosis. Mean PTGI scores of 54.82 were reported, which is slightly higher than existing studies of PTG in survivors of CRC (e.g. Salsman et al., 2009), but lower than those reported in other studies examining PTG in individuals following a breast cancer diagnosis (e.g. Cohen & Numa, 2011; Cordova et al., 2001; Silva et al., 2012). As hypothesised, following from existing studies in the trauma field (e.g. Vishnevsky et al., 2010), males reported significantly lower levels of PTG than females.

In line with existing research, PTG was positively correlated with perceived social support (e.g. Nenova et al., 2013; Thornton et al., 2006; Wilson et al., 2007). This is consistent with existing theories that suggest that social support is an important catalyst for PTG (Tedeschi & Calhoun, 2004). PTG scores were also significantly correlated with

cancer specific distress and cognitive processing (deliberate and intrusive rumination), which is consistent with theories that propose that individuals must experience distress to initiate cognitive processes that enable them to rebuild their core beliefs and appreciate how they have changed through the experience of a significant life event such as cancer (Janoff-Bulman, 1992).

### 2.4.2 Distress

Two forms of distress were explored in this research. Current cancer specific post-traumatic distress (measured by the IES) and overall distress of the cancer experience. The findings indicate that the majority of the participants were not currently experiencing clinically significant levels of distress, however 30.9% of participants reported clinically significant levels of post-traumatic stress and a significant proportion of participants reported finding their overall cancer experience distressing. Moreover, 33.3% of participants reported experiencing clinically significant levels of anxiety and 14.6% reported experiencing clinically significant levels of depression, which highlights the longer-term impacts of cancer. Correlational analysis identified that current distress, overall distress of the cancer experience and anxiety were positively associated with PTG which supports the view that distress and PTG can occur simultaneously (Stanton et al., 2006; Tedeschi & Calhoun, 2004). These findings support theories of PTG that suggest that distress is a precursor to PTG (Tedeschi & Calhoun, 2004); however, neither current distress nor overall distress of the experience were identified as significant predictors of PTG. Although significant correlations were not found between distress and social support, correlational analysis indicates that both current distress and overall distress were negatively associated with social support, indicating that social support may be useful in reducing cancer specific distress, however further research is warranted.

### 2.4.3 Gender Differences

It was hypothesised that there would be significant gender differences in distress, PTG, social support and cognitive processing (intrusive and deliberate rumination). As predicted, females scored higher than males on all of the measures. Significant gender differences were found in self-reported PTG, distress and in levels of intrusive and deliberate rumination. Such findings are consistent with existing studies that reported higher rates of PTG in females compared to males (e.g. Bellizi, 2004; Foley et al., 2006; Morris & Shakespeare-Finch, 2011b; Smith et al., 2014; Tallman et al., 2010). However, higher rates of distress were found in females compared to males, which is in contrast to the findings of Dunn et al. (2013) and Goldzweig et al. (2009) who found higher rates of distress in male CRC survivors compared to females.

Although females scored higher than males on the perceived social support scale no significant gender differences in total social support were found. Such findings may be explained by the limitations of the measure used. The measure only examined perceived social support from family and friends and did not distinguish between different aspects of social support, which have been suggested to have differential effects on adjustment (Shroevers et al., 2010). Moreover, the measure did not assess the extent to which individuals utilise social support and it is therefore important to consider that there could be gender differences in the amount individuals discussed their experiences with their support network. Similar to other studies (e.g. Nenova et al., 2013) the social support scores were negatively skewed, indicating that very few participants were lacking in social support. It is also important to note that most of the participants were married and the findings therefore may not generalise to individuals who are not married.

### 2.4.4 Social Support and PTG

In line with previous research, social support was identified as a significant predictor of PTG, providing support for theories that imply that social support is a vital factor in facilitating PTG through disclosure of difficulties, promoting cognitive processing of the experience (Tedeschi & Calhoun, 1995; 2004). However, social support was not found to be a significant mediator in the relationship between gender and PTG. Such findings may be explained by the limitations of the measure used, the absence of evidence for gender differences in social support, and because a limited number of participants were lacking in social support. Moreover, the sample size may not have been large enough to detect a small effect. Further research into this relationship would therefore be beneficial.

The additional information collected from the demographic form provided useful information about aspects of social support that participants had found helpful, particularly the help from professionals, support groups and family of friends. A number of participants also highlighted the lack of support they had received, particularly younger females.

### 2.4.5 Cognitive Processing

This study examined both intrusive and deliberate rumination. Although intrusive rumination was found to be significantly associated with PTG, it did not explain any more of the variation in PTG than the other predictors in the regression analysis. Theories of PTG suggest that intrusive rumination often occurs in the aftermath of a trauma and then over time more intentional deliberate rumination leads to PTG. Our finding therefore support existing theories of PTG as the ERRI measured current levels of intrusive rumination, rather than amount of intrusive rumination experienced after completion of treatment. It is therefore likely that intrusive rumination may have been more likely to have occurred shortly after completion of treatment. This suggests that it is the more intentional, deliberate rumination that may be particularly important in facilitating PTG.

In line with existing theories of PTG, deliberate rumination was significantly associated with PTG and was identified as a significant predictor of PTG. Such findings are consistent with previous research (e.g. Morris & Shakespeare-Finch, 2011a). Deliberate rumination was also found to be a significant mediator in the relationship between gender and PTG, which suggests that deliberate rumination is an important process in PTG and that gender differences in PTG are partially due to the effects of gender on deliberate rumination.

Deliberate and intrusive rumination were significantly correlated with PTG scores and distress scores, providing evidence for cognitive processing theories of PTG, which suggest that distressing experiences prompt cognitive processes which promotes PTG (Cann et al., 2011). However, this requires replication in a more methodologically robust study using a longitudinal design or structural equation modelling.

### 2.4.6 Clinical Implications

This study found evidence for PTG after CRC, which highlights the importance of clinicians considering the possibility of growth following CRC, without imposing this as a specific expectation (Joseph & Linley, 2006). It is however important to note that although participants reported experiencing PTG, a number of participants also reported experiencing current distress and reported finding the overall cancer experience distressing, which highlights the importance of using measures that assess both the positive and negative psychological sequelae of cancer, because those who report positive outcomes may also be likely to report distress. The findings indicate that there is likely to be a whole psychological reaction to cancer and that distress and PTG do not occur in isolation, which is something that clinicians should consider.

The findings provide some evidence for the role of social support in facilitating PTG and social support should therefore be considered when supporting individuals

following a cancer diagnosis. Social support from friends was found to be associated with PTG ($r$=.315), which suggests that individuals who are not married or who have limited family support can still find benefit from social support. The additional comments section provided some useful insights into experiences of social support and highlighted aspects of social support that participants found helpful such as support from professionals, friends, cancer support groups, volunteering and choirs. Such findings indicate that individuals facing a cancer diagnosis may benefit from sign-posting to forums of support. The additional comments section also highlighted a perceived lack of support, particularly for younger females. Such findings are consistent with existing research that highlighted the lack of support available to individuals who have a diagnosis other than breast cancer (Morris & Shakespeare-Finch, 2011b). These research findings indicate that individuals with CRC may benefit from CRC specific social support, but further research is warranted.

Two forms of rumination were investigated in this research and evidence was provided for the role of deliberate rumination in PTG. Clinicians should therefore be aware of these different forms of rumination and they should educate individuals about the difference between intrusive and deliberate rumination. Moreover, given that deliberate rumination appears to be the most important aspect of cognitive processing in facilitating PTG, clinicians should aim to facilitate individuals to shift from intrusive rumination to more deliberate rumination to facilitate PTG. Clinicians working with individuals with cancer should therefore aim to reduce distress, allow disclosure and promote deliberate rumination. The findings indicate that individuals facing a cancer diagnosis may benefit from situations to promote deliberate rumination such as groups, individual therapy or supportive social interactions.

Gender differences in PTG were found which indicate that it is imperative to ensure that men are effectively targeted and provided with optimal support and opportunities for discussion of their experiences to facilitate cognitive processing.

### 2.4.7 Strengths, Limitations and Future Directions

Although this study used a relatively large sample of participants recruited at various stages following treatment through different methods, who were likely to have had a range of experiences, it is important to note some important methodological limitations which should be considered when interpreting results. The cross-sectional design was useful to establish relationships between PTG and predictor variables; however, it limits conclusions that can be drawn about the relationship between the variables over time. We cannot infer causation and it may be that greater levels of PTG increase an individual's probability of engaging in cognitive processing or social support. Further research, employing a longitudinal design would be beneficial to further understanding about the process of PTG. Intervention studies would also be beneficial to further understanding of the extent to which cognitive processing and social support facilitate PTG. Such studies would enable a direct comparison of individuals who had specifically engaged in deliberate rumination and social support compared to controls.

It is also important to note the absence of any path analysis and it was therefore not possible to examine more complicated relations between variables, particularly interactions between cognitive processing and social support. Further research employing path analysis would therefore be beneficial to directly test the theoretical assumptions of PTG.

The recruitment strategy of utilising a convenience sample of participants introduces the possibility of sampling bias, which may limit the generalisability of the findings. The final sample consisted of more females than males. Interestingly, more males than females were recruited through Salisbury District Hospital, whereas online significantly more females than males completed the questionnaires. Such findings may be attributed to gender differences in support seeking behaviour, whereby females may be more likely to seek support through online forums and pages compared to men. Females

may also be more prepared to talk about their experiences. Further research exploring support seeking behaviour of males and females would therefore be beneficial.

It is also important to note that there were significant differences in the mean total PTGI scores from the two recruitment methods, whereby those recruited online had a mean PTGI score of 61.01 compared to those recruited from Salisbury District Hospital who had a mean PTGI score of 45.15. Such findings may be explained by the participants who were recruited online actively seeking support through charity forums or social media pages or by them having a significantly greater mean time since completion of treatment of 41.6 months compared to 26.79 in those recruited from Salisbury District Hospital, indicating that they had greater time to experience PTG, which highlights the need for longitudinal research.

Of the participants approached through Salisbury District Hospital, there were relatively high rates of non-responders, which reflects the difficulty of recruiting participants once they have completed treatment. Demographic data on non-responders was not collected and it is therefore important to consider that individuals may have been more likely to respond if they had experienced greater PTG. Moreover, participants with higher levels of distress or those who do not like talking about their experiences may have opted not to participate thus biasing the final sample.

Participants recruited from Salisbury District Hospital were recruited at their follow-up clinic appointments, which may have influenced the findings given that a number of participants reported thinking about their cancer more in the week leading up to the appointment. It is also important to consider that the participants recruited online through cancer charity forums or social media may represent a biased sample of people who access such forums of support, which may not be representative of all survivors.

The mean age of the final sample was 62 years, indicating that the sample consisted of predominately older adults. It is therefore important to consider that age and generational effects may have influenced the findings, whereby older adults may have adopted the 'stiff upper lip approach' to their cancer and may have therefore not talked about their experiences, which may have influenced the amount of PTG experienced. However, it is important to note that a number of participants did not give details of their age; nevertheless, correlational analysis did not reveal a significant association between age and PTG, which is consistent with the findings of Jansen et al. (2011) who did not find an association between PTG and age in 483 CRC survivors.

Four participants were included in the analysis even though they had completed the questionnaires less than six months following completion of treatment. It is therefore important to note that their results could have influenced the findings, however their PTGI scores were examined and they had not scored significantly lower than the mean, indicating that sufficient time had passed for them to experience PTG. Research evidence suggests most PTG occurs in the first 6 months (e.g. Danhauer et al., 2013) and existing studies have found relatively high levels of PTG shortly after completion of treatment (e.g. Lofti-Kashani et al., 2014; Silva et al., 2012).

The research relied on self-report measures, which may have been subject to recall bias or demand characteristics, which limits the reliability of the findings. Further research employing a diary method to verify reports would therefore be beneficial. The PSSS did not assess different aspects of social support and therefore limits the conclusions that can be drawn about various aspects of social support. Moreover, the measure is dated and not validated for use in cancer patients. Further research exploring different aspects of social support would therefore be beneficial.

The PTGI was used, which is the most widely used measure of PTG, enabling the results of this study to be compared to existing research. However, it has been suggested that the use of the PTGI neglects the range of experiences of cancer survivors (Park & Lechner, 2006) and limits participants to purely positive responses (Cann, Calhoun, Tedeschi, & Solomon, 2010). The measure is also not specifically designed for a cancer population and validation studies were based on college students (Tedeschi & Calhoun, 1996). It may therefore be beneficial to use a validated measure designed specifically for the cancer population such as the Impact of Cancer Tool (Zebrack, Patricia, Bernaards, Petersen, & Abraham, 2006), which assesses both the positive and negative impact that cancer can have on various aspects of an individual's life. Qualitative research may also enable us to understand in more depth the experiences of survivors of CRC.

The findings provide evidence for cognitive processing theories of PTG, which imply that deliberate rumination is an important process in PTG. However, the study did not consider the extent to which a cancer diagnosis had shattered the participant's core beliefs. Further research using the Core Belief Inventory (CBI, Cann, Calhoun, Tedeschi, Kilmer, et al., 2010) would therefore be beneficial to determine the seismic nature of the cancer experience (Bellizzi, 2004) and thus the extent to which beliefs were shattered. Such research would further understanding of the role of cognitive processing in PTG.

It is also important to note that although part of the effect of gender on PTG was found to be due to deliberate rumination, there is still a reasonably sized direct effect of gender on PTG, and future research exploring other possible mediators would therefore be beneficial.

Finally, it is important to highlight that the study did not consider other life experiences which may have confounded or influenced findings.

## 2.5 Conclusion

This novel study investigated gender differences in PTG following a diagnosis of CRC, which is a population largely neglected in the PTG literature. Significant gender differences in PTG, distress and intrusive and deliberate rumination were found. Social support, distress and cognitive processing (intrusive and deliberate rumination) were positively associated with PTG. Regression analysis showed that female gender, having greater social support and engaging in more deliberate rumination predicted increasing levels of PTG. The study also sought to examine cognitive processing and social support as mediators in the relationship between gender and PTG. Deliberate rumination was found to mediate the relationship between gender and posttraumatic growth. The findings highlight the importance of deliberate rumination and social support in PTG and provide support for existing models of PTG. The findings suggest that gender differences in PTG exist and these are partially due to the effects of gender on deliberate rumination, which has a number of imperative clinical implications. The findings of this research are promising and pave the way for further research.

# Appendix A- Demographic Questionnaire

Salisbury NHS
NHS Foundation Trust

| | |
|---|---|
| Name | |
| Gender (please circle) | Male Female |
| Age | |
| Marital Status (please circle) | Single Married Divorced Cohabiting Other |
| Employment Status (please circle) | Unemployed Employed Self-employed Full-time parent/ caregiver Other |
| Cancer Type | |
| Length of Time Since Completion of Treatment | |
| Type of Treatment Received (please circle) | Surgery Chemotherapy Radiotherapy Clinical Trial Other (please state) |
| Do you have a Stoma? (please circle) | No Yes, a permanent Stoma Yes, a temporary Stoma |
| Professional Support Accessed (please circle) | None Well Being Group One to one Support Psychological Therapy Other (Please state) |
| How distressing did you find your cancer experience? (please circle number on scale) | 0 1 2 3 4 5 6 7 8 9 10<br>No distress Very distressing |
| Any additional comments? | |

# Appendix B- Posttraumatic Growth Inventory

**Please indicate the degree to which each change has occurred in your life following your cancer diagnosis:**

| **Amount of change**>>> | Not at all | Very small degree | Small degree | Moderate degree | Great degree | Very great degree |
|---|---|---|---|---|---|---|
| **1** My priorities about what is important in life. | | | | | | |
| **2** An appreciation for the value of my own life. | | | | | | |
| **3** I developed new interests. | | | | | | |
| **4** A feeling of self-reliance. | | | | | | |
| **5** A better understanding of spiritual matters. | | | | | | |
| **6** Knowing that I can count on people in times of trouble. | | | | | | |
| **7** I established a new path for my life. | | | | | | |
| **8** A sense of closeness with others. | | | | | | |
| **9** A willingness to express my emotions. | | | | | | |
| **10** Knowing I can handle difficulties. | | | | | | |
| **11** I'm able to do better things with my life. | | | | | | |
| **12** Being able to accept the way things work out. | | | | | | |
| **13** Appreciating every day. | | | | | | |
| **14** New opportunities are available which wouldn't have been otherwise | | | | | | |
| **15** Having compassion for others. | | | | | | |
| **16** Putting effort into my relationships. | | | | | | |
| **17** I'm more likely to try to change things which need changing. | | | | | | |
| **18** I have a stronger religious faith. | | | | | | |
| **19** I discovered that I'm stronger than I thought I was. | | | | | | |
| **20** I learned a great deal about how wonderful people are. | | | | | | |
| **21** I accept needing others. | | | | | | |

# Appendix C- The Impact of Events Inventory

NAME ..... DATE ..../...../.....

Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you **DURING THE PAST SEVEN DAYS** with respect to your experience of colorectal cancer. How much were you distressed or bothered by these difficulties?

Select only one answer per row.

| | | Not at all | Rarely | Sometimes | Often |
|---|---|---|---|---|---|
| 1. | I thought about it when I didn't mean to. | 0 | 1 | 3 | 5 |
| 2. | I avoided letting myself get upset when I though about it or was reminded about it. | 0 | 1 | 3 | 5 |
| 3. | I tried to remove it from memory. | 0 | 1 | 3 | 5 |
| 4. | I had trouble falling asleep or staying asleep because of pictures or thoughts about it that came to my mind. | 0 | 1 | 3 | 5 |
| 5. | I had waves of strong feelings about it. | 0 | 1 | 3 | 5 |
| 6. | I had dreams about it. | 0 | 1 | 3 | 5 |
| 7. | I stayed away from reminders about it. | 0 | 1 | 3 | 5 |
| 8. | I felt as if it hadn't happened or was un real. | 0 | 1 | 3 | 5 |
| 9. | I tried not to talk about it. | 0 | 1 | 3 | 5 |
| 10. | Pictures about it popped into my mind. | 0 | 1 | 3 | 5 |
| 11. | Other things kept making me think about it. | 0 | 1 | 3 | 5 |
| 12. | I was aware that I still had a lot of feelings about it, but I didn't deal with them. | 0 | 1 | 3 | 5 |
| 13. | I tried not to think about it. | 0 | 1 | 3 | 5 |
| 14. | Any reminder brought back feelings about it. | 0 | 1 | 3 | 5 |
| 15. | My feelings about it were kind of numb. | 0 | 1 | 3 | 5 |

# Appendix D- Perceived Social Support Scale

Perceived Social Support Scale (Friends)

The statements which follow refer to feelings and experiences which occur to most people at one time or another in their relationship with *friends*. For each statement there are three possible answers: Yes, No, Don't know. Please choose your answer by selecting the relevant box for each item:

| | Yes | No | Don't Know |
|---|---|---|---|
| Q1.1 My friends give me the moral support I need. | ○ | ○ | ○ |
| Q1.2 I get good ideas about how to do things or make things from my friends | ○ | ○ | ○ |
| Q1.3 Most other people are closer to their friends than me. | ○ | ○ | ○ |
| Q1.4 When I confide in friends who are closest to me, I get the idea that it makes them feel uncomfortable. | ○ | ○ | ○ |
| Q1.5 My friends enjoy hearing about what I think. | ○ | ○ | ○ |
| Q1.6 My friends share many of my interests. | ○ | ○ | ○ |
| Q1.7 My friends come to me when they have problems or need advice. | ○ | ○ | ○ |
| Q1.8 I rely on my friends for emotional support. | ○ | ○ | ○ |
| Q1.9 There is a friend I could go to if I was just feeling down, without feeling funny about it later. | ○ | ○ | ○ |
| Q1.10 My friends and I are very open about what we think about things. | ○ | ○ | ○ |

| | | | |
|---|---|---|---|
| Q1.11 My friends are sensitive to my personal needs. | | | |
| Q1.12 My friends come to me for emotional support. | | | |
| Q1.13 My friends are good at helping me solve problems. | | | |
| Q1.14 I have a good sharing relationship with a number of my friends. | | | |
| Q1.15 My friends get good ideas about how to do things or make things for me. | | | |
| Q1.16 When I confide in my friends, it makes me uncomfortable. | | | |
| Q1.17 My friends seek me out for companionship. | | | |
| Q1.18 I think my friends feel that I'm good at helping them solve problems. | | | |
| Q1.19 I don't have a relationship with a friend that is as close as other people's relationships with friends. | | | |
| Q1.20 I wish my friends were much different. | | | |

Perceived Social Support Scale (Families)

The statements which follow refer to feelings and experiences which occur to most people at one time or another in their relationship with their *families*. For each statement there are three possible answers: Yes, No, Don't know. Please choose your answer by selecting the relevant box for each item:

| | Yes | No | Don't Know |
|---|---|---|---|
| Q2.1 My family gives me the moral support I need. | ○ | ○ | ○ |
| Q2.2 I get good ideas about how to do things or make things from my family. | ○ | ○ | ○ |
| Q2.3 Most people are closer to their family than me. | ○ | ○ | ○ |
| Q2.4 When I confide in the members of my family who are closest to me, I get the idea that it makes them uncomfortable. | ○ | ○ | ○ |
| Q2.5 My family enjoys hearing about what I think: | ○ | ○ | ○ |
| Q2.6 Members of my family share many of my interests. | ○ | ○ | ○ |
| Q2.7 Certain members of my family come to me when they have problems or need advice. | ○ | ○ | ○ |
| Q2.8 I rely on my family for emotional support. | ○ | ○ | ○ |
| Q2.9 There is a member of my family I could go to if I was just feeling down, without feeling funny about it later. | ○ | ○ | ○ |
| Q2.10 My family and I are very open about what we think about things. | ○ | ○ | ○ |
| Q2.11 My family is sensitive to my personal needs. | ○ | ○ | ○ |

| | | | |
|---|---|---|---|
| Q2.12 Members of my family come to me for emotional support. | | | |
| Q2.13 Members of my family are good at helping me solve problems. | | | |
| Q2.14 I have a deep sharing relationship with a number of members of my family. | | | |
| Q2.15 Members of my family get good ideas about how to do things or make things for me. | | | |
| Q2.16 When I confide in members of my family, it makes me uncomfortable. | | | |
| Q2.17 Members of my family seek me out for companionship. | | | |
| Q2.18 I think my family feel that I'm good at helping them solve problems. | | | |
| Q2.19 I don't have a relationship with a member of my family that is as close as other people's relationships with family members. | | | |
| Q2.20 I wish my family were much different. | | | |

# Appendix E- The Event Related Rumination Inventory

INTRUSIVE RUMINATION ITEMS

After an experience like cancer, people sometimes, but not always, find themselves having thoughts about their experience even though they don't try to think about it. Indicate for the following items how often, if at all, you had the experiences described during the weeks immediately after the event (or in the last few weeks).

| | 0 (Not at all) | 1 (Rarely) | 2 (Sometimes) | 3 (often) |
|---|---|---|---|---|
| I thought about the event when I did not mean to. | | | | |
| Thoughts about the event came to mind and I could not stop thinking about them. | | | | |
| Thoughts about the event distracted me or kept me from being able to concentrate. | | | | |
| I could not keep images or thoughts about the event from entering my mind. | | | | |
| Thoughts, memories, or images of the event came to mind even when I did not want them. | | | | |
| Thoughts about the event caused me to relive my experience. | | | | |
| Reminders of the event brought back thoughts about my experience. | | | | |
| I found myself automatically thinking about what had happened. | | | | |
| Other things kept leading me to think about my experience. | | | | |
| I tried not to think about the event, but could not keep the thoughts from my mind. | | | | |

DELIBERATE RUMINATION ITEMS

After an experience like cancer, people sometimes, but not always, deliberately and intentionally spend time thinking about their experience. Indicate for the following items how often, if at all, you deliberately spent time thinking about the issues indicated during the weeks immediately after the event (or in the last few weeks).

| | 0 (Not at all) | 1 (Rarely) | 2 (Sometimes) | 3 (often) |
|---|---|---|---|---|
| I thought about whether I could find meaning from my experience. | | | | |
| I thought about whether changes in my life have come from dealing with my experience. | | | | |
| I forced myself to think about my feelings about my experience. | | | | |
| I thought about whether I have learned anything as a result of my experience. | | | | |
| I thought about whether the experience has changed my beliefs about the world. | | | | |
| I thought about what the experience might mean for my future. | | | | |
| I thought about whether my relationships with others have changed following my experience. | | | | |
| I forced myself to deal with my feelings about the event. | | | | |
| I deliberately thought about how the event had affected me. | | | | |
| I thought about the event and tried to understand what happened. | | | | |

# Appendix F- University of Southampton Ethics

Submission Number 9213:
Submission Title An Exploration of Gender Differences in PTG in Survivors of Colorectal Cancer:
The Research Governance Office has reviewed and approved your submission

You can begin your research unless you are still awaiting specific Health and Safety approval (e.g. for a Genetic or Biological Materials Risk Assessment) or external ethics review (e.g. NRES).If your study is classified as requiring NRES review and you are being sponsored by the University of Southampton you will receive a paper notification of sponsorship from the Research Governance Office which will enable you to submit for NRES review.
If you do not receive this within two working weeks or have any queries please email rgoinfo@soton.ac.uk quoting your ERGO submission ID number. The following comments have been made:
"
I am writing to confirm that the University of Southampton is prepared to act as Research Sponsor for this study under the terms of the Department of Health Research Governance Framework for Health and Social Care (2nd edition 2005). We encourage you to become fully conversant with the terms of the Research Governance Framework by referring to the Department of Health document which can be accessed at:
http://www.dh.gov.uk/en/Aboutus/Researchanddevelopment/Researchgovernance/DH_4002112
If your study has been designated a Clinical Trial of an Investigational Medicinal Product, I would like to take this opportunity to remind you of your responsibilities under Medicines for Human Use Act regulations (2004/2006), The Human Medicines Regulations (2012) and EU Directive 2010/84/EU regarding pharmacovigilence If your study has been designated a 'Clinical Investigation of a Medical Device' you also need to be aware of the regulations regarding conduct of this work.
Further guidance can be found:
http://www.mhra.gov.uk/
The University of Southampton fulfils the role of Research Sponsor in ensuring management, monitoring and reporting arrangements for research. I understand that you will be acting as the Principal Investigator responsible for the daily management for this study, and that you will be

providing regular reports on the progress of the study to the Research Governance Office on this basis.
Please also familiarise yourself with the Terms and Conditions of Sponsorship on our website, including reporting requirements of any Adverse Events to the Research Governance Office and the hosting organisation.
If your project involves NHS patients or resources please send us a copy of your NHS REC and Trust approval letters when available. Please also be reminded that you may need a Research Passport to apply for an honorary research contract of employment from the hosting NHS Trust.
Both our Terms and Conditions of Sponsorship and information about the Research Passport can be found on our website:
http://www.soton.ac.uk/corporateservices/rgo
Failure to comply with our Terms may invalidate your ethics approval and therefore the insurance agreement, affect funding and/or Sponsorship of your study; your study may need to be suspended and disciplinary proceedings may ensue.
Please do not hesitate to contact this office should you require any additional information or support. May I also take this opportunity to wish you every success with your research.
Submission ID : 9213
Submission Name: An Exploration of Gender Differences in PTG in Survivors of Colorectal Cancer
Date : 08 Apr 2014
Created by : Katie Redwood

# Appendix G- NHS Ethics

NHS
Health Research Authority

**NRES Committee East Midlands - Nottingham 2**
The Old Chapel
Royal Standard Place
Nottingham
NG1 6FS

Telephone: 0115 8839311
Facsimile: 0115 8839294

29 April 2014

Miss Katie Redwood
Clinical Psychology
Building 44a
University of Southampton
SO17 1BJ

Dear Miss Redwood

| | |
|---|---|
| **Study title:** | **An Exploration of Gender Differences in Post-Traumatic Growth in Survivors of Colorectal Cancer** |
| **REC reference:** | **14/EM/0195** |
| **IRAS project ID:** | **151560** |

The Proportionate Review Sub-committee of the NRES Committee East Midlands - Nottingham 2 reviewed the above application on 28 April 2014.

We plan to publish your research summary wording for the above study on the NRES website, together with your contact details, unless you expressly withhold permission to do so. Publication will be no earlier than three months from the date of this favourable opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to withhold permission to publish, please contact the Rec Manager Miss Andrea Graham, nrescommittee.Eastmidlands-nottingham2@nhs.net.

**Ethical opinion**

- The Committee agreed this is a standard questionnaire.
- The Committee noted the short time to consent but Participants can take the Questionnaire away with them if they are unsure
- The Committee agreed the study has no material ethical issues

On behalf of the Committee, the sub-committee gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation, 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.

*Management permission ("R&D approval") should be sought from all NHS organisations involved in the study 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 a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.*

*For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.*

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

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database within 6 weeks of recruitment of the first participant (for medical device studies, within the timeline determined by the current registration and publication trees).

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non clinical trials this is not currently mandatory.

If a sponsor wishes to contest the need for registration they should contact Catherine Blewett (catherineblewett@nhs.net), the HRA does not, however, expect exceptions to be made. Guidance on where to register is provided within IRAS.

**You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers. The REC will acknowledge receipt and provide a final list of the approved documentation for the study, which can be made available to host organisations to facilitate their permission for the study. Failure to provide the final versions to the REC may cause delay in obtaining permissions.**

**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 documents reviewed and approved were:

| *Document* | *Version* | *Date* |
|---|---|---|
| Investigator CV | Catherine Margaret Brignell | |
| Investigator CV | Katie Redwood | 25 March 2014 |
| Investigator CV | Dr Kate Jenkins | |
| Letter of invitation to participant | 2 | 03 March 2014 |
| Participant Consent Form | 2 | 03 March 2014 |
| Participant Information Sheet | 2 | 03 March 2014 |
| Protocol | 2 | 25 March 2014 |
| Questionnaire: Post Traumatic Growth Inventory | | |
| Questionnaire: Demographic Form | 1 | |
| Questionnaire: Event Related Rumination Inventory (ERRI) | | |
| Questionnaire: Hospital Anxiety and Depression Scale (HADS) | | |
| Questionnaire: Impact of Events Scale | | |
| REC application | 151560/596428/1/902 | 14 April 2014 |

**Membership of the Proportionate Review Sub-Committee**

The members of the Sub-Committee who took part in the review are listed on the attached sheet.

**Statement of compliance**

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

**After ethical review**

Reporting requirements

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
- Notification of serious breaches of the protocol
- 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.

Feedback

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.
information is available at National Research Ethics Service website > After Review

**14/EM/0195** **Please quote this number on all correspondence**

We are pleased to welcome researchers and R & D staff at our NRES committee members' training days – see details at http://www.hra.nhs.uk/hra-training/

With the Committee's best wishes for the success of this project.

Yours sincerely

**Dr Martin Hewitt**
**Chair**

Email: nrescommittee.Eastmidlands-nottingham2@nhs.net

*Enclosures:* *List of names and professions of members who took part in the review*

*"After ethical review – guidance for researchers"*

*Copy to:* *Barbara Halliday*
*Louise Bell, Salisbury NHS*

# Appendix H- R & D Approval

Salisbury NHS
NHS Foundation Trust

**Salisbury Research Support Service**
**Block 24 SDH South**
**Salisbury District Hospital**
Salisbury
Wiltshire
SP2 8BJ
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6th June 2014

Miss Kate Redwood
Clinical Psychology
Building 44a
University of Southampton
SO17 1BJ

Dear Miss Kate Redwood

| | |
|---|---|
| **CSP number:** | **151560** |
| **REC number :** | **14/EM/0195** |
| **UKCRN ID number:** | **Number or not applicable** |
| **RDMC number** | **01/2014/2015** |
| **Title:** | **An Exploration of Gender Differences in PTG in Survivors in CRC** |

Thank you for submitting the above research project to the Salisbury Research Support Service (RSS) for NHS permission to proceed at Salisbury NHS Foundation Trust.

I am pleased to inform you that NHS permission to proceed for the above research was granted for Salisbury NHS Foundation Trust on 6th June 2014. Salisbury NHS Foundation Trust will act as a Participant Identification Centre. We note that Clinicians may identify and refer potential study participants to the Chief Investigator and their study team. The NHS permission to proceed applies to this referral only. Salisbury NHS Foundation Trust is not a research site, and is not responsible for the conduct of any research activities..

NHS permission was granted on the basis described in the application form, protocol and supporting documentation, subject to the following conditions:

You should notify the RSS Office, within the same timeframe of notifying the REC and any other regulatory bodies, of the following:

- Amendments (including changes to the local research team) in accordance with guidance on IRAS
- Progress reports
- Changes to the status of the study
- End of study reports

Please do not hesitate to contact the RSS Office on 01722 425026 if you require any additional information or support.

I wish you every success with your research project

Yours sincerely

Dr Stef Scott

# Appendix I- Information Sheet

Salisbury NHS
NHS Foundation Trust

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 experience of colorectal cancer so psychologists may better identify patients' 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 completed treatment for colorectal cancer a minimum of six months prior to participation (there is no maximum time limit)
3. You must not currently be undergoing treatment for cancer of any type.
4. You must be able to read and understand the information provided on the participant information sheet and consent form.
5. You must complete the consent form

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 are happy to complete the questionnaires you will automatically be entered into a prize draw for a chance to win one of two £25 Marks & Spencers Vouchers.

If you have any questions please do not hesitate to contact me on 07837878338.

Kind Regards,

Katie Redwood

(Trainee Clinical Psychologist)

University of Southampton

# Participant Information Sheet (Version 2/03.03.2014)

**Study Title**: An Exploration of Gender Differences in Post-Traumatic Growth in Survivors of Colorectal Cancer

**Researcher**: Katie Redwood (Trainee Clinical Psychologist)

ERGO Study ID number: 9213

**Please read this information carefully before deciding to take part in this research study. If you have any questions please contact Katie Redwood on 07837878838.**

**If you are happy to participate you will be asked to sign a consent form.**

**What is the research study about?**

The study aims to examine the experience of individuals who have been treated for colorectal cancer. It specifically looks at gender differences in the impact that cancer may have on different areas of life, and any changes that may have occurred in your life as a result of experiencing cancer. It will also look at the role of social support and at the way you think about and have processed your experience and the relationships between these things.

**Why have I been chosen?**

All individuals who have been treated for colorectal cancer more than a year ago will be invited to take part. Participation is entirely optional. If you decide to participate you will be asked to sign a consent form. If you change your mind about participation 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 completed either return the pack to a member of the clinic or post them back to the researcher in the pre-paid envelope provided. The contact details of the researcher are detailed above should you wish to contact her with any questions or if you 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?**

All individuals who choose to participate will automatically be entered into a prize draw to win one of two £25 Marks and Spencers vouchers.

Some individuals may be interested to know the findings of this research. If you wish to be sent information on the results of this 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 you find completing the questionnaires distressing in any way please contact the researcher on the number provided who will be happy to talk with you and offer support.

**Will my participation be confidential?**

Yes. We will follow ethical and legal practice and all information about you will be kept confidential. You will be assigned a unique identification number and you will only be identifiable by your ID number. Data will be stored in compliance with the Data Protection Act and all completed questionnaires will be kept in a locked cabinet and will be destroyed when no longer needed. The data that is transferred to a computer will be kept anonymous.

**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.

**What happens if something goes wrong?**

In the unlikely case of concern or complaint, please contact the Chair of the Ethics Committee, Psychology, University of Southampton, SO17 1BJ, UK. Phone: **+44 (0)23 8059 4663**, email slb1n10@soton.ac.uk

**What to do if this study causes distress or you need further support?**

If this study has caused you any distress or you need further support please contact my supervisor Dr Kate Jenkins on **01722 425105** or Kate.Jenkins@salisbury.nhs.uk.

**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. The study has also been approved by the National Research Ethics Service.

**Where can I get more information?**

If you have any further questions regarding the study then please do not hesitate to contact me on kr7g12@soton.ac.uk Tel: **07837878838.**

Please keep this information sheet for your reference.

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

# Appendix J- Consent Form

Salisbury NHS
NHS Foundation Trust

## CONSENT FORM (Version 2/03.03.2014)

**Study title**: An Exploration of Gender Differences in Post-Traumatic Growth in Survivors of Colorectal Cancer

**Researcher name**: Katie Redwood (Trainee Clinical Psychologist)

ERGO Study ID number: 9213

*Please initial the box(es) if you agree with the statement(s):*

I have read and understood the information sheet (Version 2/ 03.03.2014) and have had the opportunity to ask questions about the study ☐

I agree to take part in this study and agree for my data to be used for the purpose of this study ☐

I understand my participation is voluntary and I may withdraw at any time without my legal rights, or treatment being affected ☐

I would like to be offered a follow up assessment appointment if required. ☐

Name of participant (print name)……

Signature of participant……..

Date……

# Appendix K- Debrief Form

Salisbury NHS Foundation Trust

**An Exploration of Gender Differences in Post-Traumatic Growth in Survivors of Colorectal Cancer**

## Debriefing Statement *(written)* Version 2/03.03.2014

The aim of this study was to explore gender differences in the positive psychological changes that can be experienced following a difficult life experience such as cancer. This is referred to as post-traumatic growth and we are exploring how cognitive processing and perceived social support may influence post-traumatic growth. We will be looking at your responses to the questionnaires that you completed to determine how having cancer has affected you and whether there are any gender differences in responses. We will also be looking at the influence of how you have processed your experience and how much social support you have had to determine if they influence posttraumatic growth. Your data will help our understanding of the mechanisms that may lead men and women to perceive growth differently, which may have important implications for the care and promotion of psychological adjustment to cancer and future treatment. Once again results of this study will not include your name or any other identifying characteristics. The study did not use deception. You may have a copy of this summary if you wish and a copy of research findings once the project has been completed.

If you have any further questions please contact me (*Katie Redwood)* at ***07837878838*** *or* ***Kr7g12@soton.ac.uk*** *or Dr Kate Jenkins at* ***01722 425105*** *or* ***Kate.Jenkins@salisbury.nhs.uk***.

In the unlikely case of concern or complaint, please contact the Chair of the Ethics Committee, Psychology, University of Southampton, SO17 1BJ, UK. Phone: **+44 (0)23 8059 4663**, email slb1n10@soton.ac.uk

Thank you for your participation in this study.

# Appendix L- Additional Comments

The participants recruited from Salisbury District Hospital generally spoke very positively about the support they had received, particularly from the Colorectal Clinical Nurse Specialist, which had enabled them to feel supported through their experience. Others mentioned other forms of support they had found beneficial such as attending support groups or a choir for individuals who have had cancer, which enabled participants to gain support in a less threatening environment.

Participants recruited online also left valuable comments about their experience. Three participants left comments about the support they had received from professionals such as:

> "*The support I had from my consultant and all at the Cancer unit was fantastic"*
>
> "*Support from cancer nurse specialist and stoma nurse were wonderful (temporary stoma)*".

Seven participants commented on the limited support that was available to them, such as:

> *"I was diagnosed aged 30 and felt that there was little emotional support offered to me"*
>
> *"I think there is still a big need for support for young patients young women especially"*
>
> *"I was introduced to the bowel cancer nurse and spoke to her on the phone twice about being left with incontinence and I got no support from her and she said it was something I had to live with not heard from her for 18 months"*
>
> *"I feel that there should be more support following treatment and release from hospital. There are many unexpected experiences during recovery that have not*

*been covered in the advice and they can be worrying and distressing. Medical care is excellent during treatment but there is a sense of having been forgotten afterwards until it is time for the next scan.*"

Four participants also commented about volunteering or running support groups, such as:

*"I have been chair of a local bowel cancer support group for the last 8 years so talking to patients & carers and sharing experiences so my answers in this survey probably reflect that talking and sharing with others is a great help in coming to terms with cancer & stomas."*

Three participants left comments that related to social support from family and friends:

*"At the time of my treatment I wasn't really interested in thinking about it but now I am with my life partner and it has been something that we have had a lot of discussions about."*

*"Swapped tumour for colostomy bag so win win for me! I call it my Prada bag and use humour when talking with friends. This makes bowel cancer sound less scary!"*

*"My head is always helped by getting out of the house ... by doing something (however trivial) and being with other people."*

Other participants left comments about the impact of having cancer as a young female:

*"As a young patient (26 when diagnosed) the loss of my fertility has been the hardest element to bear and certainly has the greatest impact on my life now."*

# Glossary of Terms

| | |
|---|---|
| α | Cronbach's alpha |
| β | Standardised regression coefficient |
| *B* | Unstandardised regression coefficient |
| CRC | Colorectal cancer |
| *df* | Degrees of freedom |
| ERRI | Event related rumination inventory |
| *F* | *F*-ration (*F*- distribution) |
| $f^2$ | Cohen's effect size for multiple regression |
| IES | Impact of events scale |
| M | Mean |
| *N* | Sample size |
| *p* | A probability quantifying the strength of evidence against the null hypothesis |
| PSSI | Perceived social support inventory |
| PTG | Posttraumatic growth |
| PTGI | Posttraumatic growth inventory |
| *r* | Pearson's product-moment correlation coefficient |
| $R^2$ | The percentage of total variation explained by a variable or statistical model |
| RI | Rumination Inventory |
| *SD* | Standard deviation |
| *SE* | Standard error |
| *t* | Value of t-statistic |
| UK | United Kingdom |

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