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DEVELOPMENT OF A PSYCHOMETRIC MEASURE OF PHYSICAL POST TRAUMATIC GROWTH IN PROSTATE CANCER AND EVALUATION OF ITS ROLE IN PREDICTING PSYCHOLOGICAL ADJUSTMENT.

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Thesis submitted to the National University of Ireland, Galway in fulfilment of the requirements for the Degree of Doctor of Philosophy (Psychology)

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Abstract

Post traumatic growth (PTG) can be defined as positive change following a traumatic event (Tedeschi & Calhoun, 1995). The current conceptualisation of PTG encompasses five main dimensions: ‘perceived changes in self; developing closer relationships; changing life philosophy/increased existential awareness; changed priorities and enhanced spiritual beliefs’. However, there is no dimension which accounts for the distinct effect of a physical trauma on PTG.

The purpose of the present research was to develop a psychometric measure that acknowledges the role that physical trauma and the body have in post traumatic growth and, in so doing, give a more comprehensive picture of post traumatic reactions. Men with prostate cancer were chosen given that previous research focuses on breast cancer survivors. This sample allowed investigation into the extent to which older men may experience ‘physical post traumatic growth’ (i.e., how physical trauma uniquely impacts growth).

Qualitative interviews were conducted and analysed using thematic analysis. This resulted in four themes emerging, three of which related to the general prostate cancer survivorship experience (i.e., Resilience, Secrecy vs. Support and Acceptance), while one theme related to physical post traumatic growth (i.e., New Awareness). The theme ‘New Awareness’ informed the generation of items for the measure of physical post traumatic growth.

Exploratory and confirmatory factor analyses revealed two factors of physical post traumatic growth, namely, ‘Health Autonomy’ and ‘Health Awareness’. Reliability analyses and tests of validity were subsequently conducted. Internal reliability was excellent (90, 95%CI = .88 - .92), while construct validity was supported with significant correlations observed between physical post traumatic growth and mindfulness (r=0.20, p < .01) and post traumatic growth (r=0.42, p < .001), no significant correlation was observed between physical post
traumatic growth and body awareness. These findings offer further support for the psychometric soundness of the Physical Post Traumatic Growth Inventory (P-PTGI).

The P-PTGI was then used to evaluate the role of physical post traumatic growth in predicting adjustment using structural equation modelling (SEM). Physical post traumatic growth predicted lower distress and improvement of quality of life, whereas conversely, the traditional post traumatic growth measure was linked with poor adjustment. The relationship between resilience and adjustment was fully mediated by physical post traumatic growth and traditional post traumatic growth. Furthermore, mindfulness was found to moderate the relationship between physical post traumatic growth, post traumatic growth and quality of life.

In conclusion, the studies provide support for a new dimension of post traumatic growth following physical trauma and suggest the inclusion of physical trauma in future theoretical frameworks. Moreover, the hypothesised model has provided insight into the relationships between resilience, mindfulness, post traumatic growth and adjustment. This research also provides a valuable tool with good psychometric properties to measure physical post traumatic growth.
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Chapter 1

Prostate Cancer

1.1 Aims of chapter
This chapter aims to contextualise the current research by detailing the nature of prostate cancer and its treatment and the impact it has on psychological adjustment.

1.2 What is prostate cancer?
Prostate cancer occurs when the cells of the prostate gland grow in an abnormal way. There are three types of prostate cancer: localised prostate cancer, locally advanced prostate cancer and advanced prostate cancer. Each type of prostate cancer has potentially different treatment paths and prognoses. Localised prostate cancer is found within the prostate gland only; this can also be known as early prostate cancer. Locally advanced prostate cancer is a cancer which has spread to nearby tissues. Advanced prostate cancer is a cancer which has spread to other parts of the body through the bloodstream or lymph vessels. Prostate cancer commonly spreads to bones. It is not possible to cure advanced or metastatic prostate cancer but there are treatments available to help keep it under control (Irish Cancer Society, 2014).

1.3 Risk factors
The exact cause of prostate cancer is unknown. Research continues to study possible causes and risk factors. Age is a major risk factor for prostate cancer as the risk of prostate cancer increases with age. It is rare in men under the age of fifty. The cumulative risk of a man developing prostate cancer before the age of 50 is 1 in 485, before the age of 70 the risk is 1 in 13 (NCRI, 2014). Family history is also one of the main risk factors. If a first relative has been diagnosed with prostate cancer in the past, the risk of a positive diagnosis of prostate cancer is higher. Race is also a known risk factor for prostate cancer. African-American or Afro-Caribbean men are more at risk than other ethnic
groups. Lifestyle factors are also deemed to play a role. Factors such as weight, diet, smoking or exercise have been implicated as causal factors of prostate cancer but, as yet, no definitive evidence exists (NCRI, 2014).

1.4 Symptoms

Both prostate cancer and its treatment can cause urinary incontinence. Many men experience urinary dysfunction such as: trouble starting or stopping the flow of urine, passing urine more often, the feeling of not fully emptying your bladder after passing urine, pain or difficulty when passing urine and/ or the presence of blood in the urine. The options available to treat incontinence depend on the specific symptoms, how severe they are and the recovery trajectory. These include medications, catheters and surgery (Mayo Clinic, 2014).

Erectile dysfunction is linked to both prostate cancer and its treatment. Medications, vacuum devices and surgery are currently the available options to manage erectile dysfunction (Mayo Clinic, 2014).

Prostate cancer treatment side effects can be distressing for patients (Roth, Weinberg & Nelson, 2008). Certain treatments have more salient side effects in day to day living. In particular, hormone therapy can present side effects which are difficult to manage especially for patients who were otherwise asymptomatic. These include side effects ‘hot flashes, osteoporosis, anemia, fatigue, sarcopenia, gynecomastia, loss of libido, erectile dysfunction, risk of diabetes, risk of cardiovascular disease and fatal cardiac events and distress’ (Holzbeierlein, Castle & Thrasher, 2004, p.319). Recently, it has been suggested that hormone therapy also affects cognitive abilities (Holzbeierlein et al., 2004). Bone pain can also be a symptom experienced by some men.

1.5 Prevalence of prostate cancer in Ireland

Prostate cancer rates in Ireland are the highest in Europe and amongst the highest in the world. Irish men have a 1 in 8 chance of developing prostate cancer (NCRI, 2014). Prostate cancer is often a
slow growing cancer and symptoms may not occur for many years. Prostate cancer is estimated to be 90% curable if it is treated in its earliest stages (NCRI, 2014). The number of people with this cancer still alive in Ireland in 2011 was 23,981. There was a significant upward trend in prostate cancer of 9.1% annually between 1994 and 2004 and of 4.4% annually between 2004 and 2010. These models project that patient numbers will increase by 104% to 288% between 2010 and 2040, with proportionate increases in treatment rates (NCRI, 2014).

Currently University Hospital Galway is the largest Rapid Access Prostate Clinic. At the University Hospital Galway clinic, 551 transrectal ultrasound-guided prostate biopsies were carried out in 2010, of which 45% were positive. Median age was 66 years and median prostate specific antigen (PSA) was 8.36 ng/mL. Of the positive biopsies, 132 (53%) were intermediate or high-grade cancers. In terms of treatment, 29 patients (11.6%) opted for surgery, a lower percentage than in St Vincent’s University Hospital, Dublin, but similar numbers opted for hormonal treatment or watchful waiting. Over 50% of patients chose external beam radiotherapy or brachytherapy. The significant burden on the clinic in terms of population and geographical coverage has also been highlighted. In 2010, men from 11 different counties were biopsied at the clinic including all the Connacht counties as well as Limerick, Clare, Offaly, Westmeath, Longford and Donegal. This area covers a population of over 1.1 million people (Knowles, 2011). The high incidence as well as high grade cancers present on the western seaboard was also noted, with a 50% positive biopsy rate, and approximately 50% of those biopsies indicating intermediate or high-grade cancer (Knowles, 2011).

1.6 Screening for Prostate Cancer

Early screening is an important part of detection and treatment of prostate cancer. There are a number of ways for this screening. Presentation at the local doctor with symptoms related to possible prostate cancer is often how the process begins or as part of a general
check up depending on the patient’s age. The PSA test is a blood test used to measure the PSA level in blood. PSA is a protein made by the prostate gland that can be found in the bloodstream. Higher levels of this protein can indicate the presence of prostate cancer. At present, a normal result for the PSA is anything up to 4ng/mL. However, the rate which these proteins grow is important in terms of diagnosis and PSA levels should be compared regularly (Irish Cancer Society, 2014). A digital rectal exam (DRE) may also be carried out by a family doctor to feel the prostate.

Further tests can also be conducted in a hospital setting (e.g. a trans-rectal ultrasound scans [TRUS]). This type of scan is used to measure the size of the prostate. However, the transrectal needle biopsy of the prostate is still seen as the most accurate way to diagnose prostate cancer by taking tissues samples (Irish Cancer Society, 2014). The medical team then examine these samples for any cancer cells.

If tests indicate that prostate cancer is present, other tests are conducted to ascertain the extent of the cancer (i.e., bone scans, X-rays, CT and MRI scans). This process is called ‘staging’ and can help in deciding the most appropriate treatment for the patient. There are four stages. Stage one signifies very early cancer that is confined to a small area of the prostate and not considered aggressive. Stage two is where the cancer may be small but considered aggressive. Stage two can also mean that the cancer may be larger and involve both sides of the prostate gland. Stage three is spread beyond the prostate to the seminal vesicles or other nearby tissues. Stage four has invaded nearby organs, such as the bladder, or spread to lymph nodes, bones, lungs or other organs (Mayo Clinic, 2014).

Screening for prostate cancer in Ireland has improved greatly in recent years. In February 2010, the National Cancer Control Programme (NCCP) produced National Prostate Cancer Referral Guidelines for GPs which provided a much needed framework for the referral of men with potential prostate cancer (Irish Cancer Society, 2014). These criteria include age (between 50 and 70 years), PSA test
(two abnormal tests 6 weeks apart) or abnormal digital rectal examination (Knowles, 2011). Rapid Access clinics, which are another aspect of the NCCP initiative, provide a direct access to assessment and care from a urology team. The clinics are focused on dealing with potential prostate cancer cases immediately without patients needing to initially attend more general outpatient clinics. The rapid access clinics are currently operating in: Galway University Hospital, Beaumont Hospital, Dublin, St. James Hospital, Dublin, St. Vincent's University Hospital, Dublin, Mater University Hospital, Dublin, Cork University Hospital, Midwestern Regional Hospital Limerick and Waterford Regional Hospital.

1.7 Treatments for prostate cancer

Treatment of prostate cancer can vary. The choice of treatments is determined by many factors including the stage, grade and size of the tumour, the PSA level, individual age, general health, lifestyle, and likely side-effects of treatment (Irish Cancer Society, 2014). Methods to treat prostate cancer include: active surveillance, surgery, external beam radiotherapy, brachytherapy, hormone therapy and chemotherapy (Irish Cancer Society, 2014).

For early stage cancer, there are different options available. Much of the decision regarding treatment decisions is dependent on individual lifestyle choices. The primary treatment options are radical prostatectomy (total removal of the prostate gland), radiation therapy, and active surveillance. These treatment options all have differential outcomes in terms of sexual, urinary or bowel functioning (Roth et al., 2008).

Active surveillance can be an important step in dealing with prostate cancer. Due to the often slow growing nature of prostate cancer, some patients choose active surveillance as their ‘treatment option’. This involves regular check-ups with PSA tests, rectal exams and biopsies to monitor growth (Mayo Clinic, 2014). If these tests indicate that the cancer is growing then active treatments can begin if
the patient wishes. Active surveillance is often the decided course of action for older patients with significant co-morbidities, low-grade non-aggressive cancers, and with less than ten years life expectancy (Roth et al., 2008).

Surgery for prostate cancer is usually involves the complete removal of the prostate gland. This is known as a total or radical prostatectomy. This operation is the best course of action when the cancer is confined to within the prostate gland and the whole tumour can be removed (Mayo Clinic, 2014). The operation can be done by open surgery or keyhole surgery (laprascopically) or by using a robot. In men who are healthy enough for surgery, it has been traditionally considered the definitive treatment (Roth et al., 2008). A “nerve-sparing” surgery is the usually the first choice surgery as it has a decreased rate of complications including sexual and urinary functioning (Eastham, 2007).

External beam radiotherapy is a treatment where high-energy X-rays are focused on the cancer in order to remove the cancer. The aim is to destroy the cancer cells, while sparing cancer-free cells. This is known as radical radiotherapy (Irish Cancer Society, 2014). Brachytherapy is a form of radiation treatment for cancer that is confined to the prostate gland. Small radioactive seeds are planted in the tumour to release radiation over time (Irish Cancer Society, 2014). Depending on the size of the tumour, brachytherapy may be given with external radiotherapy. Radiation therapy may not impact on urinary functioning as much as other treatments. However, bowel dysfunction can be more prevalent depending on radiation technique and dosage (Eton & Lepore, 2002).

For more advanced disease, hormone therapy is often the treatment used. As prostate cancer growth depends on levels of testosterone hormone therapy aims to manipulate the level of testosterone in the body (Mayo Clinic, 2014). This can reduce the tumour and ease symptoms. Certain hormone therapies can stop your body from producing testosterone. Medications known as luteinizing
hormone-releasing hormone (LH-RH) agonists prevent the testicles from receiving messages to make testosterone (Mayo Clinic, 2014). Drugs typically used in this type of hormone therapy include leuprolide (Lupron, Eligard), goserelin (Zoladex), triptorelin (Trelstar) and histrelin (Vantas; Mayo Clinic, 2014). Medications that block testosterone from reaching cancer cells (anti-androgens) include bicalutamide (Casodex), flutamide, and nilutamide (Nilandron; Mayo Clinic, 2014). A surgical option for reducing levels of testosterone is the remove the testicles (orchiectomy). The effectiveness of orchiectomy is similar to hormone therapy; however it may act more quickly (Mayo Clinic, 2014).

Chemotherapeutic agents are used for more advanced tumors as palliative measures as it may improve quality of life with better control of symptoms (Roth et al., 2008).

1.8 Psychological impact of prostate cancer

Bloch et al. (2007) conducted a literature review of the psychological adjustment of men to prostate cancer. They reviewed cross sectional research and found that patients experience poor psychological adjustment in relation to treatment side effects. Longitudinal studies were also reviewed and these indicated that levels of depression and anxiety at the time of diagnosis were the greatest predictors of depression and anxiety at follow-up (Bloch et al., 2007). With regards to patterns of coping, in their meta-analysis, Roesch et al. (2005) found that active coping, as opposed to more avoidant coping, was most beneficial for adjustment. Curtis, Groarke & Sullivan (2014) found that low self efficacy and high general and cancer specific stress predicted poor mood.

Treatment decisions can be a major source of distress for prostate cancer patients, and often patients must choose between quantity of life rather than quality of life (Chen, Clark, Manola, & Talcott, 2007). This choice can lead to significant anxiety when making a
treatment decision. Anxiety is commonly experienced among men with prostate cancer (Roth et al., 1998).

In terms of distress related to treatment side effects, the association is clear between erectile dysfunction (ED) and depression. For instance, Shabsigh and colleagues (1998) found that the rate of depression was extremely high in men with ED (56%) and was significantly higher than for the control group (21%). Sometimes engaging in new forms of sexual experience is a reminder of changing roles and can sometimes lead to patients questioning how they had previously conceptualised their masculinity (Roth et al., 2008). Studies have found that males with erectile dysfunction reported less intimacy and had lower scores on measures of togetherness and tenderness (Muller, Ruof, Graf-Morgentern, Porst, & Benkert, 2001).

There are side effects of prostate cancer treatment related to urinary dysfunction. Urinal leaking, bowel accidents and the use of pads can be a difficult reality to confront for many prostate cancer patients. Indeed, urinary dysfunction has been rated as a greater source of distress than sexual dysfunction (Krahn et al., 2003). Urinary and bowel dysfunction can impede social activities and lead men to become isolated from social support networks and the community at large (Roth et al., 2008). Some aspects of these symptoms can be managed with pelvic muscle exercises, bladder training, medications, and in some cases artificial sphincter surgery (Mayo Clinic, 2014).

After treatment for prostate cancer or after a recurrence, many men become hypervigilant about their PSA tests. This PSA-related worry can lead to high levels of distress; however these have been demonstrated to be managed with education and support (Carlsson, Aus, Wessman & Hugossan, 2007).

Wootten et al. (2007) explored psychological adjustment among survivors of localised prostate cancer. The majority of patients reported relatively positive adjustment in most domains except sexual functioning. For those who reported on going psychological difficulty this was associated with sexual dysfunction, relationship adjustment,
threat appraisal, self efficacy appraisal and emotion-focused coping (Wootten et al., 2007). Lower levels of urinary dysfunction were associated with more problem focused coping. This study highlighted the importance of relationship adjustment, threat appraisal and coping style in prostate cancer survivors’ adjustment. Despite the challenges that this physical trauma poses to men with prostate cancer a growing literature indicates potential positive changes where individuals have continued to thrive and have found lasting positive outcomes subsequent to their experience of struggling with adversity (Hefferon, Grealy & Mutrie, 2009; Linley & Joseph, 2004).

1.9 Summary

Prostate cancer is one of the most common cancers diagnosed in men in Ireland. The number of risk factors for prostate cancer highlights the lack of knowledge as to how to effectively prevent development of the disease. With the creation of the National Cancer Control Programme, men have access to frontline services without delay. This has proven to be effective in the early detection of prostate cancer. A variety of useful treatments are available for men with prostate cancer including surgery, radiotherapy, active surveillance, chemotherapy and hormone therapy. Although these treatments can be effective, they can leave men with life long side effects with consequent impact for psychological adjustment.

Further research is needed to assess how physical trauma such as prostate cancer can facilitate positive change to fully reflect the broad range of post traumatic reactions to a physical illness.
Chapter 2

Theoretical Approaches to Post Traumatic Growth

2.1 Aims of chapter

This chapter introduces the concept of post traumatic growth (PTG). Historic conceptualisations of positive change following trauma will be examined, as well as current theoretical advances. The distinct role of physical trauma in PTG also known as corporeal PTG will be explored further under the term ‘physical post traumatic growth’. Methodological considerations and conceptual issues will also be addressed.

2.2 Positive Psychology and Health Psychology: A fitting union

The recent move to studying the positive aspects of health and well-being stems from the development and increased popularity of both positive psychology and health psychology. Diverging from the traditionally led pathological focus of psychology, these subdisciplines advocate for research with a focus on exploring health and wellness as much as pathology and illness (Bury 2005, p. 264). Positive psychology in particular, is concerned with topic areas such as happiness, positive affect, hope, optimism, resilience and post traumatic growth (Lopez & Snyder, 2011). The combination of positive psychology and health psychology affords the opportunity to examine positive change in diverse areas and among many cohorts. This combination places emphasis on the importance of the physical self and the role of the body in well-being. This is a central tenet of ‘positive health’, one of the pillar institutions mapped out by early positive psychology research.

2.3 Post traumatic growth

Post traumatic growth (PTG) can be defined as positive change following trauma (O’Leary & Ickovics, 1994). In the context of PTG a trauma is considered to be an event which disrupts worldview, where fundamental assumptions regarding life are altered or ‘shattered’
In the past it has been assumed that mainly negative outcomes arise from trauma. Research has focused on negative post traumatic stress reactions (e.g., post-traumatic stress disorder, depression, anxiety and distress. However, in recent years, trauma has been investigated more broadly including the possibility of positive post traumatic reactions such as growth and optimal functioning.

There is much research to suggest that PTG is present across a wide range of cohorts from breast cancer, heart disease and HIV to military combat (Joseph et al., 2005). The five main elements of growth, as posited by Tedeschi and Calhoun (1995, p. 5) in their widely used model of post traumatic growth are ‘perceived changes in self; developing closer relationships; changing life philosophy/increased existential awareness; changed priorities and enhanced spiritual beliefs’.

2.4 Past conceptualisations of positive change

Growth from trauma is historically a popular concept as early examples from the sociological and anthropological disciplines show (Frank, 2002). In the 1990s, the illness narrative literature began to focus on the idea of illness as a chance for self-development and transformation. Bury (1982) proposed that chronic illness was a disruptive event in which ‘the relations between body, mind and everyday life is threatened’ (Bury, 2001, p.264). This conceptualisation of chronic illness as an event which would disrupt existing worldviews has influenced the formation of theory in this area. The idea that chronic illness could have such an effect on all aspects of life and even facilitate an individual to not only survive but to thrive was a novel idea with considerable impact.

The most prominent illness narrative was that of Arthur Frank (Frank, 1995, 1998). Frank discussed these illness narratives in three groups: restitution, chaos and quest. The ‘restitution narrative’ involves the person exploring his or her experience of transitioning between
health and sickness while maintaining a goal of returning to the way they were pre illness. The ‘chaos narrative’ describes a clear sense of ‘life never getting any better’ (p. 97). This reflects the chaos of constructing life around an illness. Finally, in ‘the quest narrative’, which parallels the concept of growth from adversity, ‘quest stories meet suffering head on; they accept illness and seek to use it’ (p. 115).

The ‘quest narrative’ focuses on illness as the commencement of a journey, giving a sense of purpose to the patient. The ‘quest narrative’ played an important part in the development of post traumatic growth theory. There are three aspects to the quest narrative: memoir, manifesto and automythology. The ‘memoir’ is the individuals’ reflection and narration of their illness in conjunction with other areas of their life. ‘Manifesto’ quest narratives are focused on mass communication of suffering and illness experiences whereby there is a sense of responsibility for facilitating social change and advocacy.

Finally, the third type of quest narrative, ‘automythology’, represents the story of reinvention and rebirth following trauma and illness, ‘the phoenix, reinventing itself from the ashes of the fire of its own body’ (Frank, 1995, p. 122). Similar to the manifesto, the authomythology is preoccupied with strong stories of change and rebirth via suffering. These three areas are reflected in later PTG theory.

2.5 Earlier models of PTG

There are a number of main theoretical frameworks which consider the role of post traumatic growth.
Figure 2.1
*Early models of positive change following trauma.*
2.5.1 Shattered Assumptions Theory (Janoff-Bulman, 1992).

Janoff-Bulman (1992) claims that at the core of our inner world or personal narrative there are fundamental assumptions about our world. Trauma occurs when these assumptions or worldviews are tested and 'shattered'. This is a leading theory in the development of current PTG theory and has influenced research and theory in defining post traumatic growth as the process of rebuilding after a traumatic experience where one's worldviews were shattered. Janoff-Bulman (2004) further posits that there are three explanatory models of PTG: 1) strength through suffering, 2) psychological preparedness and 3) existential re-evaluation. The first of these, strength through suffering, is based on the belief that 'whatever does not kill us only makes us stronger' and supports the five domains of PTG as posited by Calhoun and Tedeschi (2006). The second model, psychological preparedness, states that by suffering, people can create a tolerance for future adversity (individual's becoming 'inoculated against stress'), whilst the third model, existential re-evaluation, states that trauma kickstarts existential re-evaluation and a quest for understanding the trauma. This third model has been supported by later research from Hefferon, Grealy & Mutrie (2009) on post traumatic growth following physical trauma and facing one's own mortality.

2.5.2 The Life Crisis and Personal Growth Model (Schaefer & Moos, 1992).

This model predicts that following a traumatic event, it is an individual's personal resources that determine his or her psychological outcomes. Schaefer & Moos (1992) suggest that the factors that determine positive outcomes post trauma, such as environmental and personal resources, shape the trauma experience and the post traumatic reaction. These resources influence the cognitive appraisal processes and coping responses which then impact the post traumatic reaction. All components of this model are connected through feedback loops. Although Schaefer and Moos (1992) have provided evidence to support their model, there are limitations in terms of their
neglect of post-trauma influences, suggesting that the ability to achieve growth is pre-determined. Given the lack of inclusion of post trauma influences, this model suggests that a person could resign themselves to poorer quality of life following trauma (Zoellner & Maercker, 2006).

2.5.3 Model of Chaos and Growth (Hager, 1992). Hager (1992) posits that chaos can create a pathway for development. Hager proposed that these chaotic states are valid stages in a process whereby the person is using chaos and disorganisation they experience to lead to self-development. Ultimately, Hager proposed that it was the therapist that had the most control over whether the person found meaning and growth from his or her ‘gestation state’ or whether they reverted back to baseline. Drawbacks of Hager’s theory are that it places an enormous amount of expectation upon the therapist, thus neglecting important social and cultural components of the process (i.e., social support, primary reference group and religion).

2.5.4 Dyadic Model of Resolution and Growth (Nerken, 1993). This model describes changes to the core-self and reflective-self following bereavement (Nerken, 1993). The core-self consists of the resources of identity. The reflective side however is the interpretive part of the self (Nerken, 1993) and responsible for meaning making. By working on and nurturing this reflective side, the individual is able to overcome the trauma (Nerken, 1993). Criticisms of this model include the intense reliance on the reflective-self and the omission of other influential components in the process of growth. This is inconsistent with the more developed theories of PTG as they posit that social and cultural factors have a large influence on the attainment of growth (Calhoun & Tedeschi, 2006).

2.5.5 The Model of Quantum Change (Miller & C'deBaca, 1994). This model focuses more on the process than the outcome of PTG. Trauma propels the person to a new level of functioning: lower functioning or higher functioning. Miller and C'deBaca (1994) propose that there are four potential components to facilitating this change following adversity: self-regulation, perceptual shift, value conflict and
transcendence. They suggest that a person may be able to consciously regulate his or her behaviour following a significant event. A quantum change can result from shattered worldviews or schemas which force the person to re-evaluate his or her life. Rapid change can result from the realisation of value conflict, which forces the person to change their behaviour more accordingly. Finally, quantum change can be the result of a belief in encountering a supernatural force or experience.

Criticisms of this model stem from difficulties in testability, predictability and its reliance on retrospective reporting. In addition, the four proposed mechanisms of quantum change have not been deconstructed in order to validate this model of change (O’Leary, Alday, & Ickovics, 1998).

2.5.6 The Transformational Coping Theory (Aldwin, 1994). Aldwin (1994) states that trauma can lead to a transformation of the self. Aldwin recognised the existence of both growth and distress. This is interesting given how research has grappled with the concept of both growth and distress co-existing following trauma. However, this dualistic presence of both growth and distress is in line with most recent qualitative work (Curtis, Groarke, McSharry & Kerin, 2014).

Aldwin (1994) cited three levels of functioning: negative transformational coping, homeostasis and positive transformational coping. Problems with Aldwin’s model arise from the fact that it was created through literature reviews of other researchers’ work and not on first-hand empirical evidence (O’Leary et al., 1998).

2.5.7 The Resilience and Thriving Model (O’Leary & Ickovics, 1994). O’Leary and Ickovics (1994) progress these models in that it explicitly mentions a form of optimal functioning post trauma-referred to as ‘thriving’. O’Leary and Ickovics (1994) mention survival, recovery and thriving in their model. Survival simply infers that the person is no longer functioning at his or her previous levels of performance. Recovery implies that the person has returned to their pre-trauma levels and obtained homeostasis. Thriving, however, implies surpassing the previous level. This model has had an enormous
impact on thriving and PTG research. Criticisms of this model refer to the fact that the population used to construct the model was solely female. However, similar limitations exist throughout this area given past research focus on breast cancer samples (Thornton & Perez, 2006). The researchers acknowledge that trauma and challenges will be perceived differently for each gender, creating potentially differential roads to thriving (O’Leary et al., 1998). Finally, the model outlines the potential outcomes of trauma, but not the intricate processes of how thriving occurs (O’Leary et al., 1998).

2.5.8 Extending early models of PTG. The above models have contributed to greater acknowledgement of the potential for positive change following trauma. However, the lack of focus on empirically testing these models and operationalising these concepts has lead to insufficient research regarding the process of post traumatic growth in early research. Later models of PTG are distinguished from earlier models as they seek to develop the processes and mechanisms involved in PTG. For instance, an important component of later models is cognitive processing.
2.6 Later models of PTG

Figure 2.2

*Later models of positive change following trauma.*
2.6.1 Cognitive Processing-an integral element of later PTG models. At the core of later PTG models is focus on cognitive processing as a contributing factor of PTG. Central aspects of cognitive processing hinge on whether individuals following a traumatic event attempt to assimilate the incident or whether they accommodate the incident into a new worldview. Individuals who assimilate the traumatic incident aim to bring the traumatic event into their existing schemas, thus not shattering their current worldview (e.g., bad things only happen to people that deserve it). This can lead to self blame and oftentimes to maladaptive coping strategies (Joseph & Linley, 2008).

Accommodation, on the other hand, modifies these pre-existing schemas in order to accommodate the new information. Accommodation can exist in two ways; positive or negative. Negative accommodation leaves a person susceptible to depression and helplessness, whereas positive accommodation leads to growth (Joseph & Linley, 2008). Later research suggests that a combination of both types of processing is possible (Zoellner & Maercker, 2004; Park, 2010).

Calhoun and Tedeschi (2006) suggest that the construct of rumination, described in terms of deliberate and intrusive cognitive processing, may be the key to facilitating PTG. Deliberate cognitive processing is characterised as something an individual has decided to engage in. This stems from Martin and Tesser’s (1996) conceptualisation of cognitive processing, which includes making sense (e.g., making sense of the trauma or loss, coming up with an acceptable explanation) and problem solving. Calhoun and Tedeschi (2006) suggest that, although intrusive and deliberate cognitive processing usually co-occur, cognitive processing in the immediate aftermath of trauma is mainly intrusive. While more purposeful cognitive processing (i.e., deliberate cognitive processing) is more prevalent in the later stages of PTG development (Calhoun & Tedeschi, 2006) and
are proposed to rebuild the individual’s general understanding of the world.

Calhoun and Tedeschi (2006) also emphasise the role of ‘comprehensibility’ and ‘manageability’. Comprehensibility focuses on the individual trying to make sense of the situation. With emerging comprehensibility comes a better chance at manageability. These two aspects of cognitive engagement with trauma are akin to the primary and secondary appraisals described by Lazarus and Folkman (Calhoun & Tedeschi, 2006) and are not immediate. Finding meaning is also considered an important aspect of cognitive engagement. It is this final and more reflective element that Calhoun and Tedeschi (2006) suggest can yield PTG. This is supported by Janoff-bulman and Frantz (1997) who posit that initial efforts at making meaning and re-establishing a ‘sense of comprehensibility’ later shift to greater questions of personal significance and value contributing even further to growth and adjustment.

In a meta-analysis, Helgeson, Reynolds, and Tomich (2006) demonstrated that higher levels of intrusive rumination are associated with post traumatic growth. There are many potential reasons for this such as on-going cognitive processing. Stockton, Hunt, and Joseph (2011) highlight how certain types of cognitive processing may be more or less beneficial to trauma survivors. Certain sub-types of intrusive thinking are more conducive to facilitate the processing of trauma, while other sub-types may impede processing (Siegle, Moore, & Thase, 2004).

Studies on rumination have shed further light on these various sub-types by distinguishing between ‘brooding’ and ‘reflective pondering’ (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Brooding is characterised by a focus on the causes and consequences of negative emotions or experiences while reflective pondering describes an individual’s attempt to self evaluate and engage in constructive problem solving (Stockton et al., 2011). In a study by Stockton et al., (2011) it was found that ruminative brooding is negatively associated with PTG,
and that reflective pondering is positively associated with PTG when brooding is statistically controlled.

Cognitive processing and its various elements are at the core of the following later models of PTG. These later models seek to offer a more extensive view of the process of PTG and thus incorporate more of an emphasis on social, cultural, environmental and even an evolutionary approach to positive change following trauma.

2.6.2 Transformational model of Growth (Tedeschi & Calhoun, 1995, 2004). This transformational model proposes that PTG results from cognitive processing following a traumatic event. Following the traumatic event, the person is presented with challenges (management of emotional distress, beliefs and goals and narrative). The next stage is the management of cognitive processing/excessive rumination in three stages: 1) automatic and intrusive thoughts; 2) management of automatic and intrusive thoughts and 3) deliberate rumination. Throughout this period, the person is also engaging in self-disclosure; attempting to reduce emotional distress; disengaging from previous goals and changing schemas and narrative development. These are crucial aspects of how this model conceptualises the process of how individuals may come to experience post traumatic growth.

An important advance of this model is how Tedeschi and Calhoun incorporate many facets such as the characteristics of the person and of the challenging circumstances. The Transformational Model (Tedeschi & Calhoun, 1995) is currently the most widely used model of growth. It is mutli-faceted and includes both distal and proximal predictors of PTG. Distal factors are factors such as a person’s pre-trauma characteristics, while proximate factors include rumination, schema change, narrative development and enduring distress. The model explicitly acknowledges that distress can co-exist alongside PTG and this is an important aspect of the model (Calhoun & Tedeschi, 2006).
2.6.3 Biopsychosocial-Evolutionary theory (Christopher, 2004). Christopher (2004) offers a biopsychosocial evolutionary view of post traumatic reactions. This is an important perspective as it provides a platform for understanding growth following trauma in a broader context. Christopher argues that the normal trauma response is better understood as ‘an evolutionarily inherited mechanism for meta-learning, which shatters and reconstitutes the meta-schema (i.e., concepts of self, society, and nature), in which learning normally takes place’ (Christopher, 2004, p. 76). The inherent assumption of this model is that this process is simultaneously biological, psychological, and social. Christopher (2004) claims that research conclusively supports the notion that the normal outcome of traumatic stress is growth rather than pathology.

Later theories such as those from Joseph & Linley (2005) have built upon this premise. The difference between regular stress responses and the pathological stress responses seems to be determined by three categories of factors needed to turn stress into adaptation and development: 1) whether the organism is sufficiently biologically healthy to make use of the resources available to it; 2) whether the cognitive schema are available to transform stress and anxiety into learning, meaning, and adaptive behaviour; and 3) whether social relationships are complex, responsive, and flexible enough to adequately buffer against stress arousal.

2.6.3 The Organismic Valuing Theory (Joseph & Linley, 2005). This theory stems from a person-centred approach and states that all humans are oriented towards growth “there is an innate, biological need to reproduce, self-regulate and grow from trauma” (Joseph & Linley, 2005, p. 269). Joseph and Linley (2005) propose that there are three steps in the transition to become a fully functioning or self-actualised person. They posit that obstacles to attaining growth include the person’s social environment but not necessarily his or her pre- or post-trauma personality. The completion tendency is an element
of the model which states that the person is required to incorporate the trauma into his or her world view via accommodation or assimilation. The oraganismic valuing theory (OV theory) hypothesises that people are intrinsically motivated toward positive accommodation; however certain environments and resources may impact this intrinsic motivation.

This model attempts to clarify the cognitive processes following trauma (assimilation, positive accommodation and negative accommodation). By separating this cognitive processing into these three possible directions, Joseph and Linley (2008) have attempted to explain how some people can become more vulnerable and not resilient in the aftermath of crisis. They suggest that by assimilating the trauma into their cognitive functioning, some people return to baseline with feelings of being more vulnerable to future traumas. The model also accepts that a person can experience both accommodation and assimilation in varying aspects of their worldview. Later research has attributed this to temporal factors.

The kernel aspect of this model and the biopsychosocial-evolutionary theory is that people are actually motivated towards growth. There is mention of some genetic or physiological reasoning for growth in terms of the innate drive of organisms toward the active pursuit of fulfilment and well-being (e.g., reproduction, growth, self-regulation, and agency). However, Joseph and Linley omit the inclusion of the body as part of the process of growth which is not a criticism exclusive to their model, but to all models within the current literature (Sabiston, McDonough, & Crocker, 2007).

2.6.4 Affective Cognitive Processing Model (Joseph, Murphy & Regel, 2012b). Joseph et al. (2012b) have since extended their work on the OV theory to a model of affective cognitive processing. The affective cognitive processing model is the most recent model of PTG. Joseph, Williams, and Yule’s (1997) psychosocial framework is based on
three theoretical principles: 1) subjective appraisal processes are the core of post-traumatic stress reactions 2) that post-traumatic stress merely illustrates the need for cognitive processing and that this potential distress signifies a natural process following trauma; and 3) that personality, social and psychological factors influence the speed and depth of the cognitive processing (Joseph & Williams, 2005). Joseph et al. (2012b) propose that this model is consistent with PTG theory. They suggest that following the shattering of an individual’s basic pre-trauma assumptions, their schemas are rebuilt but in light of appraisal processes (Joseph & Williams, 2005). The affective–cognitive processing occurs via the iterative process of event cognitions appraisal, emotional state, and coping as previously held worldviews are reconstructed to acknowledge the new trauma-related information. Consistent with OV theory, it is proposed that people are intrinsically motivated to move towards ‘growthful outcomes’.

Affective–cognitive processing begins with the presence of intrusive thoughts. These intrusive thoughts begin a cycle, as they themselves become the subject of deliberate cognitive appraisal. This cognitive appraisal activity can lead to changes in negative or positive emotional states and general affectivity. These emotional states and general affectivity lead to a variety of coping strategies. Coping strategies are an important aspect of understanding the growth process. There are several studies that indicate that both problem-focused and emotion-focused coping strategies are related to growth (Bellizzi & Blank, 2006; Kennedy et al., 2000; Pollard & Kennedy, 2007). Joseph et al. (2012) propose that this feedback cycle of appraisal, emotional states and coping continues indefinitely as the individual is motivated to affectively process the experience. The very process of coping with trauma can become the subject of cognitive appraisal and even lead an individual to assess and appraise how they are coping with the trauma itself.
The speed and depth of processing is influenced by social and environmental factors that determine the type of event cognitions and the coping strategies used. Types of cognitive processing or more specifically, types of rumination, such as brooding and pondering are dependent on the coping strategies and emotional states of the individual. Reflective pondering facilitates the individual to resolve discrepancies between new trauma-related information and previously held worldviews (Stockton et al., 2011).

2.7 Two-component models of post traumatic growth

2.7.1 The Janus Face Model (Zoellner & Maercker, 2006).

This model proposes a two-component approach to the phenomenon of PTG. Within this model PTG is considered to have a functional or constructive side, consistent with Tedeschi and Calhoun (1995) but also an illusory aspect whereby the individual perceives growth as a coping mechanism for dealing with the trauma. This illusory side of posttraumatic growth has been examined by Taylor and colleagues (Taylor & Brown, 1994; Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000) who used the term 'positive illusions'. The Janus face model posits that these two sides (constructive and illusory) have differential outcomes on adjustment and are more prevalent at different stages following trauma. These two ‘faces’ or sides of PTG are assumed to represent co-existing components.

Past research in the field of post traumatic growth has placed a larger emphasis on the constructive side of PTG whereby the growth experienced is deemed to be more than a coping strategy. Zoellner and Maercker (2006) suggest the one-sided conceptualisation of PTG as functional may not present the most accurate picture of the PTG process. A strength of the current model is that it recognises that perceptions of growth may be potentially used to manage the distress and other negative post traumatic reactions (for similar ideas see also Taylor, 1983; Taylor & Armor, 1996). The constructive side of perceived growth has been correlated with healthy adjustment. In
contrast, the illusory side of PTG (or PTG as solely a coping strategy) may be correlated with unsuccessful/incomplete cognitive processing following a traumatic event and even with denial (Zoellner & Maercker, 2006). However, it has been suggested by Zoellner and Maercker (2006) that this illusory aspect of PTG may also co-exist with deliberate thinking and sense making following trauma. Once the illusory side of the PTG process does not impede active coping efforts, then, it may act as a short-term adaptive coping strategy. This illusory component (acting as an initial coping strategy) would then decrease over time while the constructive side of PTG increases (Zoellner & Maercker, 2006).

The two-component model (Zoellner & Maercker, 2006) may clarify the role that post traumatic growth has to play in adjustment over time. This model may explain how longitudinal studies on PTG usually show positive relationships with psychological adjustment whereas the findings in cross-sectional studies are less definitive. In longitudinal studies, the constructive side of PTG may have manifested itself explaining any long-term adaptive effects.

2.7.2 Meaning Making Model (Park, 2010). Many of the core elements of the previous models could be viewed as aspects of a wider framework known as the ‘meaning making model’ (Park, 2010). This model provides a wider context and theoretical framework which integrates both earlier and more recent research on positive change. Park (2010) ties together much of the existing research by summarising the aspects where there is wide consensus and has identified six points which she suggests address the core assumptions of positive change following trauma. These core assumptions are: 1) people possess a cognitive framework from which to interpret their experiences; 2) when faced with events which do not coincide with existing worldviews, individuals evaluate those situations and assign meaning; 3) the extent to which the appraised meaning varies from the individual’s existing worldview determines the degree to which they experience distress; 4) the distress caused by the discrepancy between
this new trauma related information and the individual’s existing worldviews initiates a process of meaning making; 5) through this process of meaning-making, individuals attempt to align this new information with their past worldviews (i.e. reduce the discrepancy between appraised and global meaning); and 6) this meaning making process leads to better adjustment to the stressful event (Park, 2010).

The main components of the meaning making model are global and situational meaning. Global meaning refers to the core schemas (Janoff-Bulman & Frantz, 1997). Global meaning is thought to develop early in life and is supplemented by personal experience (Austin & Vancouver, 1996). Situational meaning encapsulates meaning but in more specific contexts. It can refer to potentially ongoing processes and outcomes (e.g., appraised meanings, but also the evaluation of the discrepancies between this appraised meaning and the global meaning; Park, 2010).

Following trauma, individuals determine the discrepancy between that appraised meaning and their global meaning. Perceptions of discrepancy are thought to create the distress that drives meaning making efforts (Carver & Scheier, 1998; Dalgeish, 2004). The meaning making model posits that the aftermath of processing trauma involves reducing the discrepancy using assimilation and accommodation. Some theorists have proposed that assimilation is more common and that global beliefs change only when individuals are confronted with new trauma related information too discrepant that it could not be assimilated into their existing global meaning (Janoff-Bulman, 1992). However, others have proposed that accommodation might be relatively common and perhaps more advantageous, particularly when individuals face major and irreversible stressors. Accommodation allows reorientation to other goals which may be more in line with the individual’s post trauma context and thus may promote better adjustment (Wrosch, Scheier, Carver, & Schulz, 2003). Assimilation and accommodation often seem to co-occur (Block, 1982) and this is also
highlighted by Joseph, Murphy and Regel (2012b) in the Affective Cognitive processing model.

'Meanings made’ refers to the products of meaning-making processes, many of which could be referred to as growth outcomes (Park, 2010). Many different meanings can be made: comprehensibility, acceptance, re-appraisals and causal understanding, perceptions of positive change, transformed identity, altered global beliefs and goals, new sense of meaning in life (Park, 2010).

2.8 How does physical trauma affect PTG?

From previous models it can be seen that proximal factors (i.e., personality) play a role in the development of PTG. However, current PTG theories have not yet considered the role of physical trauma and the role of the body in the development of a distinct PTG experience. This is surprising as much of the current research investigating PTG is in the context of physical trauma such as cancer. Calhoun and Tedeschi (2006) have acknowledged that PTG research needs a closer focus on PTG in mortality salient environments such as illness and other physical related traumas (e.g., car accidents). This is an advance for the field as research has been criticised for lack of attention it allocates to the influences of the body on many psychological processes (Stam, 1998). Physical trauma can create an entirely different adjustment framework due the potential impact on an individual’s self-identity (Gilboa, 2001). For example, the impairment of usual bodily functioning following cancer diagnosis (e.g., increased fatigue, weight gain, hair loss, steady attack on the body by the body) should, therefore, have a unique and different impact on a person’s post traumatic reaction (Hefferon, 2012; Hefferon, Grealy & Mutrie, 2009).

While current post traumatic growth theory recognises that trauma survivors will confront their own mortality and may cultivate greater existential awareness (Calhoun & Tedeschi, 2006), it does not consider the lasting effects of a physical trauma on the development
and trajectory of post traumatic growth. Cozzolino, Staples, Meyers, and Samboceti (2004) support that to gain a full understanding of the broad range of post traumatic reactions, future research should concentrate on how specific traumas can increase a person’s awareness of his or her own mortality and how awareness affects the growth process.

Awareness of your own mortality or ‘mortality salience’ directly link to Frank’s (1998) area of research, which posits that we can only know the world through our bodies. This suggests that each individual has an embodied perspective of the world that is unique to them.

Mortality salience is a prominent component of Terror Management Theory (TMT). TMT suggests that there is an innate, biological need to survive and deals with the management of the evolutionary cognitive realisation of mortality (Pyszczynski, Greenberg, & Goldenberg, 2002). TMT posits that the way in which humans deal with this realisation is through the use of “a dual-component cultural anxiety buffer consisting of a) cultural aspects and b) self-esteem, which is acquired by believing that one is living up to these standards of value inherent in one’s own cultural worldview” (Pyszczynski, Greenberg, & Solomon, 1999, p. 836). The Mortality Salience hypothesis suggests that when individuals are confronted with their own mortality, their worldview defence strengthens and they seek to conform to the accepted beliefs and behaviours of their culture (Harmon-Jones et al., 1997). This has implications following a physical trauma. The reminder of a person’s close encounter with death (e.g., physical changes such as scars) may create a mortality salient environment. According to Pyszczynski et al. (1999), survivors utilize proximal defences and distraction to defend them from death-related reminders.

The mortality salience hypothesis highlights the important role of the physical self in the experience of trauma. PTG theory has been criticised for neglecting to further investigate the role which mortality salient environments may play in the development of post traumatic growth (Lykins, Segerstrom, Averill, Evans, & Kemeny, 2007).
2.9 A possible new dimension of PTG?

There has been an increased interest in the unique and important role of physical trauma as a distinct aspect in the trajectory of positive change. Research suggests that there are exclusive elements to PTG following a physical trauma. This has particularly been examined in the qualitative literature. The unique impact of physical trauma on growth was first investigated in 2009 through a qualitative meta-synthesis where 57 qualitative articles exploring life threatening physical illness were collated (Hefferon et al., 2009). This collation led to a new perspective on findings in the area of post traumatic growth. Findings supported previously undocumented aspects of positive change directly related to physical trauma. The theme ‘a new awareness of the body’ was present across various cohorts included in the meta-synthesis. Findings suggested that diagnosis of a physical illness heightened the connection to and awareness of the physical self and physical identity (Hefferon et al., 2009). Some participants found that it was the process of overcoming their physical trauma that acted as a springboard to a greater level of functioning and their experience of PTG. Salick and Auerbach (2006) found that the ‘reclaiming of the physical body’ was a vital component to the growth process. This ‘reclaiming’ of the physical self centred on breast cancer survivors regaining feelings of physical power and strength. Participants began to take more responsibility for their own health as they researched their own illness in order to better understand the changes their body was experiencing (Manuel et al., 2007; Milne, Guilfoyle, Gordon, Wallman, & Courneya, 2007; Tandon & Mehrotra, 2007). Respondents in a study by Paterson et al. (1999) discussed how illness-related trauma forced them to take greater control of their own health. This sense of greater control and responsibility included ‘listening to the body’ and ‘monitoring’ one’s own health status.

Several studies have reported the improvement of health behaviours following the diagnosis of illness (Arman, Rehnsfeldt,
Physical activity has been noted as a buffer against anxiety and distress while also having a positive effect on the maintenance of physical functioning (Pakenham, 2007). In addition to adopting improved health behaviours following diagnosis of an illness, a reduction in risky behaviours has also been reported, including decreases in drug, alcohol, and tobacco use as well as risky sexual practices (Affleck, Tennen, Croog, & Levine, 1987; Coward & Kahn, 2005; Gotay, Holup, & Muraoka, 2002). Heiland et al. (2002) also found a reduced rate of risk behaviours (risky sexual practices, substance abuse) and positive health behaviour change.

Further qualitative work extending these findings was conducted with a cohort of breast cancer survivors (Hefferon et al., 2010). The study found that the role of the body was deemed to be a fundamental part in the process and outcomes of PTG including themes such as fear of changed body post treatment, negative effects of chemotherapy on the body (fatigue, loss of desire), and reconnection with body. This ‘reconnection with the body’ in particular emphasises the findings from the synthesis conducted by Hefferon et al. (2009) where studies cited physical rejuvenation following illness (i.e., cocoon to butterfly), increased levels of body awareness (i.e., listening to the body), monitoring the body (i.e., using the body as a ‘barometer’ to check personal health status), improved health behaviours and a greater sense of responsibility for personal health. Hefferon et al. (2009) found that participants perceived their physical self as a core component of their identity and that the physical aspects of their trauma played an important role in their experience of change following physical illness. Therefore, future research should investigate the neglected role of the body as a key feature in the PTG process.

Mutrie et al. (2007) also discussed how a group exercise programme for women being treated for early stage breast cancer, endured the physical trauma of treatment for breast cancer and overcame the negative physical experiences of these traumas. Many felt
they had a new strength and appreciation for their physical functioning. This contributed to a greater awareness and renewed connection with the body (Hefferon, Grealy & Mutrie, 2010). Inman and Ogden (2011) found that participants who had experienced a range of traumas described a sense of mortality, reflected in a feeling that life was fragile, which had offered them opportunity to make changes across a number of life domains. In another qualitative study, Dahan and Auerbach (2006) found the experience of ‘physical rebirth’ to be a prevalent component of participants’ journey. This rejuvenation or recovery was seen as a key part of the journey to psychological growth post cancer (multiple myeloma patients treated with a peripheral blood stem cell transplant). Heightened awareness of the body is increasingly being recognised as an outcome reported following physical illness (Fatone, Moadel, Foley, Fleming, & Jandorf, 2007). Participants can become more aware of their health while re-evaluating their lifestyle and implement health-related behaviour changes. Paterson, Thorne, Crawford and Tarko (1999) reported similar findings in a small sample of 22 patients with diabetes.

With regards to the broader picture of PTG, there appears to be support for models of growth which include unique aspects of physical trauma in PTG. Sabiston et al. (2007) proposed a reconfiguration of the PTG model for their participants’ experience of cancer, to include physical elements of the process of growth. The increased physical competency and strength reported is indicative of the concept of physical thriving. Recent research has coined the term ‘corporeal post traumatic growth’ as a dimension of post traumatic growth following physical illness (Hefferon, 2012). Corporeal post traumatic growth is a “new addition of a more embodied perception of PTG, which dictates that as embodied individuals, any trauma caused unto or within the body will entail a different reconstruction and journey to PTG than other types of trauma (e.g., caused by an external transgressor)” (Hefferon, 2012, p.1241). Corporeal post traumatic growth has been
conceptualised in this thesis as ‘physical post traumatic growth’. The development of research into physical traumas and their unique growth outcomes has created an impetus to extend the current models of PTG to include physical post traumatic growth as an active contributor and facilitator of growth post trauma.

2.10 Remaining conceptual and methodological issues in the field

Much debate has focused on the extent to which ‘actual’ growth correlates with perceptions of growth (Frazier et al., 2009) and whether this positive change is ‘real’ or ‘illusory’. Theoretical approaches to PTG vary. Distinguishing between those models that emphasise an unintentional change, where positive growth is the unexpected outcome of struggling with adversity (functional/‘real change’), from those that conceptualise positive change following trauma as a coping strategy (illusionary) is a key area for future research to clarify. However it has been acknowledged that such differentiation may only be for ontological purposes (Sumalla, Ochoa, & Blanco, 2009).

Tedeschi and Calhoun (2004) consider the impact on identity as a key element in this debate of ‘true growth’. The models that link PTG to a core identity transformation argue that this positive change occurs at the level of basic schemas and worldviews (Janoff-Bulman, 1992). For those that view PTG as solely illusory, PTG is seen as a means of coping following trauma suggesting it is nothing more than a survivor's attribution process (Ford, Tennen, & Albert, 2008). It has been posited that it is a person's attempts to gain a sense of control over his or her circumstances by altering their perceptions (Ford et al., 2008). Tenman and Affleck (2002) have argued that the nature of positive change and gains have distracted from many other core issues. Calhoun and Tedeschi (2006) have suggested that the establishment of the true nature of positive growth may not be possible, but also not particularly important as ‘perceptions of growth, regardless of any grounding of
those perceptions in reality’ impact on psychological and physical well-being.

Past research has attempted to demonstrate the validity of growth in several ways, including methods of triangulation, examining changes in personal and environmental resources across time and assessing adjustment as a proxy of PTG (Calhoun & Tedeschi, 2006). Frazier et al. (2009) also sought to address this issue of the validity of growth through a longitudinal survey which compared actual changes with perceived changes finding only a weak correlation. Further exploration of post traumatic growth and post traumatic growth following physical trauma is needed to form an inclusive representation of post traumatic reactions and to extend existing theory of post traumatic growth, particularly in relation to psychological and health related outcomes.
Chapter 3

Post traumatic growth following physical trauma: Relationships with psychological and health related outcomes

3.1 Aims of chapter

The current chapter outlines variables theoretically related to post traumatic growth and physical post traumatic growth following physical trauma (i.e., prostate cancer). These variables include resilience, distress, mindfulness, body awareness, health behaviours and quality of life following prostate cancer. Hypotheses are presented on the relationships between these variables and all forms of post traumatic growth. These will be tested in Study Three using structural equation modelling. Methodological issues are also examined.

3.2 Rationale

As post traumatic reactions following physical trauma may be distinct from traumatic reactions following a psychological trauma alone, a revision of the existing model of post traumatic growth is required, for example, incorporating the influence of the type of trauma on the growth trajectory. Despite the proliferation of research into post traumatic growth in recent years, a more thorough understanding of the dimensionality of post traumatic growth is needed. Measuring physical and health changes in post traumatic growth would extend analysis of the post traumatic reaction. Therefore, it is vital to explore constructs with possible direct and indirect relationships with post traumatic growth following physical trauma and to assess the current measures of post traumatic growth to offer a more thorough picture of PTG across various settings.

3.3 Post traumatic growth and prostate cancer

As the incidence of prostate cancer is rising in Ireland (NCRI, 2014), life after prostate cancer, in particular, adjustment and growth need to be further explored. As outlined in Chapter One, prostate cancer
survivors are living longer (Remzi, Waldert, & Djavan, 2004) to the extent that prostate cancer and its side effects are likened to a chronic condition for many survivors. Even with the knowledge of prevalence rate and number of prostate cancer survivors, there is a shortage of research on the psychological impact of prostate cancer diagnosis, treatment and survivorship. In Ireland, the five-year relative survival rates for those diagnosed between 1994 and 2001 was 69.5% for prostate cancer (NCRI, 2014). Despite this, specific support is not provided for cancer survivors who are post medical treatment, it is left to the individual, his or her family and volunteer organisations (Ivers, Dooley, & Bates, 2012). There are no standardised national services with the specific responsibility of helping survivors adjust and cope with any long-term physical or mental effects of the disease or its treatment. There is also no support to help maximise quality of life and reduce future health risks (Ivers et al., 2012).

Cancer survivors report that cancer can elicit symptoms of both distress and growth. Although some individuals experience PTSD symptoms, reporting of sub-clinical levels of traumatic symptomatology is more common. These symptoms include intrusive rumination, avoidance behaviours, and hyper-vigilance following treatment (Jim & Jacobsen, 2008). Despite this, accounts of positive change following cancer diagnosis and treatment are oftentimes reported (Hefferon et al, 2009; Cordova et al., 2001). Prostate cancer is a common cancer, yet there is little research into prostate cancer and survivorship.

Cross-sectional studies have investigated the most distressing or traumatic symptoms following prostate cancer treatment. These studies have found that patients reported more distress in relation to sexual, urinary and bowel functioning, as measured by the ‘bother’ component of the UCLA Prostate Cancer Index (Bacon, Giovannucci, Testa, Glass, & Kawachi, 2002). As these are directly related to the body and bodily functions, the unique role of the physical self should be considered in relation to adjustment and growth.
Thornton and Perez (2006) suggest that PTG may be relevant for men recovering from prostate cancer. Investigating PTG in prostate cancer survivors provides an opportunity to explore the extent to which older, male cancer survivors report PTG and physical PTG (Thornton & Perez, 2006).

3.4 Post traumatic growth and resilience

There has been conflicting research finding with regard to the relationship between post traumatic growth and resilience. Currently, there are three different dimensions encapsulated in the term ‘resilience’. Recovery, which includes elasticity and recovery to pre-stress levels (Bonanno, 2004); resistance, which indicates that the individual is undisturbed following trauma; and reconfiguration, which has been compared with post traumatic growth in the literature. Reconfiguration has been conceptualised as the ability to come back from difficulty strengthened and more resourceful (Walsh, 1998). Individuals have been cited as exhibiting this type of resilience when they are able to reconfigure their cognitions, beliefs, and behaviours, which allows them to adapt to traumatic experiences and withstand future traumas. Lepore and Revenson (2006) have explored how resilience is the product of interactions between risk and protective factors both internally and externally. Theoretically, this is akin to post traumatic growth. However, debate surrounds whether or not post traumatic growth is a form of resilience, with post traumatic growth often argued as ‘superior’ in terms of adjustment compared to resilience (Lepore & Revenson, 2006; Tedeschi & Calhoun, 1995; Westphal & Bonanno, 2007).

Given the salutogenic perspectives of both post traumatic growth and resilience, it may be reasonable to expect a correlation between these post traumatic reactions. Janoff-Bulman (2006) proposed three kinds of post traumatic growth processes which could be equated to resilience: strength through suffering, existential re-evaluation, and psychological preparedness. Psychological
preparedness in particular is similar conceptually as it involves rebuilding an assumptive world to withstand future shocks to the system and strengthening the self will produce confidence in facing further difficulties (Calhoun, Cann, & Tedeschi, 2010).

However, Tedeschi and Calhoun (2004) have suggested that PTG is distinct from resilience, arguing that PTG is transformative, whereas resilience is not. Further, Tedeschi and Calhoun (1995) suggested that individuals who are resilient may be the least likely to experience transformation, particularly PTG, because the traumatic experience may be less challenging to resilient individuals who, therefore, are less likely to engage in meaning making behaviours (Bonanno, Wortman, & Nesse, 2004) and in the extensive cognitive processing associated with growth. Given that cognitive processing is the most essential element in the model of PTG, it has been argued that perhaps resilience may not facilitate post traumatic growth (Westphal & Bonanno, 2007).

Although Calhoun and Tedeschi (2006) have suggested that individuals who are resilient may resist threats to world views, interestingly they have also suggested that levels of resilience may be enhanced because of post traumatic growth. A potential factor in the relationship between PTG and resilience is the timing of the event and the length of time following the event. Resilience and PTG may be negatively related early on in the aftermath of trauma, but positively related after processing of the trauma into a growth experience. In their theoretical model of PTG, resilience and preparedness are predicted to be outcomes of PTG (Calhoun & Tedeschi, 2006) which indicates a time lapse and ongoing processing.

An example of this potential inverse relationship is a study conducted with Israeli adolescents exposed to terror (N = 2908), and citizens and army personnel following the second Lebanon War (N = 588). This study found that higher levels of resilience were in fact correlated with the lower levels of post traumatic growth (Levine, Laufer, Stein, Hamama-Raz, & Solomon, 2009). The results in this study imply that, although growth and resilience are both salutogenic.
constructs, they are inversely related, however, Levine et al. (2009) have defined resilience as simply a lack of PTSD in this study. It is unclear whether this trend extends to other severe traumatic events or adult samples. This is relevant because children and adults may differ in the abstract thinking abilities necessary for post traumatic growth (Helgeson et al., 2006).

3.5 PTG and distress

Post traumatic growth has been viewed as a form of cognitive adaptation in response to cancer diagnosis that can give meaning and act as a buffer against distress in breast cancer survivors (Helgeson et al., 2006). Investigations have reported that after severe life-threatening illness patients may develop growth and benefits but, at the same time, they may still experience depressive symptoms or anxiety disorders. The literature concerning the relation between PTG and mental health appears to be inconsistent (Helgeson et al., 2006). While some studies did not find any relations between PTG and distress (Morris & Shakespeare-Finch, 2011), others concluded that PTG was associated with lower levels of distress (Helgeson et al., 2006).

Further investigations suggested that the greater the distress people experienced following cancer, the higher the PTG (Bellizzi et al., 2010; Sears, Stanton, & Danoff-Burg, 2003). Helgeson et al. (2006), in a meta-analysis, found that PTG was associated with more positive well-being and less depression, but that it was unrelated to measures of quality of life, global distress, anxiety, and reports of physical health. The moderators of the relationship between PTG and health outcomes were: time since traumatic event and, only partially, the nature of the traumatic event (health stressors/personal trauma). PTG has been related to reduced levels of distress for health stressors. In a longitudinal study by Frazier, Conlon and Glaser (2001) survivors of sexual assault were assessed at two time points post assault. Frazier et al. (2001) found that depression and PTG were negatively correlated cross-sectionally. In addition, those who expressed some positive
changes from time 1 to time 2 were significantly less depressed 12 months post-assault.

Recently, structural equation modelling has been used to identify factors that are associated with PTG, in particular to assess the relationships between perception of diagnosis severity, rumination, social support, distress, and PTG (Morris & Shakespeare-Finch, 2011). Trauma severity was found to be directly related to greater distress, but not to PTG. Deliberately ruminating on benefits and reflecting on social support resources was directly related to PTG, while intrusive rumination was related to greater distress. This model highlighted that distress and PTG have differential predictors and suggests that these two constructs be conceptualised as two discrete elements following trauma. This study provides support that post-diagnosis experience is simultaneously shaped by positive and negative changes and that they are not mutually exclusive and could even appear concurrently. These results highlight the importance of investigating both growth and distress arising from the same trauma (Curtis, Groarke, McSharry, & Kerin, 2014; Leal et al., 2014).

Tedeschi and Calhoun (2004) posit that distress may be a catalyst for the initiation of the post traumatic growth process. Past research has shown direct positive correlations between PTG and traumatic stress symptoms (e.g., Morris, Shakespeare-Finch, Rieck, & Newbery, 2005). This may contribute to the often conflicting evidence shown in studies of post traumatic growth, post traumatic stress, anxiety and depression. Joseph and Linley (2008) suggest that previous conflicting research may be better understood from a psychological well-being (PWB) perspective. Psychological well-being is conceptualised as encompassing high levels of autonomy, environmental mastery, positive relations with others, openness to personal growth, purpose in life and self-acceptance within contemporary literature (Ryff, 1989). Psychological well-being and subjective well-being come from two quite different philosophical
perspectives - the eudaimonic and the hedonic approach respectively (Keyes, Shmotkin, & Ryff, 2002; Ryan & Deci, 2001; Wood & Joseph, 2010). Subjective well-being reflects affective states and life satisfaction whereas psychological well-being reflects engagement with the higher levels of human flourishing (Joseph et al., 2012). Psychological well-being may be a more appropriate foundation for post traumatic growth rather than subjective well-being which may not be able to adequately capture the type of positive change reported in PTG where there is both growth and distress.

3.5.1 Post traumatic growth and post traumatic stress disorder. Post traumatic stress can be a type of distress experienced following cancer. Sub-syndromal depressive symptoms and poorer quality of life are important adverse effects of cancer which contribute to well-being levels. PTSD and sub-syndromal post traumatic stress symptoms were associated with greater levels of depression and lower quality of life among cancer patients and survivors (Cordova et al., 2007). Although PTG may not completely disrupt the PTSD symptomatology, this buffering effect may alleviate aspects of cancer-related distress and may also contribute to well-being. This complex relationship between PTSD and PTG may be an additional cause of conflicting findings in previous empirical studies.

Most cross-sectional studies investigating the association between PTG and symptoms of PTSD have failed to find a systematic relationship between the two (Shakespeare-Finch & Lurie-Beck, 2014). Post traumatic stress and post traumatic growth may have a curvilinear relationship. Low levels of post traumatic stress reactions indicate that the person has been minimally affected. With low levels of traumatic stress, the new trauma related information has not created a high level discrepancy in the individual’s worldview; therefore, minimal post traumatic growth is expected. A moderate level may provide enough of a challenge to the individual’s worldviews or basic schemas to initiate the post traumatic growth process; however the individual
may successfully cope and cognitively process the trauma. A high level of post traumatic stress, however, where a diagnosis of PTSD might be considered could mean that the individual has difficulty coping and his or her ability to cognitively process the experience in question is hampered. These results support previous assertions in the literature of both linear relationships, for instance, low stress related to low growth (e.g., Calhoun et al., 2010; Kleim & Ehlers, 2009; Solomon & Dekel, 2007) and of curvilinear relationships, for instance above a certain level of stress, the growth no longer increases and may decrease (e.g. Butler et al., 2005; Lechner, Carver, Antoni, Weaver, & Phillips, 2006).

Nightingale, Sher and Hansen (2010) found that there were both shared and separate pathways from stressor to psychological distress and PTG with pathways mediated by cognitive processing (intrusive and deliberate rumination) in a cohort receiving HIV diagnoses. Nightingale et al. (2010) highlight the importance of further considering how the timing of cognitive processing is important to these trauma outcomes.

Morill et al. (2008) reported that PTG moderated relationships between post traumatic stress symptoms and both depression and quality of life. They showed that PTG may work to counter certain negative aspects of post-traumatic stress in a sample of breast cancer survivors by acting as a positive buffer alleviating some distress and perhaps contributing to well-being. Benefit finding or meaning making following trauma may be psychologically protective. This then could have implications for long term adjustment.

Substantial research indicates that individual differences in the ability to create meaning from trauma is related to positive mental health outcomes and psychological distress, however as yet the pathways to these positive outcomes are not clear and need further investigation (Park, 2010; Pennebaker & Chung, 2007). Given the inconsistent findings and taking the PTSD literature into account, it is anticipated that physical post traumatic growth will be a key feature of
clarifying the nature of the relationship between post traumatic growth and distress due to the very nature of illness. Due to this a non-directional hypothesis is proposed for the relationship between traditional post traumatic growth and distress; however it is hypothesised that those with higher levels of physical post traumatic growth will experience lower levels of distress. Illness involves changes in levels of physical functioning, time-related recovery expectations and goals and increased engagement with health services which may uniquely impact distress.

3.6 Post traumatic growth and mindfulness

Mindfulness can be conceptualised as an ‘approach for increasing awareness and responding skillfully to mental processes that contribute to emotional distress and maladaptive behaviour’ (Bishop et al., 2004, p. 230). Mindfulness focuses on five key areas: 1) Non-reactivity to inner experience; 2) observing/noticing/attending to sensations/perceptions/thoughts/feelings; 3) acting with awareness/concentration/nondistraction; 4) describing; and 5) nonjudging of experience (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006).

Mackenzie, Carlson, Munoz, and Speca (2007) qualitatively explored the relationship between mindfulness and post traumatic growth. Their findings consisted of five themes: 1) opening to change; 2) self-control; 3) shared experience; 4) personal growth and 5) spirituality. The themes opening to change and personal growth are particularly relevant to post traumatic growth and physical post traumatic growth and highlight that these three constructs may be vital in shaping survivorship outcomes.

The first theme ‘opening to change’ encapsulates ideas from a recent model of mindfulness mechanisms proposed by Shapiro, Carlson, Astin & Freedman (2006). This model describes how meditation can create an important shift in focus or perspective known as ‘re-perceiving’. This is relevant given the role of positive re-appraisal following trauma. Mackenzie et al. (2007) have suggested that
participants’ description of becoming more open to different perspectives in relation to their experience following a mindfulness intervention reflects this idea of re-perceiving.

Bonadonna (2003) suggests that meditation may be a practice that facilitates positive adjustment. Bonnadonna (2003) found in a chronic illness sample that meditation helped participants to reconsider their illness journey and possibly explore both positive and negative changes that were a result of their illness. This change in perception allowed greater benefit finding, and showed how responding mindfully to change and loss created by a physical trauma such as cancer may result in greater adjustment. For example, exploring both positive and negative changes may facilitate psychological flexibility which could potentially play a role in controlling levels of distress and quality of life post trauma.

Although there is sparse literature on the concept of mindfulness and post traumatic growth, a connection can be suggested. The mechanisms which may facilitate positive change following trauma pertain to cognitive processing element. Trauma is a time where induced disruption may lead to a transition towards present-moment awareness of experience, without judgment or analysis. A trauma such as an illness may actually provoke patients to begin an internal search for greater awareness and a sense of meaning and purpose in life (Garland, Carlson, Cook, Lansdell, & Speca, 2007). Garland et al. (2007) support this positive association between post traumatic growth, mindfulness and adjustment indices in cancer outpatients.

Another fundamental component of mindfulness is attention. The mindfulness facet of ‘observing’ does not explicitly separate attention to internal cognitions and internal physical sensations from attention to external stimuli (Baer et al., 2006). Therefore, mindfulness is an important component when considering both psychological and physical trauma. Mindfulness involves disengaging from automatic thoughts, habits, and negative health behaviours. This may play a key role in developing behavioural regulation, which has previously been
related to improved well-being (Ryan & Deci, 2000). Awareness and attention are key aspects of distress, quality of life, body awareness and health behaviours following illness as the physical self becomes such a prominent part of physical trauma recovery (Hefferon et al., 2009). Self determination theory (SDT; Ryan & Deci, 2000) is a theory of self regulation which places awareness at the heart of facilitating an individual to act in line with their needs, values, and interests (Deci & Ryan, 1980). This may be particularly pertinent to goal directed behaviours such as improved health behaviours. Greater attention (an important aspect of mindfulness) to psychological, physical, and environmental cues has also been found to be useful in the process of healthy self-regulatory processes (Brown, Ryan & Creswell, 2007).

Body awareness could also be conceptualised as attention to the physical self. This may indicate that higher levels of mindfulness and physical post traumatic growth including dimensions such as reconnection with the body (cocoon to butterfly, listening to body and body as a barometer/monitoring) predict greater levels of body awareness. Mindfulness may also facilitate cognitive flexibility and this could be one pathway through which personal growth can be achieved and allows for positive reappraisal and meaning making.

3.7 Post traumatic growth and body awareness

Frank (1995) has emphasised the necessity of understanding that the illness narrative is fundamentally shaped around bodily experience and thus, the physical experience of illness, recovery and rejuvenation. Therefore, physical trauma should be considered as a distinct aspect of post traumatic growth. Merleau-Ponty (1962) stated that the embodied nature of our relationship to the world as ‘body-subjects’ meant that our body is our only means of true communication with the world. This meant that an individual’s every day experiences could only be fully understand when incorporating their embodied perspective. This is relevant to gaining a comprehensive picture of reactions to various types of trauma, in particular physical trauma.
More recent work in the field of embodiment has provided an interesting framework in terms of body awareness and post traumatic growth. Morse’s (1997) model which depicts responding to threats to integrity of the physical self shares many core ideas with the latest qualitative findings in post traumatic growth following physical illness (Hefferon et al., 2010). Morse (1997) describes several stages which are informative in the conceptualisation of the physical self at the core of both illness and recovery. Five stages are cited in the process of responding to the ‘threat’ or illness.

The first two stages are ‘vigilance’ and ‘disruption: enduring to survive’ which describe the acute phases of physical illness and how these overshadow sense of identity, disruption or change. The third stage ‘enduring to live: striving to regain self’ describes how individuals are forced to acknowledge the physical changes and perhaps lower levels of functioning. This model proposes that individuals may seek to restore physical functionality as quickly as possible. The fourth stage ‘suffering: striving to restore self’ describes how the effects of what has happened are being processed and the individual begins to acknowledge what has been lost. In the fifth stage ‘learning to live with the altered self’ the person comes to accept his or her changed body. These stages are significant given the ‘reconnection with the body’ theme which has emerged through in-depth qualitative work across heterogeneous groups following multiple physical illnesses (Hefferon et al, 2010). These findings from Hefferon et al. (2010) have implications for current post traumatic growth theory, as current perspectives do not provide an adequate picture for all trauma survivors, particularly in terms of those who have experienced a health related trauma.

Body awareness can be defined as the ability to recognise subtle body cues (Mehling et al., 2009). Body awareness and this reconnection with the body is deemed important in the illness experience in terms of how the individual responds, recovers and adjusts post physical trauma (Hefferon et al., 2009). A review from Mehling et al. (2009) suggests that body awareness may be useful in the management of chronic
diseases such as recurrent back pain, congestive heart failure, renal failure, and irritable bowel syndrome due to greater symptom recognition, recognising bodily tension patterns and a greater insight into the effect of stress on the body. To date body awareness has not been considered in terms of a unique positive change following physical illness. This is primarily due to the traditional definition of growth from Tedeschi and Calhoun (1995) which omits the construct of body awareness. Body awareness/embodiment resonates strongly with a more physical aspect of post traumatic growth, in particular with the salient themes identified in the recent review of qualitative literature (heightened awareness of the body, reconnection with the body, listening to the body: Hefferon et al., 2009).

3.8 Post traumatic growth and health behaviours

A positive change which has been frequently reported following diagnosis of an illness or disease is the adoption of positive health behaviours (Demark-Wahnefried, Peterson, McBride, Lipkus, & Clipp, 2000; Milam, Ritt-Olson, & Unger, 2004; Petrie, Buick, Weinman, & Booth, 1999). Researchers have suggested that the diagnosis of an illness has the potential to become ‘a teachable moment’ defined as ‘naturally occurring health events thought to motivate individuals to spontaneously adopt risk-reducing health behaviours’ (McBride, Emmons, & Lipkus, 2003, p. 156).

Urcuyo, Boyers, Carver and Antoni (2005) reported that cancer patients who were high in PTG were less likely to use alcohol or other substances as a coping strategy. Milam (2004) found a positive relationship between PTG and a healthy diet and lower levels of alcohol use at Time 1 in a sample of 835 persons who were HIV positive. These correlations are small (.08 and .18 respectively) so further research examining the associations between PTG and health behaviours would be helpful.
Cancer studies have produced similar evidence of a relationship between physical trauma and positive diet change, that is increased intake of fruit and vegetables and lowered fat, salt and meat intake (Brown et al., 2003); increased physical activity among breast and prostate cancer survivors (Demark-Wahnefried et al., 2000); and the cessation of tobacco and alcohol use (Demark-Wahnefried, Aziz, Rowland, & Pinto, 2005; Gritz et al., 1993). This area warrants further research as the maintenance of positive health behaviours over the course of the cancer journey (diagnosis, treatment and then survivorship) is important (Uhley & Jen, 2007). Physical post traumatic growth may be the factor that facilitates increased health behaviours following trauma, while trauma is the catalyst for the initiation of the post traumatic growth process.

In a five-year follow up study with breast cancer patients, Hefferon (2012) reported that many of the participants reported feeling greater health responsibility. Many felt empowered through accepting this responsibility and making conscious health behaviour changes. This new sense of health potential and health responsibility meant that participants felt they had regained some control over their survival and were more likely to engage in positive health behaviours, for instance, changes to diet and exercise as well as the cessation of negative health behaviours (e.g., smoking).

Increased levels of physical activity is one of the most beneficial positive health behaviour changes reported to emerge from the experience of trauma (Hefferon & Mutrie, 2012). Hefferon and Mutrie (2012) hailed exercise as a ‘stellar’ positive psychology intervention. Cordova (2008) suggests that introducing various types of physical activity to cancer patients such as muscle relaxation, diaphragmatic breathing, mindfulness, and meditation is beneficial as they ‘can increase their sense of control over their bodies and enhance the ability to observe, tolerate and at times regulate their thoughts and emotional reactions’ (p. 195).
Hefferon et al. (2013) have explored how psychological and emotional strength can grow via the building of physical strength which follows the ‘somatopsychic principle’. This principle suggests that by building stronger bodies, psychological strength will be fostered, implicating a twofold benefit to activity participation. The level of activity and how the physical self is utilised may affect how individuals think and feel (Mutrie, 2002). Creating a stronger body through improved health behaviours such as exercise facilitates physical competence and a more positive perception of the physical self (Mutrie & Faulkner, 2004). Deci and Ryan (1985) have proposed that the basic needs for competence, autonomy, and relatedness must be satisfied in order to experience an ongoing sense of integrity and well-being. These three basic needs are commonly reported outcomes of physical activity interventions (Mutrie & Faulkner, 2004). This could be conceptualised as well-being facilitated by the body or physical self. This has implications for post traumatic growth following physical illness. Physical activity offers a potential avenue where meaningful control can be gradually taken, as the individual assumes responsibility for their health. Fox (1997) considers that this autonomy may transfer into other areas of life through feelings of empowerment.

There is also a body of research to tentatively support post traumatic growth with objective health outcomes. Affleck, Tennen, Croog and Levine (1987) found that benefit finding in a cohort of cardiovascular patients had reduced reoccurrence of cardiovascular disease and morbidity over a prolonged period of time (eight years later). Epel, McEwen and Ickovics (1998) reported that higher levels of PTG were related to lowered cortisol levels in women exposed to stress. This finding was mirrored by Cruess et al. (2000) who reported lower cortisol levels with greater benefit finding in a sample of breast cancer survivors. Bower, Kemeny, Taylor and Fahey (1998) reported less AIDS related mortality with self-reported benefit finding among HIV positive men who had recently had someone close to them die of AIDS. Milam
(2004) also reported greater immune system functioning among HIV patients with higher levels of PTG. These findings have been supported in an extensive review by Barskova & Oesterreich (2009). They noted that relationships between ‘growth’ and health-related variables (e.g., physical deficits, pain, depression, anxiety) varied depending on research design and sampling and that several of the findings discussed in the review are disease-specific. Therefore, although initial findings indicate the potential benefits of PTG, future research is warranted. Specifically, there is a need to investigate specific physical trauma in order to gain a more comprehensive understanding of the multi-faceted processes which impact the relationships between PTG, recovery and adjustment.

### 3.9 Post traumatic growth and Quality of Life

It is unclear whether post traumatic growth is associated with enhanced quality of life in physical trauma survivors. Thornton and Perez (2006) found that PTG was largely unrelated to health-related quality of life outcomes for survivors of prostate cancer. This adds to the growing body of inconsistent findings as some investigators have reported that PTG is largely unrelated to quality of life (Cordova, Cunningham, Carlson & Andrykowski, 2001; Fromm, Andrykowski & Hunt, 1996; Sears et al., 2003) and others have found that it is inversely related (Tomich & Helgeson, 2004).

Most studies to date are all cross-sectional, making it difficult to evaluate causal effects, particularly the direction of the relationship between growth and quality of life (Bellizzi et al., 2010). Timing of the assessment of growth can also vary across studies. Different aspects of the growth experience may be more prevalent or more apparent at various stages of the PTG process.

Inconsistent findings regarding the relationship between PTG and psychological adaptation may reflect measurement and methodological issues (Thornton, 2002). Typically studies use the post
traumatic growth inventory (PTGI) which measures psychosocial areas of growth but not physical domains (Bellizzi et al., 2010). In addition, measures of quality of life may not adequately capture the ‘existential flavour’ (Thornton & Perez, 2006, p.293) of the benefits reported by cancer survivors. A scale measuring physical PTG may capture aspects of this phenomenon.

3.10 Critique of current post traumatic growth measures

Although these results are far from conclusive, this area deserves further investigation given inconsistent findings and the potential gains for patients and cancer survivors alike. However, advances in this area are difficult given that ‘none of the current scales of growth assess the dimension of positive health habits and lifestyle change’ (Park & Lechner, 2006, p. 53). This is quite surprising considering the increasing amount of literature reporting positive health behaviour changes following illness and the potential for PTG to have a positive effect on health.

Questions have been raised regarding ability of participants’ to remember personal change (Coyne, Tennen, & Ranchor, 2010). This is an important issue as every PTG scale asks participants to rate on each item how much they have changed as a result of the crisis they faced. This involves evaluation of how they rate themselves in the present and the past, and ability to assess this change and to determine how much of this change is attributed to the trauma. This is difficult for any participant and may not accurately capture the information in relation to trauma and growth (Coyne et al., 2010). When comparing past and present levels of personal growth, previous research has widely acknowledged that compared judgments are biased through illusory correlation (Chapman, 1967), this means that individuals may find it difficult to assess accurately the relationship between two variables when they expect a relationship to exist.
Stanton, Bower and Low (2006) have also reviewed the current quantitative assessment tools for measuring PTG among cancer patients. Measures included the Cancer Patient Behaviour Scale, this has been used across various studies such as Andrykowski, Brady, & Hunt (1993) who explored the cancer experience of those undergoing evaluation for bone marrow transplantation. The PTGI was used widely with women with breast cancer (Cordova et al., 2001), even assessing partner and couple perspectives (Manne et al., 2004). The Personal Changes Scale further explored psychosocial adjustment following bone marrow transplantation (Curbow, Somerfield, Baker, Wingard, & Legro, 1993). The Meaning Questionnaire was used to explore the health related quality of life in a multiethnic sample of breast cancer survivors (Giedzinska, Meyerowitz, Ganz, & Rowland, 2004). The Benefit Finding Scale has been a popular instrument with samples ranging from early stage breast cancer (Antoni et al., 2001) to a mixed sample of cancer and lupus (Katz, Flasher, Cacciapaglia, & Nelson, 2001) to individuals post cancer surgery (Schulz & Mohamed, 2004). The Life Evaluation Questionnaire was used in a sample of patients who were deemed to have incurable cancer (Salmon, Manzi, & Valori, 1996). These questionnaires lack illness specific symptom questions, health related benefits, depression and anxiety items, and do not consider cultural or religious differences in the conceptualisation of trauma. The most recent PTG questionnaire (The Psychological Well-Being Post-Traumatic Changes Questionnaire) has proposed to better capture PTG through its emphasis on psychological well-being rather than on subjective well-being. This measure (Joseph et al., 2012), through its emphasis on psychological well-being, provides a theoretically grounded perspective that is more inclusive of aspects of change than previous measures.

Ford, Tennen and Albert (2008) argue that evidence on PTG, from quantitatively based research, has been confounded by lack of methodological rigour, discrepancy of operationally defined constructs.
and few solid theoretical models. There is a lack of standardised language and operational definitions (Park, 2010). Zoellner and Maercker (2006) highlight that even the most widely used term in this literature can be misleading. They deem post traumatic growth to be an imprecise term for the phenomenon because ‘the majority of the theoretical and empirical literature on PTG describes and measures the subjective perception of PTG’ (Zoellner & Maercker, 2006, p.629). Therefore, the term ‘self-perceived post traumatic growth’ has been suggested but post traumatic growth remains widely used (Zoellner & Maercker, 2006). Park (2010), in her review, has cited this lack of standardised language as perhaps the biggest limitation of the current meaning making research and pinpoints the problem as the difficulty with the translation of rich theoretical conceptualisations to operational definitions. This is linked to problems in other areas such as failing to look at the positive change construct as a whole, and considering that many aspects of existing separate constructs may be intrinsically linked. Most studies have focused on only part of the meaning making model, precluding a full test of the model.

Park (2010) highlights how meaning making processes exist below awareness which raises issues regarding the validity of current measures of post traumatic growth as currently most measures of PTG are self-report. This raises issue for future research design. However, PTG researchers argue that it may not be the objective and quantifiable evidence of growth that is the priority in research, but the ‘subjective sense that one has been bettered by their experience in some fundamental way’ (Thornton, 2002, p. 162). Calhoun and Tedeschi (2006) argue that despite research contesting the existence of growth, there are no measurement tools or agreed upon definitions for identifying illusions or distortions. They also argue that illusions of self-enhancement have been found to be evident in very small numbers of participants and that the current quantitative measurements of growth do not correlate with social desirability measures.
3.10.1 Overview. As post traumatic reactions following physical trauma may be distinct from traumatic reactions, a reconsideration of the existing model of post traumatic growth is necessary. This reconceptualisation would incorporate the influence of type of trauma on the growth experience. There are several key areas which should be considered in light of the potential role of physical trauma in adjustment. For instance, aspects of cognitive processing, such as resilience and mindfulness, may influence adjustment. For example, resilience has been associated with lower levels of growth, while mindfulness encapsulates constructs such as acceptance and awareness, which are key factors in changing focus or perspective and positive reappraisal following trauma.

PTG is a new phenomenon that needs tools to facilitate exploration for further theory development. Improvement of existing measures of growth should be a focus of future investigations of post traumatic growth. Linley and Joseph (2004) have expressed concern that existing measures of PTG do not include aspects of the physical body and more specifically illness related trauma. Hefferon et al. (2009) conducted an in-depth qualitative review of physical-related trauma and found there are unique factors in this type of PTG, there is heightened need to develop and validate a scale of physical post traumatic growth. Hefferon (2012) suggests revision of the main methods of assessment (PTGI, CIOQ) to include health/somatic categories as another element of growth given that adoption of healthy lifestyle habits and a new awareness of the body has not yet been addressed by any of the methods of assessment (Park & Ai, 2006; Park & Lechner, 2006).

The current studies will provide a measure which may facilitate further understanding of this construct which has thus far been exclusively qualitatively examined. A qualitative study will be conducted in Study One in order to further understand the experience
of post traumatic growth in prostate cancer and generate items to be used in scale development.

Following the development of items related to physical post traumatic growth, best practice guidelines will be used within Study Two including exploratory and confirmatory factor analysis. Thus, by incorporating new aspects into the measurement of PTG, such as the impact of physical trauma and change; the extent to which health behaviours change following physical trauma may become clearer. This will be further explored in Study Three whereby physical post traumatic growth will be examined in relation to health adjustment indices (i.e., distress, quality of life, health behaviours and body awareness).

3.10.2 Overview of research questions. The core research question of Study One is to explore the experience of prostate cancer and in particular positive change following physical trauma (i.e., physical post traumatic growth). Following this, Study Two aims to develop a measure of physical post traumatic growth and to assess whether the factor structure of this measure is reliable and valid. Finally, the core research question of Study Three is to explore how aspects of this physical post traumatic growth construct relate to resilience, mindfulness and adjustment indices. The specific hypotheses are outlined below.

**Study Three Hypothesis 1:** Those higher in resilience will experience lower levels of post traumatic growth and physical post traumatic growth.

**Study Three Hypothesis 2:** Those with higher levels of physical post traumatic growth will experience lower levels of distress

**Study Three Hypothesis 3:** Those with higher levels of mindfulness will experience greater levels of health behaviours, body awareness and quality of life and lower levels of distress.
Study Three Hypothesis 4: Those with higher levels of physical post traumatic growth will exhibit higher levels of body awareness.

Study Three Hypothesis 5: Those with higher levels of post traumatic growth and physical post traumatic growth will exhibit higher levels of positive health behaviours

Study Three Hypothesis 6: Those with higher levels of post traumatic growth and physical post traumatic growth will exhibit better quality of life
Chapter 4

Study One

Exploring Illness-Related Change: Emerging Physical Post Traumatic Growth in Men with Prostate Cancer

4.1 Aims of chapter

The objective of this qualitative study is to further investigate the experience of prostate cancer, and also to explore perceived changes, particularly the emergence of positive change related to the body, in a group of men with prostate cancer who were at least one year post treatment.

This study will provide the basis to generate items for the development of a psychometric measure of physical post traumatic growth, as current scales do not consider the impact of physical trauma on the positive growth trajectory.

4.2 Rationale

Traditionally, research on trauma has extensively reported the negative consequences following traumatic illness or events (Tedeschi & Calhoun, 1995). This is problematic as it does not adequately represent the full experience of trauma and illness in terms of both distress and potential growth. Physical and health-related traumas are an important avenue to explore as they may have implications for survivorship. Finding meaning in trauma is a key area for research, as trauma survivors who derive meaning from the event have been shown to have better recovery and adjustment often leading to positive change and growth (Park, 2010).

4.3 Introduction

Cancer incidence continues to rise globally. With vast increases in the 5-year survival rate due to improved screening, early detection practices, research advances and clinical care the onus falls to oncology
services to meet the increasing demands for care. Given these trends, cancer survivorship has increasing individual and societal ramifications (Wu & Harden, 2014). The incidence of prostate cancer in Ireland continues to rise and models project that patient numbers may increase up to 288% between 2010 and 2040, with proportionate increases in treatment rates (NCRI, 2014). These projections are mirrored worldwide, around 910,000 cases of prostate cancer were recorded in 2008, accounting for 14% of all new cancer cases in men. It is predicted that the number of cases will almost double (1.7 million) by 2030 (World Health Organisation, 2012). Thus, as more people are living with this disease, research that adequately addresses psychosocial adjustment is essential to enable provision of effective support for people affected by prostate cancer. The cancer experience can be punctuated with distress, however, there can also be scope for positive growth and this may have implications for psychosocial adjustment.

The purpose of this qualitative study (Study One) is to explore post traumatic growth following a physical trauma; specifically prostate cancer. The majority of post traumatic growth research, to date, has been conducted with women with breast cancer. The relatively new concept of physical post traumatic growth (e.g., greater body awareness, greater appreciation of the body, heightened existential awareness and related health behaviour changes) has also been exclusively investigated with females and in particular women with breast cancer (see Hefferon et al., 2010). This narrow focus is problematic as it is unclear to what extent findings from breast cancer survivors are relevant to males. A second limitation is that breast cancer patients tend to be a younger demographic (Thornton & Perez, 2006). The relationship between age and PTG is still unknown, with a few papers reporting higher levels of PTG in younger patients (Barakat, Alderfer, & Kazak, 2006) and several others suggesting no association (Cordova et al., 2001; Sears et al., 2003; Tomich & Helgeson, 2004). Investigating PTG with prostate cancer survivors provides an
opportunity to determine the extent to which older, male cancer survivors report PTG.

In addition, one of the key concerns of this research area is the development of an updated measure of post traumatic growth namely because “none of the current scales of growth assess the dimension of positive health habits and lifestyle change” (Park & Lechner, 2006, p. 53). Recent research has argued that measurement tools need to take into account the nature of the trauma in how post traumatic growth develops. Steel, Gamblin, and Carr (2008) highlighted the need to revise the Post Traumatic Growth Inventory and to develop a cancer-specific post-traumatic growth measure. Their qualitative study indicated that items related to health behaviours as well as philosophy and meaning of life were needed. Steel and colleagues (2008) also suggested that further qualitative research be conducted to explore additional areas of growth that patients experience as a result of a cancer diagnosis.

4.4 Qualitative Inquiry

The use of qualitative methods could broaden understanding of men’s experience of prostate cancer and post traumatic growth. Qualitative methods are particularly valuable in the early stage of theory development, where a topic needs to be explored in great detail. These methods are flexible allowing unforeseen novel areas to emerge which were not predicted by the researcher.

Qualitative methods are useful for the development of psychometric measures. The validity of psychological concepts in quantitative research can be enhanced through being initially grounded in real life situations and observations through qualitative inquiries (Rowan & Wulff, 2007).

The use of mixed methods has numerous benefits including the ability to answer research questions which single approach designs cannot; the provision of better or stronger inferences from research findings; and the opportunity to present a greater diversity of views within a single study (Tashakkori & Teddlie, 2003). Given that
standardised language and operational definitions have been cited as a limitation of current PTG literature (Park, 2010), a purely quantitative or qualitative methodology may be insufficient for understanding the full experience of post traumatic growth and its correlates, therefore the current qualitative study will be followed by quantitative analysis in Study Two and Study Three.

Through ‘integration,’ the varying paradigmatic assumptions inherent in different methods can work together ‘to produce a whole which is greater than the sum of its parts’ (Moran-Ellis et al., 2006, p. 50). The combination of the differing epistemological claims can be even used to develop multi-dimensional understandings of a phenomenon (Frost & Bowen, 2012).

There is a growing consensus to find ways to combine qualitative and quantitative approaches. One way to combine methods is through the use of a pragmatic approach which has played an important role in the development of mixed methods research (Creswell, 2009; Tashakkori & Teddlie, 2003; Yardley & Bishop, 2008). In this vein, analysis of interviews in this study were conducted from a critical realist perspective (Lund, 2005) with participant experiences conceptualised as corresponding ‘to real entities or processes, which exist independently’ of the researcher while maintaining an awareness of the subjective nature of the production and analysis of the data.

By conducting research pragmatically and combining aspects of both qualitative and quantitative methods in order to answer specific research questions, it is possible to gain a more complete understanding of the participants’ experience. In the current study semi-structured interviews were conducted and analysed. Thematic analysis can be used to both understand the individual experience and to develop a quantitative measure. This combination allows in-depth experiential understandings of health and illness, growth and distress and can aid in understanding different ways individuals make sense of physical trauma such as prostate cancer.
4.5 Method

4.5.1 Participants. The sample consisted of 18 men living in Ireland who had received treatment for prostate cancer (M=66.18, SD=8.81, range=52-82 years). Men were only eligible to take part if they completed treatment for prostate cancer and if this treatment was at least one year prior to the interviews. This timeframe was specifically chosen so that participants would have had time to reflect both on the diagnosis and treatment and to physically recover from their prostate cancer treatment.

4.5.2 Sample Selection. Twenty Five participants were selected from two medical databases (i.e., surgical database and radiotherapy database) of both men who received surgery and who had received adjuvant treatment at a Rapid Access Prostate Cancer Diagnostic Clinic, at University Hospital Galway. These participants were chosen at random. This allowed for non-responses to the request and drop-out, while providing a sufficient sample for interview from the two different treatment groups.

4.5.3 Data Collection. All individuals were contacted via post. Eighteen men in total were interviewed, with nine in each treatment group. Recruitment continued until an adequate level of ‘saturation’ had been reached and no new significant insights were emerging from the interviews (Morse, Barrett, Mayan, Olson & Spiers, 2008). When the researcher felt no new content emerged during interviews, data collection ceased. Table 4.1 presents the questions and probes used throughout the interviews.
Table 4.1
Set of Guiding Questions and Probes Used to Facilitate Discussion of Relevant Topics.

1) Introductions, confidentiality and freedom to withdraw at any time
2) Conversation recorded with their permission
3) Basic demographic questions
4) Could you tell me about your experience with prostate cancer?
   - When did you first think you had prostate cancer?
   - Were there any symptoms?
   - Tell me about your diagnosis
   - Tell me about your treatment
5) Which treatment did you choose?
   - Why did you choose this treatment?
6) Can you tell me about how the treatment affected your body?
   - What were the main side effects?
7) How did the side effects impact on you?
   - What happened?
   - How did you manage/cope?
8) How did you feel during your treatment?
9) How did you feel when your treatment was complete?
10) After your diagnosis and treatment, did you think about your body differently?
    - In what way did you think about it?
11) Do you think your body has changed?
    - In what ways?
12) Do you think having prostate cancer changed you in any way?
### Probes used throughout the interview:

- Could you tell me more about that?
- How come?
- Why?
- Could you tell me what you were thinking at the time?
- What do you mean by that?
- How did you feel about that?
**4.5.4 Procedure.** Ethical approval was received from the Research Ethics Committees of the National University of Ireland, Galway, and University Hospital, Galway. Letters were sent to the selected men (Appendix A). These letters included an information sheet (Appendix B) about the study and contact details of the researcher. For those that did not contact the researcher following the issue of an invitation to participate, one follow-up phone call was made to the invitee. Participants were contacted in this way until the target number for recruitment had been reached (n= 18). This ‘target number’ for recruitment was flexible pending the interviews to allow data saturation to be reached. Men who agreed to participate were asked to select a time that would be suitable for them to take part in an interview. Participants were invited to join the researcher for an interview in person on the NUI Galway campus and consent was obtained (see Appendix C). Over half of the participants asked for the interview to be conducted over the phone (n=13) namely for travel reasons; no difference was noted between participant’s interviews and whether they chose to be interviews face-to-face or via phone. Semi-structured interviews were conducted to allow participants to tell the story of their personal experience.

An interview guide of open-ended questions focusing on the individual’s prostate cancer experience was used flexibly to guide the interviews. Participants were encouraged to lead the flow of the interview and topics were followed up using nondirective general prompts. Interviews ended when the interviewer decided all major topics on the interview guide had been covered. The interview schedule and probes used throughout the interview are presented in Table 4.1 above. The interviews were audio-recorded and interviews were on average 37 minutes in duration (SD= 21.22). If participants mentioned topics which were not considered on the topic list but were deemed relevant to their personal experience, this topic was further explored.

**4.5.5 Data analysis.** The interviews were transcribed verbatim. Data were subject to thematic analysis. The use of thematic analysis
allowed the combination of both inductive and deductive methods which follow the pragmatic approach. The development of a measure of physical post traumatic growth for prostate cancer survivors was an integral goal of this study, as well as understanding the individual experience. These two aims meant that only certain qualitative techniques would be suitable. Qualitative methods were employed in order to “view the construct in the context of the population of interest” (DeVellis, 2012, p.187) and generate items for the measure of physical post traumatic growth. Thematic analysis allowed for both this exploration of participant’s experience but also item generation for the development of a measure.

Braun and Clarke (2006) provide a five phase framework from which to explore the data. Phase one includes familiarising yourself with data through ‘repeated reading of the data, and reading the data in an active way - searching for meanings, patterns’. Phase two generates an initial list of ideas about what is in the data and what is interesting about them and involves the production of initial codes from the data. In phase three, themes begin to emerge and this re-focuses the analysis at the broader level of themes. Phase four involves reviewing themes whereby a set of candidate themes are explored and refined. Patton’s (1990) dual criteria for judging categories, internal homogeneity and external heterogeneity, are considered and applied to each of the themes. Internal homogeneity refers to how data within themes should fit together meaningfully; while external heterogeneity refers to how there should be a clear distinction between themes (Braun & Clarke, 2006). Phase five involves defining and naming themes. Braun & Clarke (2006, p. 22) suggest that this process is about ‘identifying the essence of what each theme is about and determining what aspect of the data each theme captures’. Current data were subject to thematic analysis employing Braun and Clarke’s (2006) recommendations. The initial analyses were conducted during and after successive listening to the recordings and reading the scripts. Notes were made in relation to significant and interesting comments made by each interviewee. To
maintain the integrity of the data, memos were made throughout the analysis to create a paper trail of analytical decisions and theme formation. These were evaluated by two reviewers- an expert in psycho-oncology and an expert in qualitative methodology. Various aspects were taken into account in the selection of themes including their pervasiveness in the data, the richness of the excerpts relating to the themes, and how the theme helped clarify other features of the account.

4.5.6 Reflexivity. Reflexivity was considered to be an important aspect of the analysis. Personal reflexivity involves considering how we, as researchers, influence and guide research. This can include life experiences, personal biases, attitudes and beliefs (Howitt, 2010). When conducting this qualitative study the researcher was aware of the importance to engage in reflexivity.

The researcher conducted analyses of the data with awareness of the importance of reflecting how the researcher role can influence the interview’s progression. Due to researcher’s gender (female) it was apparent that understanding of erectile dysfunction and other side effects of prostate cancer would not be understood from the same embodied perspective of another man.

Another issue which the researcher considered may impact the interview process was the age-cohort difference between the researcher and participants. Underwood, Satterthwait and Bartlett (2010) explored how age-cohort is a factor in every research relationship whether researcher and participant are of similar age or separated by several generations. This relationship is shaped by the times and culture lived during formative years (Underwood et al., 2010). The researcher was aware that age difference may impact the level of openness experienced within the interviews. However, the researcher was satisfied that due to previous experience working in an applied hospital setting with men with prostate cancer that age difference would not be a barrier for discussion of sensitive topics. This
previous experience working in a prostate cancer setting was considered to have a positive impact on the interviews due to the researcher’s skills of establishing rapport, whereby men could share their personal experience of cancer.

However, conversely participants may not have gone into such depth in their accounts of their prostate cancer experience if speaking to an ‘insider’ as they may presume that the individual innately understands without needing explicit details (Hamberg & Johansson, 1999).

### 4.5.7 Ensuring Quality

Yardley (2000) presents four broad principles for assessing the quality of qualitative research: 1) sensitivity to context demonstrated through sensitivity to the social setting, existing literature and the material obtained from the participants; 2) commitment and rigor in the degree of attentiveness to the participant during data collection; 3) dedication to indepth analysis, transparency and coherence, demonstrated through clearly describing the stages of research, and 4) presenting a coherent, logical line of argument of the impact and importance of the research demonstrated through telling the reader something interesting, important or useful. These four broad principles were considered and utilised during the design and implementation of this research.

### 4.6 Findings

Three themes were identified as relating to individuals’ experience of prostate cancer: Resilience, Secrecy vs. Support and Acceptance. However, the fourth theme New Awareness also explores illness-related change and emerging physical post traumatic growth. This theme of New Awareness will be used for item generation in the scale development process (Study Two).

A description of each theme and sub-themes, as well as illustrative quotations designed to contextualize the themes are delineated below. An overview of these themes and related subthemes
are presented in Figure 4.1. A table depicting the representativeness and depth of the themes across participants is included in Appendix D.
Prostate cancer experience

- Resilience
  - Survival Instinct
  - Active Coping
- Secrecy vs Support
- Acceptance
  - Age Acceptance
  - Tit for tat: Are the side effects worth it?
  - Acceptance aided by trust
- New Awareness
  - Appreciation of Health
  - New Health Behaviours

Figure 4.1
Overview of themes and sub-themes
4.6.1 Resilience. Resilience is a collection of personal qualities that enable one to thrive in the face of adversity (Connor & Davidson, 2003). Different aspects of resilience were prevalent throughout the interviews. There was a focus on the resistance and reconfiguration aspects of resilience where many participants were exerting efforts to maintain personal levels of normal functioning. However, participants also used their prostate cancer diagnosis as a springboard to higher levels of functioning. There was a particular emphasis on trying to ‘get up and get on with things’, surviving and coping in a pro-active way. Resilience as a psychological resource was largely related to ‘survival instinct’ and ‘active coping’ mechanisms. These two sub-themes are described in detail below.

Survival Instinct. This sub-theme describes how many of the participants focused on a solution and prioritised survival and quantity of life over quality of life. Most participants were aware of the likelihood of potential treatment side effects, such as impotence and incontinence. Although these side effects were initially accepted as a reasonable consequence for treating the prostate cancer, some were still unprepared for the changes in erectile and urinary functioning which followed their treatment: “There are days I wished to God I never did [have surgery]. Why did I do it? But I’m not a person...I’m not that way inclined but I often thought why did I get myself into this position, that I can’t get out and I can’t help people [family] like I used to” (Participant 17).

Despite this many felt they were obliged to act vigorously against the cancer and take the most effective available option at the time: “The reality is I’m still here. If that [proton therapy] was an option at the time, but if I had to wait for that, with the aggressiveness of the cancer at the time, they said it was high and aggressive cancer, chances are I wouldn’t. It could have been gone too far into the bone to be of any [...] you have to live in the present. Yeah it was a possibility but that’s all,
maybe a very remote possibility. So I’m just happy to be around”
(Participant 1).

A key concern was the treatment choice and how they wanted to get ‘rid’ of the cancer from the body in order to ensure survival. For this reason, surgery was often seen as the most desirable treatment option. Physically ‘taking out the cancer’ was intuitively appealing to many participants and provided reassurance that the cancer was eliminated from the body: “I would have preferred an operation as I thought just get it out and throw it away” (Participant 7). Consultants also spoke of being ‘fit’ and ‘strong’ enough for the surgery. Many felt that if they were recommended for surgery it meant that they were considered to be at a certain level of health and fitness which was desirable in the perceived ‘fight’ against cancer. Long term survival seemed to trump all quality of life expectations: “I only came to one conclusion straight away and that was have it removed and that was it [why?] because I think that when there is something bad inside you get it out as quickly as possible” (Participant 13).

A substantial amount of individuals participating in this study noted that they had to ‘get on with things’ and treated prostate cancer as an acute event that needed to be managed. Much of the dialogue focused on adhering to masculine roles. Many of the participants felt that they had to provide for their family and they could only do this when they were alive and well. Participants expressed both the need and desire for them to fulfil this role: “I do kind of keep my health looked after; when you have a young family you kind of have to. You have to be around for them, you have to be in good form for them. That’s what it boils down to” (Participant 16). Prostate cancer and treatment had consequences for many participants and their families. Family life was a major source of worry for some of the participants; however some were able to use their worry as a motivator in their recovery. Many felt a strong sense of responsibility to their families as the primary earner in the household: “It was either send one of my kids to college or pay the VHI [health insurance] and...I figured, you know, it would be selfish to
cover myself and not everybody else but in reflection thinking back, I was the main breadwinner” (Participant 1).

**Active Coping.** Several aspects of actively coping with prostate cancer were identified. Many were not aware of their coping style but were just ‘trying to get on with things’. Participants were often very active following diagnosis and while waiting for treatment decisions to be made. Participants researched various treatment types via the Internet, health professionals and specific literature provided to them. Many of the men set goals for recovery and planned regimes to help themselves achieve these goals: “I’m the type of person that if there is a problem, you find the problem and [figure out] what you are going to do about it. That is just how my mind works or how I think about the world. Problems are just there to be solved” (Participant 15).

Participants gave a detailed account of their routines and plans of recovery, employing systems whereby they counted down days of their recovery, tracking their bodies and even small advances made in recovery and exercise: “Mentally just, just get through it. Ten days - just countdown each day, you’re half way through; you are three quarters way through. Just focus on it and they say you have to get over it and get back” (Participant 16).

For some, taking an active role in treatment preparation allowed a sense of agency and control. Many wanted to have the responsibility of preparing their body for the prostate cancer treatment. Some men began to prepare for their rehabilitation prior to the treatment and were pro-active in asking for information regarding anything they could do preceding the treatment: “I remember saying to Mr. X is there anything I can do at this point in time to speed up the recovery at the other end of the journey and he said to me- exercise, pelvic floor exercises” (Participant 15). Being actively involved in planning before the treatment was mentioned, indicating how it would later pay off in post-operative results: “The surgeon told me about the exercises and to strengthen up the [pelvic floor] muscles even before surgery so I was
doing that I was preparing myself for it and after that I really got stuck into the exercises and I was determined to get back. So after 5 or 6 weeks I was back good enough [with urinary control]” (Participant 16).

Many focused on community-based initiatives such as fundraising, increasing awareness and strengthening social support networks: “The GAA were very good to me...there is more to the GAA than hurling and kicking football, they are a big family like you know, they are the sort of things I live for” (Participant 7). Participants used pastimes as a positive outlet and as a way of staying active and connected to others: “Tonight now, when I go home I have to go to a GAA meeting and that will keep my mind off things. Tomorrow I have a small bit of concreting to do and then tomorrow night, nothing on Friday night, and then another GAA meeting, things like that, somewhere to go” (Participant 9).

Raising awareness of prostate cancer was seen by participants of a way of giving back to the community and helping others in return: “We started to getting people to do the [sponsorship] cards and do the walking and each one trying to get more on the card than the other but it was like playing a game again. in other words, in our area in East Galway we collected 50,000euro[for Hospice and Cancer Care West]” (Participant 9). Raising awareness was seen as a rewarding option and used as a coping mechanism for a number of participants: “I openly talk to people about my cancer because if I can get one man or two men to go and get checked out it could save them and their families a lot of grief... if it’s got early” (Participant 8).

4.6.2 Secrecy vs. Support. There was a tension between maintaining silence and seeking support. Achieving adequate support with a level of discretion was challenging for many of the participants. Maintaining masculine perceptions of oneself in the community presented difficulties for some of the participants. In order to receive support a certain level of vulnerability had to be displayed, which was often in contrast to past behaviours within family, peers and the community. Much of the issues surrounding the desire for secrecy were in relation to embarrassment and threats to roles in the workplace and
community. An older participant kept his prostate cancer diagnosis and treatment a secret. He felt that pity was always an aspect of providing support especially due to his age [74 years]: “I never told anybody [...] we are how other people see us so I was damned if I was going to finish up being the poor old guy that had cancer. You know no matter how people try to do anything about it there is always that kind of pity factor, treating you like something special and defective, so I never said anything to anyone and I was seen as someone who was very active” (Participant 4).

Some found that silence was expected lest others feel uncomfortable: “I suppose I face up to it and I got rid of the phobia. I can talk freely about it whereas other people go ‘Shhh!’, there are certain words, it’s the same as cancer years ago— you know, they got ‘it’ and silently as if it’s something that shouldn’t be talked about“ (Participant 8). Some participants also felt this pressure from fellow prostate cancer survivors. This may relate to how many of the participants considered prostate cancer to be an acute incident in their lives which is now over: “I met him at a football match after and he didn’t really want to talk to me about it. He just moved away from me...I couldn’t understand that” (Participant 13). Participant 13 describes an interesting situation where a group of men who met in the clinic exchanged details and kept in contact; however, one man did not want to engage with the group any further after a certain amount of time: “There were a couple of men there with me at the time and we sort of have communicated with each other since, you know talked back and forth [...] there is another chap from Limerick but he wasn’t really that up for talking about it. Seemingly everybody is different” (Participant 13).

Family was a key source of support. A family support network managed to combine elements of both secrecy and support as information could be kept more private. For those that chose to avail of it family support was a great source of support and strength: “The one thing I do notice is that family support is very important. Family is hugely
important like and I just don’t know how I would cope if I hadn’t a family” (Participant 7).

The disparate styles of dealing with secrecy versus support emphasises the individual nature of coping. Participant 7 discussed how he could understand the value of peer support and support services but that it did not appeal to him and he felt it could foster a sense of helplessness and an unhealthy type of social comparison: “They like to be with people that has the same complaint as them, you know discussing and debating it and whereas I might go onto the internet to find out something like, then I am dealing with it for so long. I just don’t like listening to people complain about it and being sad about it, get up and go!”. Participant 7 seems to suggest that his perception of these services is that of futile complaining and helplessness. Participant 7 would rather research the information and think about it in his own time. He suggested that he would only feel sicker if he stayed in hospital during his treatment rather than staying with friends or family.

Participant 8 suggests that it is embarrassment and the nature of prostate cancer that deter men from sharing their experiences. Prostate cancer is often linked to urinary and sexual dysfunction. Participant 8 comments on how men may withdraw from instances where they are questioned about their health and their recovery: “It wasn’t that I was afraid of the test because I was getting the test, but a woman when she is having a baby - everything is out and no inhibitions. But a man is - it’s one of the major physical hang ups of men is their physical box, and when it comes into question or threatened, they withdraw. They go into denial”.

**Nothing to see.** Oftentimes there were no visible signs of illness to the outside observer which meant that secrecy was quite achievable if so desired. Secrecy was facilitated by the very nature of prostate cancer symptoms, treatment and side effects. The often asymptomatic nature of the onset of prostate cancer makes it difficult for patients to fully understand its presence and development. The majority of the group did not have any symptoms prior to their diagnosis of prostate cancer. This meant that many of the participants felt that they never
really experienced the cancer itself, just the treatment for the cancer: “There was nothing to show the doctor, nothing to look at where you see, if you had a wound, say a part of your body had a wound you could see the changes and then it gradually heals up but in my case, I didn’t feel any pain or lumps or there was nothing to see, to see change. I was just, I felt sort of...when I was discharged I felt ‘oh good! I’ll just go to the hospital less” (Participant 5). This meant that often men did not receive as much support as was needed during their prostate cancer experience.

Participant 15 commented on the advantages of prostate cancer being silent. He was particularly concerned with having outward signs of his illness visible in his social circles and in the workplace. Although he considered his impotence as a very difficult side effect to manage, he noted how good urinary function was preferable: “My biggest concern was having urinary problems where I wouldn’t be able to control any discharge. That would be a major problem. It would be embarrassing. It would affect how I work and who I work with and all that type of stuff. If that had been an end result after the operation that would have - on me, on my lifestyle, my work, my confidence and all those things, that would have had a huge impact on me in terms of my lifestyle going forward. The fact that I’m impotent won’t affect you outwardly”. Despite this, participant 5 noted that due to the lack of outward signs of prostate cancer there was nothing to quantify the magnitude of the loss experienced. This prevented some people seeking the support needed: “I didn’t lose my hair, there was no way to tell that there was a problem with me there was nothing physical to see” (Participant 5).

4.6.3 Acceptance. Acceptance was a core theme which encompassed different aspects of the prostate cancer journey from the initial treatment decisions to the acceptance of medical advice and support. Some felt that acceptance was made easier depending on their age and life stage (Age Acceptance), while others found it difficult to determine if the quality of life compromises and side effects of the treatments were worth the extra years of life (Tit for Tat: Are the side effects worth it?). Trust in the medical team was very important to
many of the participants, with many attributing much of their recovery to the attention and care of staff. This trust in the medical team helped many of the participants become optimistic and accepting of the recovery trajectory and prospects.

**Age Acceptance.** Some felt that acceptance was made easier because of their age and later life stage. Many of the participants discussed how they were ‘at a certain age’ and they expected their bodies and health to deteriorate. This highlighted how participants felt a certain age-related acceptance of their ill health; and indeed, their own mortality. Side effects of prostate cancer were seen as another matter of growing older: *“Just say for arguments sake if I was in my thirties and this happened, then I think it would be very different because it would be with you all your life. I know in less than 20 years' time I’ll be coming towards the end anyway”* (Participant 9).

Some felt that, given their age, these side effects were not as important as they would be to a younger man. Participant 1 felt that for a younger man expectations are quite different than that of an older man who has already raised his family: *“Well you know if I was a much younger man maybe it would be debilitating, you know-I’m not [young]. I’m where I am […] and this is the way it is going to be”* (Participant 1).

Another participant noted that he is not angry about the prostate diagnosis and the severe side effects of treatment. He reflects on how he has had a long life and many opportunities. This raises issues of mortality and expectations: *“Some people would say to me ‘Was I annoyed or mad at the world, or God or what?’ and I’d say ‘Why the hell would I be mad at God? I’m 58 years of age! People haven’t lived a quarter of that time, half that time!’ And people would say ‘Why you?’ and I would say ‘why not me? What right have I over anybody else to get these things?’”* (Participant 1).

**Tit for tat: are the side effects worth it?** Acceptance of prostate cancer was a multi-faceted issue for the majority of participants. Most participants felt content and safe that they had dealt with the diagnosis of prostate cancer effectively. Survival instinct
spurred many to choose an effective treatment for prostate cancer quickly while almost side-lining thoughts about quality of life issues. This active coping approach during their decision making process was indicative of the general coping style displayed across interviews: “You look at yourself and you say ‘Right! That’s a problem solved, if I die of something, whatever I die of in the future, hopefully what I won’t die of is prostate cancer’” (Participant 15).

Across participants and even within interviews there were degrees of convergence and divergence. The relief felt following treatment came at a cost in terms of quality of life. This illustrates the fraught and dualistic nature of survival instinct, new health behaviours and greater appreciation of life, whereby positives and negatives co-exist: “He didn’t tell us that there was an enlargement of the breasts, nipples, sometimes you couldn’t put your shirt on they were so tender and sensitive. Everything [the penis] shrinks as well, you know so, there was three things—psychological, physically and the actual treatment” (Participant 8).

Some began to reflect at post treatment on their decisions following diagnosis, which were often made under time urgency and distress. Following treatment some participants began to think about other options that they may have chosen. More people began to wonder about the value of other less invasive procedures such as active surveillance; however this is in the context of having ‘controlled’ the cancer already. It has been noted with prostate cancer that many men die with, rather than of prostate cancer, this sometimes raised questions over how vital the treatment was if sometimes the elimination of the prostate cancer is not the only option: “Am I foolish? Not a thing, no pain, no ache-nothing! Not a thing. Maybe if I knew all the problems down the line I might not [have had treatment]. It would make you think. It just makes me think that I would be in two minds” (Participant 17).

Participant 8 spoke directly about his ease with his own mortality but emphasises that it is his quality of life that is a key
concern: “For me death is not a fear. It’s something that’s there. I respect it, I will achieve it, but it’s how I achieve it rather than...it’s how I get there rather than the event itself” (Participant 8).

Acceptance aided by Trust. Acceptance was aided by health professionals. In prostate cancer oftentimes the best treatment decisions are difficult to decipher and is often a very personal decision for each individual. This can create uncertainty and can instil worry and regret among prostate cancer survivors. This sub-theme focuses on how the trust in medical professionals can help this difficult time. Doctor-patient communication is an integral aspect of acceptance. An important point to note is that humour was greatly valued even when delivering news of diagnosis and treatments: “I found his mode better, he was...I wouldn’t say jovial but, he had a sense of humour” (Participant 8). Some participants found that communication was more difficult with health professionals from different cultural backgrounds. Sometimes communication was more direct and some participants found this disconcerting: “If you have someone that is brought up in a different culture and they are used to that 'say it out and that’s it’, whereas we’re, we haven’t come fully into that [way of communicating yet]” (Participant 8).

The rapport established with the health professionals was integral to the experience of treatment and feelings of support. Many participants felt a strong affinity with their doctor and this helped them to feel comfortable and safe with the treatment recommendations and decisions. Some of the participants discussed how they almost felt protected and “in the hands of a man with great integrity and decency” (Participant 1). This trust was based on the doctors’ reputation. People had often heard from other members of the community about the skills and services of individual clinics and doctors: “I feel very safe with them [in the clinic]. I didn’t tend to worry much about it at all like! I felt very confident in them, and I heard at the time they were very good; some of the best you would come across. That’s why I felt so comfortable” (Participant 11).
This feeling of security is a difficult area for medical professionals to navigate. An uncertain balance exists between reassuring patients and sometimes inadvertently not disclosing the full extent or likelihood of adverse outcomes to patients in order to minimise initial distress. This is quite important in terms of treatment choice and patient satisfaction with the choice. Many of the participants wanted to feel reassured that they had made the ‘right’ decision. One participant was encouraged by his surgeon’s confidence that a prostatectomy was the correct choice: “He said to me not to worry, we can control it. So his words reassured me that from his experience [...] there was nothing to worry about and I haven’t worried since” (Participant 5).

4.6.4 New Awareness. A new awareness of health can often be the by-product of a serious illness diagnosis and treatment. This new awareness contributed to new health related behaviours like health screening, visits to the doctor, improved nutrition and exercise. This new awareness emerged in two key areas: Appreciation of Health and New Health Behaviours.

Appreciation of Health. Many experienced a renewed appreciation of health. It was felt that there was now an opportunity to really appreciate life, but also to take more responsibility in terms of personal health: “I was lucky. It’s not all down to me a lot of it is down to luck and somebody out there praying for me. But there are some little things you can do for yourself as well. Yeah it’s good to get another chance to smell the flowers” (Participant 1).

This sense of appreciation also extended to a greater appreciation of the physical self and the body. Participants expressed how well their bodies had recovered following their prostate cancer treatment. For some, this greater appreciation was bittersweet. Many felt regret that they had not appreciated their health prior to the diagnosis and adjuvant treatment: “I didn’t appreciate good health before I had any trouble, not as much anyways. Now I’d give a lot to be as good as I was before” (Participant 2).
New Health Behaviours. This greater appreciation of health was also reflected in terms of how many of the participants desired to change their health behaviours. Many participants felt that they had been given an opportunity to take more responsibility in terms of personal health: "It’s put that onus on me [to go for health checks]. It’s your body, and that’s what they are there for and they can’t find out if you don’t go to them. Now I don’t mean to pester them or to mider (annoy) them, but if there is something wrong just go and see what it is” (Participant 9).

Many participants exhibited new health behaviours such as dietary improvements: “I’ve lost a stone and a half [...] my style of eating has changed. I am now more healthy, because I know we have our own lettuce and veg. It’s so much fresher, it’s nicer to eat, we have fresh eggs, we eat a lot of stir frys now than what we used to. I’m gone away from chips although I like them” (Participant 8).

Even small nutritional changes were adopted to increase health outcomes: “I’ve given up butter, I have this flora proactive and cutting out cream and biscuits and all that kind of craic” (Participant 12). Drinking behaviours were also modified: “Alcohol is one thing, I used to like a drink nearly every second night and I cut that down to a Saturday night and a couple of pints and I feel an awful lot better” (Participant 9). In addition, smoking behaviours changed: “Smoking; gave up that and avoid smoke as much as possible” (Participant 12).

Visits to health professionals were seen as routine and as a means of monitoring health and preventing any reoccurrence of cancer. Many participants felt that these check-ups were now a part of life and the new norm: “I go for these health checks once a year for all different diseases. You know because it is always there on your mind that I’m more susceptible because of my genetic make-up because I have had it” (Participant 15). Some also reflected on how it was something that did not seem as important before but now was an essential part of self-care: “I feel that I suppose this is something maybe that I should have done more before, it’s all just part of life now I suppose” (Participant 14).
4.7 Discussion

This is the first exploratory study of physical post traumatic growth in a male sample with a physical illness and the results add new insight into perceptions of positive growth related to the body, expressed in a new awareness, with new health behaviours and an appreciation of the body and health. This study has given insight into how the experience of prostate cancer impacts on men’s embodied self-perceptions. The overall analysis of positive and negative changes revealed four central elements of prostate cancer survivorship: Resilience, Secrecy vs. Support, New Awareness and Acceptance. This is an important step as currently the experience of recovery in prostate cancer, especially in terms of post traumatic growth has received scant attention. The lack of investigation into post traumatic growth in prostate cancer means that avenues for improving patient well-being and adjustment are less understood for older adult males.

Overall findings from this study demonstrate the full and complex experience of prostate cancer through the four themes. As the interviews progressed participants detailed their recovery journey in more depth. Many spoke in terms of challenges, but also regarding the support they received and how their lifestyles had changed for the better. Evidence of post traumatic growth in traditionally defined areas can be seen throughout interviews (e.g., perceived changes in self; developing closer relationships; changing life philosophy/increased existential awareness and changed priorities). The recently investigated 6th possible dimension of post traumatic growth following physical trauma (Hefferon et al., 2009; Hefferon, 2012) ‘physical post traumatic growth’ is also present across themes. The current study adds to our understanding of the extent to which older adult males experience post traumatic growth following prostate cancer. Previous research has mainly concentrated on women with breast cancer which would have a younger than usual cohort of cancer survivors (Thornton & Perez, 2006).
Older cancer survivors may experience cancer differently and may adopt a different perspective on existential awareness distinct from younger survivors. In the current study, this was demonstrated in the theme ‘Age Acceptance’ where participants felt that they were more accepting of the cancer diagnosis and side effects due to their age. This theme is congruent with findings from Jonsson, Aus, and Bertero (2010) where it emerged that participants felt that age was ‘claiming it’s due’ and that changing health status in older age is a significant natural human process. In the current study, participants observed that loss of sexual functioning may have a greater impact on younger men. A similar finding was reported where loss of breasts for women mattered less in the latter part of the life cycle (King, Kenny, Shiell, Hall, & Boyages, 2000). These age-related differences may play a role in acceptance in later years of life following physical trauma. The importance of both gender and age have been demonstrated by previous meta-analytical findings which explored traditional PTG and potential gender and age differences (Vishnevsky, Cann, Calhoun, Tedeschi, & Demakis, 2010). It was found that women reported greater levels of PTG than men (Vishnevsky et al., 2010) and within moderator analyses, age was the only statistically significant finding in the meta-regression. This showed that women reported incrementally more growth than men as the mean age of the sample increased. Differences were more pronounced in the over 35 age group than in the younger cohorts (i.e., 18-34 years of age). However, only 5 studies included samples where the mean age was over 60 years of age. Therefore, potentially key predictive variables must be investigated further.

Terror management theory can provide an interesting perspective on the theme of ‘Age Acceptance’. Aging involves more than changing bodies; it involves increasing awareness of mortality (Maxfield et al., 2007). Terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986) posits that awareness of the ‘inevitability of death’ has a great impact on decision making and behaviour. TMT theorists posit that as people enter later life thoughts
about death and health become more prevalent (Bevan, Maxfield, & Bultmann, 2014). It may also be that with age, the end of life becomes more of an expected event and therefore less stressful (Ryff & Dunn, 1985; Ryff & Heidrich, 1997). TMT studies note that age differences in response to mortality emerge and, in particular, adults over age 60 tended to show more positively oriented responses with lowered proximal defences when confronted with mortality salience (Bevan et al., 2014). Older adults are less prone to the types of worldview defence observed among younger populations and show the possibility that a level of acceptance of the eventuality of death has been achieved (Bevan et al., 2014). Instead, older adults seem to respond with more tolerance and more pro-social behaviour (Bevan et al., 2014). This is interesting given the level of engagement of current participants with survivorship advocacy groups and charities.

Another key area in acceptance is doctor-patient communication. As noted by previous patient care research in prostate cancer, “the science of prostate cancer is uniquely vague, and therefore definitive answers, the right choice, or correct decisions are not necessarily known” (Oliffe & Thorne, 2007, p. 154). Navon and Morag (2004) claim that the range of treatment choices can leave men conflicted about the best way to progress. This is important in the context of patient-doctor relationships and treatment decisions. These findings highlight how consideration of long-term consequences is often suspended by patients while making treatment decisions due to cancer-related distress. This time pressure was felt acutely by many participants in how they wanted to eliminate the cancer and ‘get it out’ as quickly as possible. Further research aimed at understanding how to best incorporate the longer term impact of treatment into the diagnostic consultation would be of value.

Resilience and active coping were core aspects in adjustment to the side effects of treatment decisions. According to Thornton and Perez (2006) acceptance, positive reinterpretation, and active coping have been linked to higher levels of PTG in the literature (Danhauer et
Active coping took many forms for participants including community work and prostate cancer advocacy. This is interesting given Frank’s (1995) conceptualisation of illness as a journey or the ‘quest narrative’. In this study, enabling social change and community action mirrors one aspect of his view of this illness journey or quest narrative: ‘manifesto’. This active engagement with others in the community is particularly interesting given recent quantitative work from Morris, Wilson and Chambers (2013) which posits the value of helping others in terms of helping an individual’s own meaning making process. They proposed that compassionate acts, such as those assumed by many participants in this study (e.g., taking on a role of cancer advocacy or providing support to peers) contributes to a sense of altruism (Parry & Chesler, 2005) and may also allow the cancer survivor to attribute meaning (Coward & Kahn, 2005). A shared understanding between survivors that comes from being diagnosed with cancer may also be a catalyst for helping others in similar situations and normalising the experience with peers (Coward & Kahn, 2005).

In the theme ‘Secrecy versus Support’ the issue of maintaining privacy and secrecy surrounding the diagnosis of prostate cancer was a challenging issue for some of the participants. Many did not want to be a stereotype of an older ill person and wanted to keep their entire cancer experience a secret. Some found it difficult to align a threatening diagnosis such as prostate cancer with their self-image; especially with regards to post treatment quality of life changes (e.g., needing to use medication to maintain erections and difficulty controlling urinary function). Others embraced the support provided by friends, family and community organisations and were quite vocal in relation to their diagnosis and health checks with the aim of raising awareness for others.

Bury (1991) and Van Manen (1998) have previously explored how loss of confidence in the body may lead to a similar lack of confidence in social interactions. More recently, Aujoulet, Marcolongo,
Bonadiman and Deccache (2008) have suggested that actively avoiding the risk of appearing as a sick person, or simply perceiving oneself as a sick person in the eyes of others can lead to a more restrictive life.

It is possible that this avoidance is embedded in trying to keep hegemonic masculine worldviews intact. This is an important issue as often the masculine identities are significantly altered as a result of diagnosis and treatment for prostate cancer. This is evidenced by a growing body of research which shows the large influence that hegemonic norms have across the prostate cancer journey, in terms of seeking medical information (Broom, 2005), screening tests (Oliffe, 2004), impotence (Gray, Fitch, Fergus, Mykhalovskiy, & Church, 2002) and spousal relationships (Fergus, Gray, Fitch, Labrecque, & Phillips, 2002). Cayless, Forbat, Illingworth, Hubbard, and Kearney (2010) qualitatively investigated how prostate cancer specifically brings fear that is directly related to core parts of masculinity. The emergence of the potential role of masculinity in the process of PTG is a valuable contribution of the current research. Masculinity, as a construct, will be an important area for future research investigating the male experience of PTG as it may influence the degree of positive growth and/or the extent to which it is reported.

Thornton and Perez (2006) found that their sample of male prostate cancer survivors reported lower levels of PTG compared to breast cancer survivors. This may be due to adherence to masculine roles. However, these lower levels of PTG could be related to the fact that women are more inclined to engage in coping behaviours that involve emotional expression and seeking support (Carver et al., 1989) which have been noted as contributing to the development of PTG. An alternative explanation for gender differences may be high resilience levels as endorsed by male participants in the current study. Calhoun and Tedeschi (2006) suggested that individuals who are resilient may be the least likely to experience transformation particularly PTG because the traumatic experience may be less challenging to them and therefore the in-depth cognitive processing preceding PTG would not
occur. More research examining gender differences and resilience in PTG in the prostate cancer population would be of benefit.

Another aspect of ‘Secrecy versus Support’ was the sub-theme ‘Nothing to see’. Some participants felt that no outward signs of prostate cancer were an advantage. They felt that they had a silent cancer so that they could go about their lives and choose who to share their experience with rather than have signs which may trigger stigma, shame or embarrassment. This had implications, however, for participants who wished to be more open surrounding their prostate cancer experience. Some felt that no identifying signs of cancer meant that people could not easily understand the magnitude of their loss unless participants themselves felt comfortable enough to move from the realm of secrecy into support.

The duality present throughout prostate cancer recovery can be seen across different areas. This tension between secrecy and support is mirrored by the dualistic presence of both growth and distress throughout participants’ recovery. The presence of both distress and growth following prostate cancer also parallels the qualitative findings from Curtis et al. (2014) in a group of breast cancer survivors. This same tension can also be seen in the theme ‘Tit for tat: Are the side effects worth it?’ where participants were changing between relief and regret.

Some respondents were disappointed in the side effects of treatment, despite warnings about consequences. Some of the men retrospectively considered treatment choices and outcomes and whether the quality of life they now had following treatment for cancer was superior to enjoying a greater quality of life for a shorter period of time. This introduces the difficult contradiction for participants of iatrogenic medicine, where treatment leads to other health and quality of life issues, albeit less life-threatening. This presence of both positive and negative changes related to the body and illness are, thus, an important aspect to consider in the broader survivorship context (Leal et al., 2014).
Though cancer has, in the past, been thought of as an acute illness, improvements in diagnosis and treatment mean that cancer is increasingly considered a chronic condition (Cayless et al., 2010). The survivorship label can sometimes fail to acknowledge the existing tension and complexity of the post cancer experience. In this study there is a clear juxtaposition in themes such as ‘secrecy versus support’. The presence of concurrent positive and negative adjustment is a core part of the complex movement between illness and health.

Bury (1982, 1991) states that illness can be a disruption to an individual’s ‘biography’ and identity. This can lead to a sense of ‘difference’ from peers, resulting in a perceived failure to ‘fit in’ (Mathieson & Stam, 1995, p. 293). This renegotiation of identity may involve biography-altering facts, altered relationships, a changed vision of the future and a changed sense of self (G. Green, Todd, & Pevalin, 2007). This state of flux and reconstruction is a prevalent part of the narrative within these interviews and the dialogue surrounding cancer survivorship. Cayless et al. (2010) found that reconstructing futures constituted key parts of life post prostate cancer. Although the concept of cancer survivorship is gaining popularity, many services still feel ill equipped to deal with this phase of illness and recovery. Skolarus et al. (2011) found that although clinics felt that prostate cancer survivorship care is prevalent in their practice, few staff felt comfortable managing side effects of prostate cancer treatment. This is of concern given the increased prevalence of men living with side effects and this issue of ongoing care must be addressed going forward.

A growing area of research in terms of survivorship is the new awareness of the body and also new health behaviours following illness. This was demonstrated in the current study with the majority of participants citing their diagnosis as a facilitator for greater awareness of their ‘health potential’. These accounts support previous research findings that a new awareness of health can be cultivated following a health related trauma (Hefferon et al., 2009). This pattern of positive health behaviour change following illness has been discussed in terms
of having the potential to be a ‘teachable moment’ in a person’s life. This refers to learning valuable lessons by experiencing difficult situations such as illness and trauma and translating the adverse circumstances into opportunities to change and adopt personal improved health behaviours including eating, drinking and smoking (Demark-Wahnefried et al., 2005; Demark-Wahnefried et al., 2000). New health and screening behaviours were discussed enthusiastically by participants. Participants showed a heightened awareness of changes in their bodies and appreciation for their bodies. This level of reporting of positive change is interesting as Thornton and Perez (2006) found that men with prostate cancer scored lower on the PTGI than previous cohorts of women with breast cancer. However, these qualitative findings indicate that perhaps this is due to the lack of refinement of the PTGI as a measure and the lack of reference to the physical self that may be more prominent in prostate cancer due to on-going side effects of treatment. Current research then may not be fully reflective or representative of the post traumatic growth experience.

The current qualitative findings support Sabiston and colleagues (2007) model of positive change. In particular, the theme ‘New Awareness’ reflect aspects which have been underrepresented by more traditional conceptualisations of positive change. Sabiston and colleagues’ model (2007) focused on positive change following trauma (breast cancer) including physical perceptions such as: athletic identity, competitiveness, aerobic fitness, strength and physical competence. This model highlights that illness provides a unique dimension for growth and an opportunity for individuals to consider their bodies in ways they had never done so before. For instance in this study, strength and physical competence were a large part of participants’ journey and goals for recovery, from strength to undergo invasive surgery to physical competence to regain previous work roles and hobbies. This work suggested that as an aspect of post traumatic growth, many individuals come to see their body as a ‘vehicle for activity’ and are not as concerned with aesthetic appearances (Hefferon et al., 2010).
Johansson et al. (2003) found that health became a very important priority for people and there was a reduced obsession with appearance. Terror management theory (TMT) provides another theoretical layer to the theme New Awareness. Bevan and colleagues (2014) suggest that with increasing proximity to mortality experienced by adults over 60 (such as a prostate cancer diagnosis), investment in healthy behaviour becomes more significant in later life. TMT suggests that, when thoughts of death are conscious (proximal mode), health intentions are greater because they act as a rational defence against death, but when death thoughts are activated outside of conscious awareness (distal mode), health intentions vary because maintaining self-esteem is of primary concern (Goldenberg & Arndt, 2008). Given this theory, it could be assumed that health-oriented motives are more likely to take precedence when individuals are highly aware of their mortality such as following a cancer diagnosis. Additionally, the terror management health model highlights the importance of coping style, optimism and behavioural efficacy in health-related responses to mortality salience. Arndt, Routledge, and Goldenberg (2006) found that a more active coping style was associated with greater intentions to engage in health-related behaviours immediately after mortality salience. The current qualitative findings support Arndt and colleagues’ (2006) premise as active coping was strongly linked to themes of new awareness, greater appreciation for health and new health behaviours.

4.7.1 Limitations. There are possible limitations with the current study which warrant discussion. Interviews were conducted by a young female. Researchers examining men’s health have found that interviewer gender can impact the interview (Broom, Hand, & Tovey, 2009; Oliffe & Mroz, 2005). Previous research has cited that men include and omit certain topics depending on the gender of the researcher (Pini, 2005). Broom et al. (2009) reported that with a male researcher, masculine traits were emphasised whereas with a female researcher, participants seemed to aim to maintain greater levels of decorum.
4.7.2 Conclusions. The experience of prostate cancer was found to have an impact on men’s embodied self-perceptions. For example, the physical side-effects and “removal” of cancer from the body were highlighted under the theme of resilience, while the theme ‘secrecy versus support’ highlighted the link between physical strength and masculinity, conflicting with perceptions of illness and vulnerability. Furthermore the extent to which participants experienced a new awareness of the body including ‘greater appreciation of health’ and ‘health behaviour change’ indicates a distinct dimension of growth following physical trauma.

This qualitative study, demonstrating novel evidence in support of the concept of physical PTG is an important first step in understanding this construct in older adult males with prostate cancer. An important next step will involve developing a psychometric measure of this additional facet of post traumatic growth. Acknowledging the importance of PTG in physical trauma is imperative for advancing the needs of cancer survivors in terms of adjustment and well-being.
Chapter 5

Study Two

Physical Post Traumatic Growth: Scale Development and Validation

5.1 Aims of Chapter

Chapter Five describes Study Two, which has five main objectives: 1) to develop a measure of physical post traumatic growth (physical post traumatic growth inventory; P-PTGI) in men with prostate cancer; 2) to assess the measure's dimensionality using current guidelines for best practice in exploratory factor analysis (Costello & Osborne, 2005; Fabrigar, Wegener, MacCallum, & Strahan, 1999; Worthington & Whittaker, 2006); 3) to further assess the P-PTGI’s psychometric properties using confirmatory factor analysis in two independent samples; 4) to examine the construct validity of the P-PTGI; and 5) to estimate the internal reliability of P-PTGI using Cronbach’s alpha.

5.2 Rationale

There is growing recognition that current measurement tools do not adequately convey the full range of post traumatic responses (Park & Lechner, 2006), particularly in relation to positive outcomes facilitated through the experience of a physical trauma such as illness (Cohen, Hettler, & Pane, 1998). In addition, there are potential contributing factors to the growth process that have yet to be examined fully such as health status, physical activity and the role of the body. It is, therefore, important for researchers to investigate the broad range of physical and psychological benefits found in survivors exhibiting PTG (Katz et al., 2001; Stanton et al., 2006; Urcuyo et al., 2005).

5.3 Introduction

Previous attempts have been made to extend the main model of PTG (Tedeschi & Calhoun, 2004). Sabiston and colleagues (2007), for
example, put forward the first model of PTG which included other factors than those traditionally defined and involved in the growth process. Their study in a group of breast cancer survivors revealed a unique relationship between physical self-perceptions and overall self-worth within the growth process (Sabiston et al., 2007). Their model (based on qualitative findings) presented a revised vision of positive growth which included a focus on physical activity and personal control, as well as a shift in physical self perceptions (e.g., strength and fitness).

The development of a quantitative measure of a dimension of growth specific to physical illness will lead to incremental theoretical advances in the field of post traumatic reactions as it may provide more clarity in terms of how illness and the physical self influence psychological adjustment and well-being. Validity of the measure is also of importance if this measure of physical post traumatic growth is to have value for prostate cancer survivors. Construct validity is an important part of the scale development process (DeVellis, 2003).

Construct validity refers to the extent to which a particular measure relates to other measures, and is based on theoretically derived hypotheses regarding the concepts being assessed (Carmines & Zeller, 1979). This type of validity is particularly important when criterion-related validity cannot be established (i.e., when there is no acceptable gold standard measure with which to ascertain the quality of the construct being measured; Cronbach & Meehl, 1955). Currently, no gold standard indicator of physical post traumatic growth exists. Thus, construct validity will be assessed using convergent validity.

Convergent validity is the degree to which scores on a measure are correlated with scores on related measures (Furr & Bacharach, 2008). It will be investigated by testing hypotheses formulated in accordance with extant research and theories on post traumatic growth; specifically, post traumatic growth, body awareness and mindfulness, which have been directly and indirectly related to physical post traumatic growth (Bishop et al., 2004; Crane-Okada et al., 2012;
Hefferon et al., 2009) will be examined. Following a review of current literature it can be seen that there is much conceptual overlap between post traumatic growth, mindfulness and body awareness which have been linked with core aspects of physical post traumatic growth (Chapter 3), such as attention and awareness. These are, therefore, suitable concepts to test convergent validity with physical post traumatic growth. The current research tests the relationships between physical PTG, traditional PTG, mindfulness and body awareness.

Physical post traumatic growth could be viewed as the ‘sixth’ dimension of post traumatic growth as defined by Calhoun and Tedeschi (2006). Mindfulness contains aspects of awareness and attention that are core parts of physical post traumatic growth (Hefferon et al., 2009, 2010). Furthermore, body awareness is thematically related to integral qualitative findings of physical post traumatic growth where illness seemed to prompt a greater general awareness of the body especially monitoring the body and listening more to the body (Hefferon et al., 2009, 2010).

5.3.1 Study Two Hypotheses. Participants who are higher in physical post traumatic growth will be higher in traditional post traumatic growth (Hypothesis One), higher in mindfulness (Hypothesis Two) and higher in body awareness (Hypothesis Three).

5.4 Item Generation for the P-PTGI

Item generation was grounded in scale development guidelines set forth by DeVellis (2003). Specifically, an extensive review of the post traumatic growth literature and a qualitative investigation (Study One) was conducted; the results of which were combined to inform item generation. This involved a process whereby all aspects related to physical post traumatic growth emerging from the qualitative interviews and extensive literature review were transformed into scale items. Any acknowledgment of positive change following physical trauma was considered relevant to the exploration of the new construct of physical post traumatic growth and was included in the measure. The
theme ‘New Awareness’ in the qualitative study was the source for items relating to appreciation of health and new health behaviours which were the basis for item generation (e.g., ‘my appreciation for my health has...’). This process yielded 69 items. To create a high quality measure, the item pool with candidate items was exhaustive and over-inclusive (DeVellis, 2003). Furthermore, items were written in such a way as to avoid confusion or ambiguity (e.g. “The time I put into researching information about my health has...”). All items were worded to be compatible with Likert-type response formats, due to their ease of administration and analysis (DeVellis, 2003). Items were designed to enable expression of varying levels of growth following trauma and various levels of quality of life and experience of side effects. To illustrate, “not applicable” and “not changed” options were included thereby enabling men to respond to all items. The aim was to incorporate previous qualitative work in this area and to extend it to prostate cancer as research, to date, has primarily been conducted with women with breast cancer.

To measure the content validity of the scale and ensure its readiness for psychometric evaluation, a panel of experts was recruited to assess the proposed items. The role of the content experts was clearly defined using guidelines to assess the theoretical relevance of the items (Davis, 1992). The panel consisted of content experts (i.e., individuals who have worked or published in the fields of psychometrics [$n = 1$] and prostate cancer and post traumatic growth research [$n = 4$]). Experts were asked to rate all items in terms of relevance to the construct (Davis, 1992). Their responses were examined and the measure was revised to accommodate this feedback (see Appendix E).

The initial item pool consisted of 69 questions reflecting the in-depth qualitative interviews that were conducted, as well as the literature review. Following feedback from content experts, 46 items were retained for distribution. Items were worded so that higher scores indicate greater physical post traumatic growth (i.e., -2=greatly
decreased, -1 = somewhat decreased, 0 = not changed, 1 = somewhat increased, 2 = greatly increased, 3 = not applicable to me). Following factor analyses, these raw scores ranging from -2 to 3, were re-coded for the purposes of calculating means, inter-item correlations and construct validity, such that the “not applicable” (raw score of 3) was changed to missing value (coded as “99”). This was used to avoid inflated scores (i.e., if ‘not applicable’ was used in the analysis rather than a missing value, individuals who found many items not applicable would have an artificially high score as ‘not applicable’ was coded as a value of three). In addition, individual’s overall P-PTGI score was calculated as a mean score; this is because a total score may look to be higher by virtue of an individual answering more questions. For example, an individual responding to all items but experiencing low levels of growth would appear to be equivalent to an individual who may have less items ‘applicable’ but perceive greater levels of growth for those that are applicable to them. If total scores, rather than mean scores, were computed, these individuals may appear to have the same level of growth; however, this would be an inaccurate depiction of both experiences. Therefore, to best represent the level of physical post traumatic growth mean scores were calculated.

5.5 Method

5.5.1 Participants. There were two phases of recruitment. In the first phase, a sample of 300 men at the Rapid Access Prostate Clinic in University Hospital Galway was invited to take part in this study (Appendix F). All patients who were at least one year post treatment were invited via a letter in a postal questionnaire packet to participate. This packet contained an information sheet (Appendix G) and, to eliminate burden, only one questionnaire (the pool of candidate items for the P-PTGI in development). The information gleaned from this analysis resulted in a reduced version of the P-PTGI which participants in recruitment phase two completed, along with eight other measures.
In the first recruitment phase there were 92 respondents to the pen and paper postal questionnaire (response rate = 30.67%). An upper limit of ten years since diagnosis was applied in this study. As records were only available from time of commencement of the clinic in 2009, long term survivors were sourced through online recruitment and cancer support groups. A further 360 participants completed the online questionnaire.

The total sample (online and postal) consisted of 452 men who ranged in age from 42-91 years (M = 64.22, SD = 8.10). Approximately 61.97% of participants were from North America (n = 277), 32.70% were from Europe (n = 148), 3.80% were from Oceania (n = 17), 0.22% were from Africa (n = 1), 0.20% were from Asia (n = 4), and 1.11% were from South America (n = 5). The sample consisted of 5 different treatment groups: surgery only (28.10%, n = 127), radiotherapy only (19.03%, n = 86), hormone therapy only (2.43%, n = 11), combination (36.06%, n = 163) and other (4.20%, n = 19). In addition to this, some participants had not opted for active treatment, choosing ‘active surveillance’ (8.85%, n = 40), while six individual’s did not indicate a treatment (1.33%).

When the online and paper and pencil samples were compared and tested for differences in demographic characteristics (age and time since diagnosis), no differences were found (p > .05). This sample was then categorised into three groups indicating their ‘time since diagnosis’. A one-way analysis of variance (ANOVA) was conducted to test for differences between groups on physical post traumatic growth items; no differences were found between groups (1-2 years, 3-4 years, 5-10 years). For the purpose of statistical analyses, the participants (n = 452) were then randomly split into two independent samples: Data Set A (n = 226, age range = 46-89 years, M = 64.24, SD = 8.02) and Data Set B (n = 226, age range = 42-91 years, M = 64.20, SD = 8.19).

The second recruitment phase (i.e., for the SEM analyses) was conducted using the full questionnaire packet. The second recruitment phase contained 241 participants (59.75% completed the survey
The total number of respondents to the pen and paper questionnaires packet was 97 (response rate = 32.33%). When the online and paper and pencil samples were compared and tested for differences in demographic characteristics (age and time since diagnosis), a significant difference in age was found, \( t(239) = -3.33, p < .01 \), Cohen's \( d = 0.44 \), as the online sample was younger (mean age = 62.72 years, \( SD = 7.58 \)) than the postal sample (mean age = 66.05 years, \( SD = 7.60 \)). No difference was found between groups for ‘time since diagnosis’ \( (p > .05) \). In addition, no difference was found between the three ‘time since diagnosis’ groups (1-2 years, 3-4 years, 5-10 years) on post traumatic growth and physical post traumatic growth \( (p \text{'s } > .05) \).

This sample ranged in age from 44-88 years (M = 64.02, SD = 7.76). Approximately 46.90% of this sample were from North America (n = 113), 47.7% were from Europe (n = 115), 3.3% were from Oceania (n = 8), 0.8% were from Africa (n = 2), 0.8% were from Asia (n = 2), and 0.4% of unknown origin (n = 1). The sample consisted of five different treatment groups: surgery only (22.0%, n = 53), radiotherapy only (30.7%, n = 74), hormone therapy only (3.3%, n = 8), combination (33.2%, n = 80) and other (5.4%, n = 13). In addition, some participants had not opted for treatment, choosing ‘active surveillance’ (5.0%, n = 12).

**5.5.2 Procedure.** Ethical approval was obtained from the University Hospital Galway Research Ethics Board and the NUI Galway Research Ethics Board.

Potential websites, forums or discussion groups were identified for online recruitment. The moderator or a coordinator in the organisation was contacted with details of the study and a request that the link be posted. When permission was received, details of the study were posted (or sent to discussion group members) directly by the researcher or by the relevant contact person. A website was created ([www.helpprostate.com](http://www.helpprostate.com)) which provided an information sheet and contact details of the researcher. The participant information sheet stated that men who had prostate cancer were eligible to participate.
The website also contained a link to the online questionnaire (Appendix H) hosted by Surveygizmo®. At the Surveygizmo® link, the participant was requested to complete a consent form before proceeding to the questionnaire. The purpose of the study and ethical requirements for research with human participants were described (i.e., participation was anonymous and voluntary).

All patients who were at least one year post treatment were identified for postal recruitment from two medical databases consisting of men who received surgery and who had received adjuvant treatment at a Rapid Access Prostate Cancer Diagnostic Clinic, at University Hospital Galway. Participants were invited via a letter in a postal questionnaire packet to participate. Participants who returned their postal questionnaires were entered into a draw to win a gift voucher worth €100. Online participants were invited to email the researcher with their contact details if they wished to be entered into this draw as the online questionnaire was anonymous.

5.5.3 Data Analytic Strategy

**Missing Data.** Little's Missing Completely at Random (MCAR) test (Little, 1988) was used. In the current study, Little’s test was significant for the P-PTGI ($p > .05$) so data were found to be not missing completely at random, however missing values were below 5% so Expectation Maximization (EM) methods were used to substitute missing values. EM is considered an excellent procedure for handling missing data, compared to traditional approaches (e.g., casewise deletion) as it reduces the likelihood of scoring bias (Allison, 2001; Graham, 2009), and is acceptable when the percentage of missing data is minimal (Graham, 2009).

**Factor Analysis.** Two types of factor analysis are used for scale development: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). EFA allows items to be related to any of the underlying factors; hence, it is most advantageous when the underlying relationships between items and factors are unknown. CFA, in contrast, requires a theoretical or empirical basis for an assumed factor structure.
(Fabrigar et al., 1999). Accordingly, the item pool was subjected to an EFA and two subsequent CFA.

The issue of sample size is complex in exploratory factor analysis (Fabrigar et al., 1999). It is generally regarded that a larger sample is better for this technique. The current studies have a sample-to-variable ratio of at least 4.9:1 (EFA). Given the strict criteria for item reduction outlined, the strength of the data is considered appropriate, and is therefore suitable for EFA analyses.

**Figure 5.1**
Recruitment and factor analyses flow chart

### 5.6 Exploratory Factor Analysis on Dataset A

The factorability of the data was examined using Bartlett’s test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. If Bartlett’s test is statistically significant it indicates that the variables being factor analysed are related to one another (i.e., the correlation matrix for the data is not an identity matrix (Tabachnick & Fidell, 2007). For the KMO measure, values above .60 are necessary for EFA (Tabachnick & Fidell, 2007). As Bartlett’s test was statistically
significant ($p < .001$) and the KMO statistic exceeded .60 (KMO = .912), EFA was suitable for the data.

The dimensionality was examined using principal axis factoring (PAF) with oblique rotation (direct oblimin, delta set at zero). PAF is a method of extraction which fits common factor models to data without distributional assumptions (Fabrigar et al., 1999). Oblique rotation was employed as some degree of interrelatedness among factors was expected. Principle component analysis (PCA) was not used as it is regarded as an item reduction technique. Although numerous researchers have employed PCA for scale development, it is not deemed an optimal technique for scale development as it does not differentiate between unique and shared variance. This can result in inflated values of variance accounted for by components (Costello & Osbourne, 2005).

Decisions regarding the number of factors to retain were based on a parallel analysis (O’Connor, 2000), in conjunction with an examination of the scree plot. Parallel analysis generates eigenvalues from random data sets that match (or are parallel to) the actual data set in relation to number of participants and variables. Eigenvalues from the random data set are then compared to eigenvalues of the actual data set. The number of factors to retain is indicated when a given eigenvalue for the random data becomes larger than the corresponding eigenvalue for the real data (Pallant, 2007). A screeplot is a graph of eigenvalues; the number of factors to retain is suggested by counting the number of data points above where the curve flattens out, excluding the data point where the break occurs (Costello & Osborne, 2005).

**5.6.1 Item reduction.** Each factor was assessed for the presence of redundant items. High correlations between variables may indicate item redundancy; thus, if two items correlated with each other in excess of .90 (Field, 2009), the item with the lower factor loading was deleted. Items were removed if inter-item correlations were weak (i.e., $r$s across other items were less than .30; Field, 2009). In addition, corrected item-total correlations for each factor were inspected; items with values less than .30 were removed (Field, 2009). For the purpose of retaining
items, the minimal acceptable factor loading was .40, with no cross-loadings greater than .32 (Worthington & Whittaker, 2006).

5.6.2 Normality. Distributions of scores on the P-PTGI items were inspected for normality (i.e. skewness and kurtosis). In line with guidelines the items evidenced an acceptable degree of standardised skew (range from 0.24 - 2.98; Chou & Bentler, 1995; Weston & Gore, 2006), as a degree of skewness greater than 3 are considered ‘extreme’. Kurtosis was also within an acceptable range given that standardised kurtosis values are below 10 (range from 0.02 - 5.38; Kline, 2011).

5.7 Confirmatory Factor Analysis on Dataset B and C

To investigate the factor structure of the P-PTGI which emerged, Data Set B was subjected to CFA. Model fit, or how adequately each item resides within a model (Byrne, 2009), was assessed using multiple criteria as per Kline’s recommendations (Kline, 2011). In the current study, absolute fit was examined using the chi-square/df ratio (Q) and the Root Mean Square Error of Approximation (RMSEA); comparative fit was assessed using Bentler’s comparative fit index (CFI). Stringent thresholds were used to assess model fit: Q < 5, RMSEA < .08, CFI >.90 signify adequate fit while Q < 2, RMSEA <.06, and CFI > .95 denote excellent fit (Byrne, 2009; Tabachnick & Fidell, 2007).

Although the chi-square statistical significance test (where statistical non-significance suggests good model fit to data) is not very useful when determining the fit of a single model, and is almost always statistically significant for large samples (i.e., greater than 400), it is reported as per current guidelines (Kline, 2011; Thompson, 2004).

To further investigate the factor structure of the P-PTGI, two subsequent confirmatory factor analyses were conducted with two independent datasets B and C (Dataset B; N=226, Dataset C; N=241) using best practice guidelines as previously outlined. The chi-square statistical significance test (where statistical non-significance suggests good model fit to data) is reported as per current guidelines (Kline, 2011; Thompson, 2004), although it is not very useful when
determining the fit of a single model, and is almost always statistically significant for large samples (i.e., greater than 400).

5.8 Construct Validity of the P-PTGI

Convergent validity was tested (see Table 5.8). Three measures were used in this way to assess their hypothesised relationship with the Physical Post Traumatic Growth Inventory (P-PTGI): (1) the Post Traumatic Growth Inventory (Tedeschi & Calhoun, 1995), (2) Frieburg Mindfulness questionnaire (Walach, Buchheld, Buttenmüller, Kleinknecht, & Schmidt, 2006) and (3) the Private Body Consciousness Subscale of the Body Awareness Questionnaire (Miller, Murphy, & Buss, 1981). See Table 5.7 for mean, standard deviation, range, Cronbach’s alpha, and possible range scores. These relationships were assessed using Pearson product moment correlation co-efficient.

To avoid inflation of physical post traumatic growth scores, the “not applicable” option was coded as missing values for all validity analyses (Meyer-Bahlburg & Dolezal, 2007; Yule, Davison, & Brotto, 2011). Thus, rather than calculating a total scale score, for each respondent, a mean item score was calculated based on the number of items the participant had answered (i.e., items that were applicable to them). This means that all response options are acknowledged and included in analysis. This is an important part of measuring positive change, as some participants may not feel that they have experienced changes as described in some of the items and other items may not be applicable to them.

5.8.1 Physical Post Traumatic Growth Inventory (P-PTGI).

The final P-PTGI measure consisted of 20 items. These items aim to assess post traumatic growth following physical trauma. Respondents are asked to consider how they feel now after diagnosis and treatment on a 6 point Likert scale ranging from -2 (greatly decreased) to 2 (greatly increased). The scale also includes non-response options such as 0 (no change) and 3 (not applicable to me). The ‘not applicable to me’ option is to be coded as 99 (missing value) and mean scores should be
calculated rather than total scores. Higher scores indicate greater physical post traumatic growth. From the original 69 items, 20 items were removed following expert content analysis. Following this, 46 items were investigated using exploratory factor analysis, and confirmatory factor analysis.

5.8.2 Psychometric properties of the Post Traumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1995). The PTGI is a 21-item scale that provides a measure of positive change following trauma. The scale contains five dimensions: relating to others (e.g. ‘I have a greater sense of closeness with others’), new possibilities (e.g. ‘I developed new interests’), personal strength (e.g. ‘I have a greater feeling of self-reliance’), appreciation of life (e.g. ‘I have a greater appreciation for the value of my own life’) and spiritual change (e.g. ‘I have a stronger religious faith’). Respondents indicate the degree to which the positive change has occurred in their life as a result of the trauma. Responses are coded on a 6 point Likert scale ranging from 0 (not at all) to 5 (a very great deal). Higher scores indicate greater levels of positive life changes.

Adequate reliability and validity have been demonstrated including internal consistency and test re-test reliability, concurrent and discriminant validity (Tedschi & Calhoun, 1995). Previously, concurrent validity was tested with social desirability (measured via the Marlowe- Crowne Social Desirability Scale; Crowne & Marlowe, 1960) as the benefits described were deemed to be desirable. Personality characteristics were also tested such as optimism. Optimism (measured via the Life Orientation Test; Scheier & Carver, 1985) reflects the extent to which people hold generalised favorable expectancies for their future (Carver, Scheier & Segerstrom, 2010). It was expected that optimists may have a tendency to perceive benefits from trauma. Responses were found to be unrelated to the motive to appear socially desirable, while perceiving benefits was most consistently associated with personality traits of extraversion, the
tendency to be open to internal experience and to optimism (Tedschi & Calhoun, 1995).

In the current study, Cronbach’s alpha for total PTGI was .97 (95% CI = .96-.97). Alpha coefficients for the PTGI subscales also were excellent: Relating to others was .93 (95% CI = .91-.94), for New possibilities it was .90 (95% CI = .87-.92), for Personal strength was .88 (95% CI = .86-.91), Appreciation of Life was .87 (95% CI = .84-.90). As the Spiritual Change subscale only has two items, Cronbach’s alpha is not appropriate (Streiner, 2003), rather, a correlation coefficient was calculated and deemed to be acceptable (r = .82; Streiner, 2003).

5.8.3 Psycometric properties of the Freiburg Mindfulness Inventory (FMI; Walach et al., 2006). The FMI is a 14-item scale that provides a brief measure of mindfulness. Responses are coded on a four point Likert scale from 1 (rarely) to 4 (almost always). Higher scores denote higher levels of mindfulness. Construct validity was demonstrated. Mindfulness was found to be related to, but not completely explained by, self-awareness and dissociation (Walach et al., 2006).

The psychometric properties of the FMI-14 item were investigated in an online convenience sample of n = 244 individuals (Kohls, Sauer, & Walach, 2009). Criterion validity was established using a simplified version of the beck depression inventory (BDI-V, r= -.51) and the trait subscale of the state-trait-anxiety-inventory (STAI-T, r=-.59). In the current study, Cronbach’s alpha was .91 for mindfulness (95% CI = .89-.93).

5.8.4 Psychometric Properties of the Private Body Consciousness Sub-Scale (PBCS) of the Body Consciousness Questionnaire (BCQ; Miller et al., 1981). This is a widely used measure of body awareness (e.g., see Mehling et al., 2009). Initial validation in student samples revealed three factors: ‘public body consciousness’, ‘private body consciousness’ and ‘body competence’. PBCS is a 5-item subscale of the Body Consciousness Questionnaire that
represents a disposition to focus on internal body sensations, being aware of interoceptive feedback, and being sensitive to changes in bodily states (Miller et al., 1981). The instrument has been used in a variety of patient populations (Ferguson & Ahles, 1998) with similar scores reported across different groups and controls, supporting how the construct is independent from illness (i.e. chronic pain).

Validity and reliability has been supported across various studies. Healthy young women exhibited improved PBCS scores after a 7-week exercise program associated with improved fitness (Skrinar, Bullen, Cheek, Mc Arthur, & Vaughan, 1986). Higher scores were also related to improved outcomes in hemodialysis patients (Christensen, Wiebe, Edwards, Michels, & Lawton, 1996). In the current study Cronbach's alpha for body awareness was .77 (95% CI = .72 - .81)

5.9 Results

5.9.1 Exploratory Factor Analysis on Dataset A. Applying the aforementioned item removal criteria (e.g., inter-item correlations, factor loadings), 25 items were retained. Using syntax provided by O'Connor (2000), parallel analysis suggested that a 3 factor solution should be retained (i.e., the first 3 eigenvalues for the real data [14.25, 5.07, 2.31] exceed the first 3 eigenvalues for the random data [1.94, 1.83, 1.75]).

Visual inspection of the scree plot suggested a four factor solution (Figure 5.1). The decision was made to run a four factor solution rather than a three factor solution. This was due to the three factor solution returning several issues including low inter-item correlations. A four factor solution was therefore conducted in order to maximise the amount of variance explained by the items. This four factor solution accounted for 54.13% of the total variance (see Table 5.1 for eigenvalues and factor loadings). Inspection of the items’ loadings on each factor suggested they measure: Health Autonomy (10 items), Health Awareness (11 items), Health Behaviour Change (1 item) and Health Acceptance (3 items).
Figure 5.2
Scree plot of Dataset A suggesting a four factor solution.

On examination of the four factors that emerged from the EFA analysis, a number of problems arose. First, the Health Behaviour change factor contained only one item which reached the minimum criteria, therefore this factor was not suitable for further analyses (Byrne, 2009). Furthermore, the Health Acceptance factor did not reach acceptable reliability criteria, as inter-item correlations were below the .30 threshold and was therefore removed (Field, 2009). Therefore, given the stringent item reduction criteria as listed above, only two factors were retained for CFA on Dataset B; Health Autonomy and Health Awareness. Factor loadings are displayed in Table 5.1. The descriptive statistics for the two factors, including means, standard
deviation, internal reliability, and tests for skewness and kurtosis are outlined in Table 5.2.

Inter-factor correlations for Health Autonomy, Health Awareness and total physical post traumatic growth were assessed (see Table 5.3). The average inter-item correlation for Health Awareness was .50 (range = .30 - .73) and for Health Autonomy was .50 (range = .25 - .79). Item co-variances ranged from .23 to .44 for Health Awareness (M = .32) and ranged from .25 to .79 for Health Autonomy (M = .50).

These findings illustrate that the two factors were moderately correlated with each other. This analysis suggests that these factors were measuring related, though distinct, aspects of the physical post traumatic growth experience.
Table 5.1

*Factor Loadings for Exploratory Factor Analysis*

<table>
<thead>
<tr>
<th>Item</th>
<th>Health Autonomy</th>
<th>Health Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>My trust in my body has...</td>
<td>.90</td>
</tr>
<tr>
<td>38</td>
<td>The feeling that I have control over my health has...</td>
<td>.82</td>
</tr>
<tr>
<td>37</td>
<td>My confidence in my body has...</td>
<td>.82</td>
</tr>
<tr>
<td>36</td>
<td>The empowerment I feel physically has...</td>
<td>.73</td>
</tr>
<tr>
<td>12</td>
<td>The control I feel over my body has...</td>
<td>.65</td>
</tr>
<tr>
<td>25</td>
<td>The feeling that I have overcome any negative physical changes has...</td>
<td>.64</td>
</tr>
<tr>
<td>21</td>
<td>I feel the physical strength in my body has...</td>
<td>.53</td>
</tr>
<tr>
<td>35</td>
<td>My confidence that my body will be strong enough to recover has...</td>
<td>.52</td>
</tr>
<tr>
<td>7</td>
<td>The feeling that my body is reliable</td>
<td>.46</td>
</tr>
<tr>
<td>29</td>
<td>The sense of achievement in overcoming the physical obstacles of my illness has...</td>
<td>.42</td>
</tr>
<tr>
<td>15</td>
<td>My awareness of my own body has...</td>
<td>.01</td>
</tr>
<tr>
<td>13</td>
<td>The amount I listen to my body has...</td>
<td>-.08</td>
</tr>
<tr>
<td>14</td>
<td>The amount I monitor my body...</td>
<td>-.01</td>
</tr>
<tr>
<td>17</td>
<td>My concern for my overall health has...</td>
<td>-.06</td>
</tr>
<tr>
<td>23</td>
<td>My responsibility for my health has...</td>
<td>.10</td>
</tr>
<tr>
<td>9</td>
<td>The attention I pay to how my body works has...</td>
<td>-.06</td>
</tr>
<tr>
<td>42</td>
<td>My awareness of parts of my body has...</td>
<td>-.01</td>
</tr>
<tr>
<td>Item</td>
<td>Health Autonomy</td>
<td>Health Awareness</td>
</tr>
<tr>
<td>------</td>
<td>-----------------</td>
<td>------------------</td>
</tr>
<tr>
<td>16</td>
<td>The care I give my body has...</td>
<td>.20</td>
</tr>
<tr>
<td>10</td>
<td>My appreciation for good health has...</td>
<td>.04</td>
</tr>
<tr>
<td>28</td>
<td>The time I put into researching information about my health has...</td>
<td>-.05</td>
</tr>
<tr>
<td>27</td>
<td>The respect I have for my health has...</td>
<td>.27</td>
</tr>
</tbody>
</table>

Eigenvalues

<table>
<thead>
<tr>
<th>% of variance</th>
<th>Health Autonomy</th>
<th>Health Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.25</td>
<td>33.14%</td>
<td>5.07</td>
</tr>
<tr>
<td>5.07</td>
<td>11.80%</td>
<td></td>
</tr>
</tbody>
</table>

Note: Health Autonomy (10 items), Health Awareness (11 items). Items displayed have met item reduction criteria and are suitable for CFA.
**Table 5.2**
*Descriptive Statistics for P-PTGI*

<table>
<thead>
<tr>
<th>Factor</th>
<th>M</th>
<th>SD</th>
<th>α</th>
<th>95% CI</th>
<th>Possible Range</th>
<th>Attained Range</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Autonomy</td>
<td>-0.14</td>
<td>0.78</td>
<td>.91</td>
<td>.89-.93</td>
<td>-2.00 - 2.00</td>
<td>-2.00 - 2.00</td>
<td>0.43 - 4.55</td>
<td>0.38 - 2.21</td>
</tr>
<tr>
<td>Health Awareness</td>
<td>0.96</td>
<td>0.66</td>
<td>.92</td>
<td>.91-.94</td>
<td>-2.00 - 2.00</td>
<td>-1.90 - 2.00</td>
<td>1.39 - 6.26</td>
<td>0.24 - 3.82</td>
</tr>
</tbody>
</table>
Table 5.3  
*Summary of inter-correlations for P-PTGI subscales and total scale scores*

<table>
<thead>
<tr>
<th></th>
<th>Health Autonomy</th>
<th>Health Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Autonomy</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Health Awareness</td>
<td>.40***</td>
<td>-</td>
</tr>
<tr>
<td>Total P-PTG</td>
<td>.83***</td>
<td>.78***</td>
</tr>
</tbody>
</table>

Note: *p<.05, **p <.01, ***<.001
5.9.2 Results for Confirmatory Factor Analysis on Dataset B.

The original 21-item P-PTGI did not possess adequate model fit when conducted with dataset B: \( \chi^2 (188) = 458.99, p < .001; Q = 2.44; \text{RMSEA} = .08 (90\% \text{CI}: .07 - .09); \text{CFI} = .90; \text{AIC} = 544.99 \) and \( \text{SRMR} = .07 \).

Due to the poor model fit, steps were taken to identify model misspecification. As part of this process items were first thematically reviewed. Following this analysis of the items within both factors, item 27 ‘The respect I have for my health has...’ was deemed to be thematically different from the other 10 items within the Health Awareness factor and was therefore deleted. This had a significant positive effect on the model (see Table 5.4). Following this five covariances were added to the model based on recommendations from modification indices. These covariances were observed to be thematically related, therefore their inclusion was justified. Each covariance contributed significantly improved the model. The final model fit indices illustrated a very good fit to the data; \( \chi^2 (164) = 284.13, p < .001; Q = 1.73; \text{RMSEA} = .06 (90\% \text{CI}: .05 - .07); \text{CFI} = .95; \) and \( \text{AIC} = 376.13 \) and \( \text{SRMR} = .06 \). The final factor loadings are shown in Table 5.5.

Reliability of the final measure of P-PTGI was excellent (see Table 5.4 for overall reliability). The final subscales displayed high internal reliability, for instance, reliability was found to be .92 (95\%CI = .90 - .93; Health Awareness) and .91 (95\%CI = .89 - .93; Health Autonomy) respectively, with a total scale reliability of .92 (95\% CI = .90 - .93). This illustrates that the pattern of scoring on items within each factor was consistent, providing evidence that items represented a similar overarching construct within each factor. In addition, the overall reliability of the scale illustrates that the items represent two distinct, but related factors.
Table 5.4  
Confirmatory factor analysis models for physical post traumatic growth on Dataset B

<table>
<thead>
<tr>
<th>Model</th>
<th>$x^2$ ($df$)</th>
<th>$\alpha$ (95% CI)</th>
<th>$Q$</th>
<th>RMSEA (90% CI)</th>
<th>CFI</th>
<th>AIC</th>
<th>$\Delta$ AIC</th>
<th>$x^2$ diff ($df$)</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Post Traumatic Growth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-PTGI 21 items</td>
<td>458.99 (188)</td>
<td>.92 (.90 - .93)</td>
<td>2.44</td>
<td>.80 (.071-.089)</td>
<td>.90</td>
<td>544.99</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Delete item 27</td>
<td>400.56 (169)</td>
<td>.91 (.89 - .93)</td>
<td>2.37</td>
<td>.078 (.068-.088)</td>
<td>.91</td>
<td>482.56</td>
<td>62.43</td>
<td>58.43 (19)</td>
<td>.0005</td>
</tr>
<tr>
<td>Co-vary item 12 and 21</td>
<td>369.59 (168)</td>
<td>.92 (.90 - .93)</td>
<td>2.20</td>
<td>.073 (.063-.083)</td>
<td>.92</td>
<td>453.59</td>
<td>28.97</td>
<td>30.97 (1)</td>
<td>.0005</td>
</tr>
<tr>
<td>Co-vary item 13 and 14</td>
<td>345.30 (167)</td>
<td>.92 (.90 - .93)</td>
<td>2.07</td>
<td>.069 (.059-.079)</td>
<td>.93</td>
<td>431.30</td>
<td>22.29</td>
<td>24.29 (1)</td>
<td>.0005</td>
</tr>
<tr>
<td>Co-vary item 36 and 38</td>
<td>320.42 (166)</td>
<td>.92 (.90 - .93)</td>
<td>1.93</td>
<td>.064 (.054-.075)</td>
<td>.94</td>
<td>408.42</td>
<td>22.88</td>
<td>24.88 (1)</td>
<td>.0005</td>
</tr>
<tr>
<td>Co-vary item 9 and 10</td>
<td>305.58 (165)</td>
<td>.92 (.90 - .93)</td>
<td>1.85</td>
<td>.062 (.051-.072)</td>
<td>.94</td>
<td>395.58</td>
<td>12.84</td>
<td>14.84 (1)</td>
<td>.0005</td>
</tr>
<tr>
<td>Co-vary 13 and 16</td>
<td>284.13 (164)</td>
<td>.92 (.90 - .93)</td>
<td>1.73</td>
<td>.057 (.046-.068)</td>
<td>.95</td>
<td>376.13</td>
<td>19.45</td>
<td>21.45 (1)</td>
<td>.0005</td>
</tr>
<tr>
<td><strong>Final Model</strong></td>
<td>284.13 (164)</td>
<td>.91 (.89 - .93)</td>
<td>1.73</td>
<td>.057 (.046-.068)</td>
<td>.95</td>
<td>376.13</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
Figure 5.3
*Final Confirmatory factor analysis model for physical post traumatic growth on Dataset B.*
Table 5.5

*Final factor loadings of CFA using dataset B on physical post traumatic growth*

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor</th>
<th>B</th>
<th>B</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>Health</td>
<td>.86</td>
<td>1.00</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Health</td>
<td>.69</td>
<td>.83</td>
<td>.07</td>
</tr>
<tr>
<td>12</td>
<td>Health</td>
<td>.69</td>
<td>.81</td>
<td>.07</td>
</tr>
<tr>
<td>21</td>
<td>Health</td>
<td>.49</td>
<td>.51</td>
<td>.07</td>
</tr>
<tr>
<td>25</td>
<td>Health</td>
<td>.72</td>
<td>.87</td>
<td>.07</td>
</tr>
<tr>
<td>29</td>
<td>Health</td>
<td>.58</td>
<td>.70</td>
<td>.07</td>
</tr>
<tr>
<td>35</td>
<td>Health</td>
<td>.79</td>
<td>1.02</td>
<td>.07</td>
</tr>
<tr>
<td>36</td>
<td>Health</td>
<td>.80</td>
<td>.99</td>
<td>.07</td>
</tr>
<tr>
<td>37</td>
<td>Health</td>
<td>.86</td>
<td>1.05</td>
<td>.06</td>
</tr>
<tr>
<td>38</td>
<td>Health</td>
<td>.84</td>
<td>1.04</td>
<td>.06</td>
</tr>
<tr>
<td>9</td>
<td>Health</td>
<td>.68</td>
<td>1.00</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Health</td>
<td>.70</td>
<td>.99</td>
<td>.09</td>
</tr>
<tr>
<td>13</td>
<td>Health</td>
<td>.74</td>
<td>1.09</td>
<td>.11</td>
</tr>
<tr>
<td>14</td>
<td>Health</td>
<td>.75</td>
<td>1.02</td>
<td>.10</td>
</tr>
<tr>
<td>15</td>
<td>Health</td>
<td>.73</td>
<td>1.00</td>
<td>.10</td>
</tr>
<tr>
<td>16</td>
<td>Health</td>
<td>.82</td>
<td>1.12</td>
<td>.10</td>
</tr>
<tr>
<td>17</td>
<td>Health</td>
<td>.72</td>
<td>1.01</td>
<td>.10</td>
</tr>
<tr>
<td>23</td>
<td>Health</td>
<td>.71</td>
<td>.99</td>
<td>.10</td>
</tr>
<tr>
<td>28</td>
<td>Health</td>
<td>.47</td>
<td>.69</td>
<td>.11</td>
</tr>
<tr>
<td>42</td>
<td>Health</td>
<td>.47</td>
<td>.68</td>
<td>.10</td>
</tr>
</tbody>
</table>

*Note.* B = unstandardised factor loadings; β = standardised factor loadings; SE = standard error.
5.9.3 Results for Confirmatory Factor Analysis conducted on Dataset C. The 20-item P-PTGI from our first CFA on Dataset B did not possess adequate model fit when conducted with dataset C: $\chi^2 (164) = 512.42, p < .001; Q = 3.21; RMSEA = .09 (90\% CI: .09-.10); CFI = .88; and AIC = 604.42$.

Due to the poor model fit, steps were taken to identify model misspecification. Following this five co-variances were added to the model based on recommendations from modification indices. This was in addition to the five covariances from the CFA on Dataset B. These additional co-variances were observed to be thematically related, therefore their inclusion was justified. Each covariance contributed significantly and improved the model (see Table 5.6). The final model fit indices illustrated a very good fit to the data; $\chi^2 (159) = 340.19, p < .001; Q = 2.14; RMSEA = .07 (90\% CI: .06-.08); CFI = .94; and AIC = 442.19$. The final list of the 20 P-PTGI items are included in Appendix I.
Table 5.6
Confirmatory Factor Analyses Model of final Physical Post Traumatic Growth Inventory (P-PTGI).

<table>
<thead>
<tr>
<th>Model</th>
<th>$x^2$ (df)</th>
<th>Q</th>
<th>RMSEA (90% CI)</th>
<th>CFI</th>
<th>AIC</th>
<th>∆ AIC</th>
<th>$x^2$diff (df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-PTGI (20 items)</td>
<td>512.42</td>
<td>3.12</td>
<td>.09 (.09-.10)</td>
<td>.88</td>
<td>604.42</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Co-vary item 39 and 7</td>
<td>407.68</td>
<td>2.50</td>
<td>.08 (.07-.09)</td>
<td>.92</td>
<td>501.68</td>
<td>102.74</td>
<td>104.74 (1)</td>
<td>.0005</td>
</tr>
<tr>
<td>Co-vary item 7 and 35</td>
<td>397.48</td>
<td>2.45</td>
<td>.08 (.07-.09)</td>
<td>.92</td>
<td>493.48</td>
<td>8.2</td>
<td>10.2 (1)</td>
<td>.0025</td>
</tr>
<tr>
<td>Co-vary item 29 and 35</td>
<td>378.29</td>
<td>2.35</td>
<td>.08 (.07-.09)</td>
<td>.93</td>
<td>476.29</td>
<td>17.19</td>
<td>19.19 (1)</td>
<td>.0005</td>
</tr>
<tr>
<td>Co-vary item 29 and 36</td>
<td>358.23</td>
<td>2.24</td>
<td>.07 (.06-.08)</td>
<td>.93</td>
<td>458.23</td>
<td>18.06</td>
<td>20.06 (1)</td>
<td>.0005</td>
</tr>
<tr>
<td>Co-vary item 42 and 28</td>
<td>340.19</td>
<td>2.14</td>
<td>.07 (.06-.08)</td>
<td>.94</td>
<td>442.19</td>
<td>16.04</td>
<td>18.04 (1)</td>
<td>.0005</td>
</tr>
<tr>
<td>Final Model</td>
<td>340.19</td>
<td>2.14</td>
<td>.07 (.06-.08)</td>
<td>.94</td>
<td>442.19</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. P-PTGI = Physical Post Traumatic Growth; Q = chi-square/df; RMSEA = root mean square error of approximation; CFI = comparative fit index; AIC = Akaike information criterion; ∆ AIC = delta Akaike information criterion.
Figure 5.4

Final Confirmatory factor analysis model for physical post traumatic growth on Dataset C.
5.9.4 Results of Construct Validity of the P-PTGI. A series of Pearson Product Moment correlations were conducted to assess the construct validity of the Physical Post Traumatic Growth Inventory (P-PTGI). Construct validity of the P-PTGI was supported. As predicted, scores on the P-PTGI were positively correlated with traditional post traumatic growth (total score and its subscales), and with mindfulness supporting Study Two Hypothesis One and Two. However, counter to Study Two Hypothesis Three, physical post traumatic growth was not correlated with body awareness. Further investigation of the physical post traumatic growth subscales showed that Health Awareness was significantly correlated with post traumatic growth total and its subscales. Health Autonomy was related to mindfulness but not to body awareness. Health Awareness was correlated with post traumatic growth total and its subscales, and was related to body awareness but not mindfulness (see Table 5.8).
### Table 5.7
Descriptive Statistics for validation measures

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
<th>Cronbach’s Alpha (α)</th>
<th>95% CI</th>
<th>Possible Range</th>
<th>Attained Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTG – Relating to Others</td>
<td>13.90</td>
<td>10.07</td>
<td>.93</td>
<td>.91 - .94</td>
<td>0-35</td>
<td>0 - 35</td>
</tr>
<tr>
<td>PTG – New possibilities</td>
<td>7.29</td>
<td>6.56</td>
<td>.90</td>
<td>.87 - .92</td>
<td>0-25</td>
<td>0 - 25</td>
</tr>
<tr>
<td>PTG – Personal Strength</td>
<td>7.19</td>
<td>5.65</td>
<td>.88</td>
<td>.86 - .91</td>
<td>0-20</td>
<td>0 - 20</td>
</tr>
<tr>
<td>PTG – Spiritual Change</td>
<td>2.77</td>
<td>3.29</td>
<td>.82&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-</td>
<td>0-10</td>
<td>0 - 10</td>
</tr>
<tr>
<td>PTG – Appre. of Life</td>
<td>7.23</td>
<td>4.21</td>
<td>.87</td>
<td>.84 - .90</td>
<td>0-15</td>
<td>0 - 15</td>
</tr>
<tr>
<td>PTG-Total</td>
<td>38.37</td>
<td>26.64</td>
<td>.97</td>
<td>.96 - .97</td>
<td>0-105</td>
<td>0 - 105</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>36.83</td>
<td>8.65</td>
<td>.91</td>
<td>.89 - .93</td>
<td>14-56</td>
<td>14 - 52</td>
</tr>
<tr>
<td>Body Awareness</td>
<td>17.01</td>
<td>4.08</td>
<td>.77</td>
<td>.72 - .81</td>
<td>5-25</td>
<td>5 - 25</td>
</tr>
</tbody>
</table>

<sup>a</sup> = Subscale only has two items therefore Cronbach’s alpha was not appropriate; Pearson’s correlation coefficient was calculated.
Table 5.8

Summary of inter-correlations for subscales and Total P-PTGI, PTG, Mindfulness and Body Awareness Scores

<table>
<thead>
<tr>
<th>Subscale</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 P-PTGI – Health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 P-PTGI – Health</td>
<td></td>
<td>.19**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Awareness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 P-PTGI – Total</td>
<td>.81***</td>
<td>.73**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 PTG – relating</td>
<td>.18**</td>
<td>.40***</td>
<td>.37***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 PTG – new possibilities</td>
<td>.19**</td>
<td>.40***</td>
<td>.37***</td>
<td>.78***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 PTG – personal strength</td>
<td>.32***</td>
<td>.42***</td>
<td>.47***</td>
<td>.81***</td>
<td>.83***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 PTG – spiritual change</td>
<td>.12</td>
<td>.27***</td>
<td>.24***</td>
<td>.64***</td>
<td>.66***</td>
<td>.63***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 PTG – appreciation</td>
<td>.13*</td>
<td>.53***</td>
<td>.41***</td>
<td>.73***</td>
<td>.75***</td>
<td>.73***</td>
<td>.57***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 PTG – Total</td>
<td>.22**</td>
<td>.46***</td>
<td>.42***</td>
<td>.94***</td>
<td>.92***</td>
<td>.92***</td>
<td>.75***</td>
<td>.84***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Mindfulness</td>
<td>.18**</td>
<td>.12</td>
<td>.20**</td>
<td>.14*</td>
<td>.20**</td>
<td>.18**</td>
<td>.17**</td>
<td>.11</td>
<td>.18**</td>
<td></td>
</tr>
<tr>
<td>11 Body Awareness</td>
<td>.02</td>
<td>.18**</td>
<td>.12</td>
<td>.11</td>
<td>.15*</td>
<td>.14*</td>
<td>.10</td>
<td>.08</td>
<td>.13*</td>
<td>.16*</td>
</tr>
</tbody>
</table>

Note. * = p < .05, ** = p < .001, ***= p <.001
5.10 Discussion

This study aimed to develop a measure of physical post traumatic growth (P-PTGI) in men with prostate cancer and to assess the measure’s dimensionality using EFA and CFA. Construct validity of the P-PTGI was also assessed. An extensive list of items was created to reflect the facets of physical post traumatic growth. This process was informed by current post traumatic growth research (Hefferon, 2012; Hefferon et al., 2009, 2010), current qualitative research with prostate cancer survivors in Ireland (Ivers et al., 2012) and by item development guidelines (DeVellis, 2003). Items were created to reflect the role of the physical self in a post traumatic growth experience within an illness context.

Items were also evaluated by five content experts prior to being factor analysed. Following EFA and CFA, twenty items were retained, which loaded onto two factors; Health Autonomy and Health Awareness. These factors evidenced good scale score reliability. The results of this study also provide evidence in support of the psychometric soundness of the P-PTGI. The original 20-item scale identified through initial testing using EFA and CFA was subjected to a second CFA using an independent sample (Dataset C), however this did not possess adequate fit. Although this model did not show good fit initially, all the items loaded onto the factors significantly and above minimum thresholds. Therefore, modification indices were assessed to identify potential model misspecification. With the addition of five co-varying paths, very good model fit was achieved.

The factors of Health Autonomy and Health Awareness demonstrate a novel aspect of the post traumatic growth experience which has thus far only been qualitatively explored. These factors show that physical trauma can create a different framework for adjustment. Subscale inter-correlations suggest the two factors measure related yet distinct concepts of physical post traumatic growth. Therefore, indicating that the identified factor structure and inter-correlations all
support the two-factor dimensionality of the P-PTGI measure. Results also demonstrated that the P-PTGI and its subscales possess good scale score reliability across the two samples (as ranging from .91 to .92), thus providing further support for the measure.

Further evidence supporting the independent nature of these two factors is found in their correlations with post traumatic growth subscales. For instance, the highest correlation between the post traumatic growth subscales and Health Autonomy is the subscale ‘personal strength’. This is interesting as both factors may capture the empowering nature of positive change following trauma.

Additional inspection of PTG subscales illuminates the differential relationships between Health Autonomy and Health Awareness. For example, spiritual change is related to Health Awareness, but not to Health Autonomy. This may indicate that through physical trauma, greater awareness in all aspects of life is enhanced, including spiritual awareness. However, enhanced Health Autonomy may not facilitate greater reflective practice in terms of spirituality. Health Autonomy demonstrates core aspects of control, empowerment and strength. In this context, perhaps Health Autonomy suggests a drive for greater levels of internal locus of control rather than external locus of control (i.e., religion and spiritual reflection).

Health Awareness is strongly related to all subscales of post traumatic growth. This is interesting as it suggests that awareness is a core aspect of both traditional and physical post traumatic growth. Health Autonomy, although also significantly related, exhibits lower correlations with post traumatic growth subscales. Therefore, this suggests that Health Autonomy may be more conceptually independent and may encapsulate the unique dimension that distinguishes physical post traumatic growth from current conceptualisation of growth.

5.10.1 Health Autonomy. The factor ‘Health Autonomy’ contains items pertaining to trust, confidence, strength, control, empowerment and a sense of achievement. Trust in the physical self is an interesting aspect of the theme of Health Awareness and is included in much
previous qualitative research on post traumatic growth (Hefferon et al., 2009, 2010). It is promising that this concept of trust has emerged here as an element of Health Autonomy. Trust in the physical self encapsulates belief in the body and relates to how an individual learns to trust the body following illness and begins to consider the body as reliable once more. A major theme which emerged in samples of breast cancer survivors was this ‘fear of new body’ following chemotherapy. This theme explored loss of control of the body which ultimately was perceived to affect the growth process (Hefferon et al., 2010). This lack of control often led to a fear of reoccurrence and created a sense of unease. This factor captures aspects of the dissociation of the body, but also the individual’s reconnection with the body which involves learning to adapt to a new sense of self and trust the body again.

The confidence aspect of Health Autonomy factor is also related to trust and the feeling that one’s body is reliable. This item relates to how individuals gain a sense of physical competence as the body grows stronger (Sabiston et al., 2007). This reflects a form of competence and a self efficacy in relation to the body. Confidence in the body relates strongly, particularly in this male sample, to the item of strength. This feeling of physical competence is an essential aspect in well-being across multiple populations (Biddle & Mutrie, 2007) relating back to the the somato-psychic principle as mentioned in Chapter 2.

In this study, control of the body is an important component of the concept of physical post traumatic growth. The development of an internal locus of control and agency impacts psychological well-being (Biddle & Mutrie, 2007). Salick and Auerbach (2006) reported findings of amputees who reported losing control over their own body as a difficult part of their experience. Similar results emerged in a sample of breast cancer survivors (Milne, Gordon, Guilfoyle, Wallman, & Courneya, 2007). Toombs (1992) suggests that the loss of certain physiological functioning can initiate feelings of humiliation causing alienation of the body from the self. This is a critical consideration for
the current sample given the potential severity of side effects following prostate cancer treatments (e.g., urinary dysfunction).

Although Tedeschi and Calhoun (2004) do not include a component of personal control in their model, Sabiston et al. (2007) highlighted how gaining control can be an important part of survivorship. Acquiring perceptions of personal control seems to be instrumental in changing self-perceptions and experiences of positive psychological growth (Sabiston et al., 2007). Therefore, the investigation of personal control as a core aspect of Health Autonomy and physical post-traumatic growth is crucial for future research.

This idea of self perceptions, identity and control are also identified in the item of empowerment. Recent research (Aujoulat et al., 2008) has suggested that patient empowerment can be linked with coming to terms with disrupted identities (i.e. during illness and recovery), as well as more traditional conceptualisations of patient empowerment (e.g. self-efficacy, mastery and control). As pointed out by Paterson et al. (1999), the transformative process of restructuring the illness experience and restructuring the self are two inter-related processes, which can be described as a double process of “holding on” to past conceptualisations of the self and past worldviews, but also “letting go” these past beliefs which may no longer be advantageous. Through this process of taking control and relinquishing control the process of empowerment can occur. This is when patients integrate different and sometimes conflicting aspects of one’s self in order to develop a renewed and valuable sense of self - a reconciled self. Aujoulet et al. (2008) found that participants had a greater sense of control and agency following this process of ‘letting go’ and began to engage in a meaning-making process focused on achieving a stronger sense of coherence in order to perceive the illness experience as acceptable and making sense. Aujoulet et al. (2008) recognise that empowerment is an important dimension to relate to meaning, they found that participants expressed the need to not only become knowledgeable about their disease and treatment, but also to assign a meaning to their illness.
experience. This empowering process of reconciling conflicting identities is a core part of maintaining a sense of wholeness and personal integrity. This is significant given that post traumatic growth is often attributed to identity change (Janoff-Bulman, 1992). Identity and bodily transformation in the illness process have important features to offer a concept of physical post traumatic growth.

Sense of achievement in overcoming the illness is a key consideration for the factor of Health Autonomy. This sense of achievement in enduring and overcoming negative physical experiences and enduring physical suffering has been cited as a vital component in propelling the individual to a higher level of functioning and the development of a distinct post traumatic growth experience (Hefferon et al., 2009). This is an important aspect as it is directly facilitated by the body in that a sense of achievement can be reached following the experience of illness and recovery. Dahan and Auerbach (2006) found this experience of “physical rebirth” to be a strong component to their participants’ positive change following illness.

The factor of Health Autonomy thus combines areas of trust, confidence, strength, control, empowerment, achievement. Although Health Autonomy is indeed related to Health Awareness they represent two distinct factors, whereby Health Autonomy encapsulates broad psychological aspects of positive change following physical illness, while Health Awareness is more concerned with aspects of health behaviour change as detailed below.

5.10.2 Health Awareness. The second factor ‘Health Awareness’ taps into a greater sense of physical awareness, greater attention and monitoring of the body and personal responsibility for health. This supports the premise put forward by Hefferon et al. (2009) that a physical life threatening illness may act as a teachable moment for many who experience such trauma. Illness can create an environment in which there is a reconnection to the body (Frank, 1995; Hefferon et al., 2009), thus facilitating greater appreciation for the body, greater care towards the body and positive health behaviour changes
(Demark-Wahnefried et al., 2005). Many participants in the current study reflected upon the heightened importance of health and their subsequent health behaviour changes. The possibility that they could have a tangible and active role in survival (and potential re-occurrence) meant that participants engaged in changes to their diet and exercise as well as the cessation of negative health practices (e.g. smoking).

This new awareness of the body has been investigated in previous research (Hefferon et al., 2010). Participants have testified to a newfound ability to listen to their bodies in an innovative way. It was found that individuals were better able to monitor their own health indicating that this positive reconnection with the body and new awareness facilitated greater monitoring of overall internal health (Hefferon et al., 2010). This is highly beneficial to individuals following physical trauma such as cancer.

Fostering a sense of greater personal responsibility for health in the aftermath of illness appears to be an important aspect of physical post traumatic growth. This has potential implications for cancer survivors’ adjustment. This idea of self care and indeed physical self care is an important area for future research. In recent years, self-care has developed as an important health care concept, emphasising individual responsibility for managing one’s health (Naue, 2008). The concept includes steps taken by individuals to prevent disease as well as promote and maintain a certain health status (Naue, 2008). In this context, self care practices are often understood as tools for empowerment, and relate strongly to the first factor ‘Health Autonomy’. This opportunity for greater responsibility for health and health behaviour change is an important outcome to be further explored.

5.10.3 Construct Validity. Construct validity was established through the examination of convergent validity. Construct validity was supported given that physical post traumatic growth (total score) was significantly positively correlated with traditional post traumatic growth (total score and its subscales). Physical post traumatic growth was also significantly positively correlated with mindfulness. These
associations are in line with previous qualitative research, whereby greater awareness and appreciation of health and the body were demonstrated post physical trauma (Hefferon et al., 2009).

Mindfulness and body awareness were key aspects of establishing construct validity for the current study. Previous qualitative research has positioned attention to the body and monitoring the body as an integral part of physical post traumatic growth (Hefferon et al., 2009, 2010). Mindfulness contains elements of both attention and acceptance which link to this ‘reconnection with the body’ (Bishop et al., 2004), while body awareness can be defined as the ability to recognise subtle body cues (Mehling et al., 2009). Body awareness and this ‘reconnection with the body’ are important parts of physical post traumatic growth in terms of how the individual responds, recovers and adjusts post physical trauma (Hefferon et al., 2010).

In the current study, the overall concept of physical post traumatic growth was not correlated with body awareness despite previous qualitative work outlining the potentially important connection (Hefferon, 2012, Hefferon et al., 2009, 2010). This lack of significance was unexpected and therefore led to further investigation of the P-PTGI subscales. The P-PTGI subscale ‘Health Autonomy’ was significantly correlated with mindfulness, but not body awareness. While the P-PTGI subscale ‘Health Awareness’ was significantly correlated with body awareness, but not mindfulness.

The differentiating feature between these two subscales is perhaps acceptance. The factor Health Autonomy has an inherent focus on the physical self as this aspect of physical post traumatic growth involves establishing how to increase health to maintain greater levels of perceived control. This is naturally associated with greater attention which is a core aspect of mindfulness. On the other hand, the Health Awareness aspect of physical post traumatic growth may create greater awareness of the changing body as it changes throughout the illness journey. However, this greater awareness may not facilitate acceptance
(i.e., a core aspect of mindfulness) and therefore, may not provide the impetus to change health behaviours due to awareness of possible physical/functional limitations. The importance of acceptance in patients’ adjustment is an important avenue for future research and has been assessed in other cohorts (e.g. individuals with Chronic Fatigue Syndrome; Brooks, Rimes, & Chalder, 2011)

This has been explored in findings from Aujoulet et al. (2008) and the process of personal transformation, whereby empowerment is a process of both ‘holding on’ and ‘letting go’. ‘Letting go’ is conceptualised as accepting to relinquish control, so as to integrate illness and related limitations into the reconciled self, quite like the factor ‘Health Awareness’. On the other hand, the process of separating identities (“holding on”) was found to be linked to efforts aimed at taking control and maintaining or regaining a sense of mastery, quite like the factor ‘Health Autonomy’.

5.10.4 Limitations. There are a number of limitations to consider in relation to this study. The time frame (between one and ten years post diagnosis) was selected as participant inclusion criteria as previous longitudinal analyses of post traumatic growth have not yet conclusively established the presence of PTG further than ten years post trauma and only few studies exist (Pollard & Kennedy, 2007; Tallman, Shaw, Schultz, & Altmaier, 2010). There are some studies, however, that have explored PTG as early as three months post trauma. Therefore, this may be considered a limitation of the current research. However, due to the exploratory nature of the research of this new physical dimension of PTG it was considered more prudent to select one year post treatment as the minimum criteria for participant inclusion in the event that cancer-related symptoms may influence responses prior to full recovery.

The questionnaire also contains only items which have a positive focus; this has been a criticism of past PTG research using the PTGI; however the current study sought to limit the cognitive burden on older male participants. Given that the response options included options
such as ‘not applicable to me’ and ‘no change’ this was considered acceptable but also offering greater response flexibility than previous measures of positive change.

5.10.5 Conclusion. In summary, the objective of this study was to develop a measure of physical post traumatic growth in men following prostate cancer diagnosis and treatment. An item pool was first created using in-depth qualitative interviews and a thorough literature search. These items were examined by content experts. The resultant scale (P-PTGI) contained two factors: Health Autonomy and Health Awareness. Scale score reliability coefficients were good, and modest evidence of the measure’s construct validity was furnished.

While the initial psychometric assessment is promising, further investigation of the P-PTGI’s reliability and validity are required. In the next study (Study Three), structural equation modelling will be used to assess how this construct relates to other measures of post traumatic growth, and to potentially relevant psychosocial factors such as health behaviour, resilience, body awareness, mindfulness and anxiety and depression.
Chapter 6

Study Three

A model to predict psychological and health related adjustment: The role of post traumatic growth, physical post traumatic growth, resilience and mindfulness

6.1 Aim of chapter

This study will test a model of post traumatic growth following prostate cancer. This model will investigate how post traumatic growth, physical post traumatic growth and mindfulness are related to outcome variables such as anxiety, depression, quality of life, body awareness and health behaviours. It will assess whether mindfulness moderates the relationship between post traumatic growth, physical post traumatic growth and adjustment indices. This model will also test resilience as a predictor of well-being and distress and whether resilience is mediated by post traumatic growth and physical post traumatic growth.

6.2 Rationale

As yet, there is no comprehensive and cohesive framework for post traumatic growth which considers how the type of trauma may influence the growth trajectory and even the type of growth experienced. Although Park’s meaning making model (2010) and, later, the affective-cognitive processing model (Joseph et al., 2012) synthesise much of the existing literature on growth, a gap remains in acknowledging the distinct role that physical trauma may play in post traumatic growth. Many of the findings on relationships between post traumatic growth and adjustment indices are inconsistent. More research is needed to fully understand the different roles of the predictors, mediators, and outcomes associated with post traumatic growth. This study will examine how these variables relate to one
another and will further explore the construct of physical post traumatic growth.

6.3 Introduction

Measurement issues may compound research seeking to delineate relationships between post traumatic growth and outcomes following physical illness or trauma. Inclusion of a physical dimension of post traumatic growth is important when examining growth following illness, particularly with survivor groups of men with prostate cancer who may be experiencing ongoing side effects following treatment. Sanda et al. (2008) found that each prostate cancer treatment was associated with a distinct pattern of change in quality of life domains related to urinary, sexual, bowel, and hormonal function. These changes influenced satisfaction with treatment outcomes among patients and their spouses or partners. Although their study did not examine positive growth directly, they highlighted the importance of physical side effects in the experience of prostate cancer survivorship including quality of life and well-being. Thus, physical trauma and subsequent related constructs (e.g., body awareness and health behaviours) should be included in future models of post traumatic growth. However, in order to fully examine a new model of positive change, which emphasises the role of physical trauma in post traumatic growth all variables must be tested simultaneously. This is ideally done using structural equation modelling (SEM).

Adjustment and well-being following illness are key concerns for the cancer community and it has become apparent that it is important to consider both positive and negative outcome variables in the survivorship experience. Findings from Park, Chmielewski and Blank (2010) support the supposition that multiple layers and subjective dimensions of the experience of survivorship combine to influence survivors’ psychological adjustment (Brennan, 2001). This is directly related to physical post traumatic growth and how the experience of an illness and the embodied nature of both physical trauma and recovery
is an important ‘layer’ and dimension of survivorship which has not been fully acknowledged. These multiple layers of experience are important in relation to adjustment indices as recent findings have supported the co-existence of positive and negative changes and the presence of both ‘benefit and burden’ in cancer (Curtis et al., 2014).

As the current study is the first model to include physical post traumatic growth, it is important to incorporate other variables which may be specific to physical trauma such as mindfulness, health behaviours and body awareness. The addition of these variables synthesises findings from previous qualitative work exploring the growth experience following physical trauma. These findings support the development of a greater body awareness following physical trauma through ‘listening to the body’ and using the ‘body as a barometer’ to monitor health status (Hefferon et al., 2009, 2010). Increased health behaviours following trauma have also been supported by previous research (Milam et al., 2004; Petrie et al., 1999; Sears et al., 2003; Siegel & Schrimshaw, 2000). The current hypotheses are a priori; however, this study must also be considered the first tentative step in measuring these relationships. The outcomes investigated in this study are depression, anxiety, quality of life, health behaviours and body awareness. The predicted relationships are detailed below.

6.3.1 Resilience, post traumatic growth and physical post traumatic growth. The model of post traumatic growth that has evolved over the past decade seeks to understand how constructs such as resilience affect the growth experience. Resilience relates to the issue of whether intensive cognitive processing is initiated following a traumatic event. The current model will measure resilience using the Connor-Davidson Resilience scale which defines resilience as an individual’s ability to thrive despite adversity (Campbell-Sills & Stein, 2007). Tedeschi and Calhoun (1995) have suggested that individuals who are resilient may be the least likely to experience transformation particularly PTG because the traumatic experience may be less
challenging to them. This is an important question for research as it may indicate that adaptive psychological flexibility leads to lower levels of post traumatic growth. Therefore, the addition of resilience as a predictor of well-being and distress and as being potentially mediated by post traumatic growth is a valuable and novel aspect of the current model.

The most recent SEM study examining resilience and PTG tested a theoretical model of PTG in prostate cancer survivors (Wilson, Morris, & Chambers, 2014). They posit resilience as a ‘driving force’ within the prostate cancer growth experience. The addition of resilience was a vital step given that it may play a role in cognitive processing as resilience has been implicated in lowering levels of PTG. Wilson et al. (2014) found that resilience, distress, social constraints, and deliberate rumination were not directly related to PTG, while small indirect effects were found for resilience on PTG via challenge appraisal and peer support. These findings suggest that higher resilience may indirectly lead to higher post traumatic growth which was contrary to their hypothesis. It is not yet clear why these findings emerged. These results must be interpreted with caution as there are several methodological issues present which compromise the clarity of the relationships in this model. In contravention of best practice SEM guidelines (Byrne, 2009), Wilson et al. (2014) added co-variances between predictors and outcomes. While these additions improved model fit, they may constitute a case of over-fitting the model to the data.

Therefore, the current study seeks to re-examine resilience and post traumatic growth with prostate cancer survivors under best practice guidelines, in order to better establish the relationship between resilience and post traumatic growth within this population.

6.3.2 Mindfulness, post traumatic growth and physical post traumatic growth. It is important to acknowledge the large role that variables related to cognitive processing, such as resilience or mindfulness, play in the post traumatic growth process. Mindfulness can be considered an aspect of cognitive processing due to its central
factors of acceptance and awareness. This is important given the evidenced centrality of cognitive processing in general in the growth process (Joseph, Murphy & Regel, 2012b; Nightingale et al. 2010; Stockton et al., 2011). Mindfulness can be conceptualised as an ‘approach for increasing awareness and responding skilfully to mental processes that contribute to emotional distress and maladaptive behaviour’ (Bishop et al., 2004, p.230). Mindfulness involves non-judgemental awareness of one’s present experience and has been incorporated into the treatment of many psychological and physical disorders (Gilbert & Waltz, 2010). Mindfulness has also been described as ‘orienting to one’s internal and external experiences’ (Gilbert & Waltz, 2010, p.227).

Many studies have reported correlations between self-reported mindfulness and psychological health (e.g. Baer, Smith, & Allen, 2004; Chadwick et al., 2008; Walach et al., 2006). Therefore, it is of value to investigate the role of mindfulness as a potential factor in adjustment following cancer. Due to a growing body of qualitative work which suggests that greater awareness is a core component of post traumatic growth (Hefferon et al., 2009; 2010), mindfulness may be one of the ‘impacting factors’ which influence the relationship between all types of post traumatic growth and adjustment indices. In the current study mindfulness will be assessed as a direct pathway to adjustment indices but also as a moderator of the relationship between post traumatic growth, physical post traumatic growth and subsequent adjustment indices. Moderation was deemed the most appropriate way of conceptualising the relationship between P-PTG and adjustment as opposed to mediation analyses, as although cognitive processing is a key part of growth, it is suggested that mindfulness may not be 

*necessary* for growth to influence adjustment indices, this precludes the use of mediation analyses as the current model is proposed. The current model proposes that mindfulness may be a constructive aspect of cognitive processing which impacts the *strength* of the relationship between growth and adjustment. Varying levels of mindfulness may
influence the strength of the relationship between post traumatic growth and adjustment indices. This suggests that the relationship between physical and traditional post traumatic growth and adjustment may be moderated by mindfulness.

Mindfulness → Distress. Some elements of mindfulness are regarded as potentially effective ‘antidotes’ against common forms of psychological distress – rumination, anxiety, worry, fear, and anger, many of which involve the maladaptive tendencies to avoid, suppress, or over-engage with one’s distressing thoughts and emotions (Hayes & Feldman, 2004; Kabat-Zinn, 1990; Keng, Smoski & Robins, 2011). Bishop et al. (2004) highlight how when acting mindfully ‘thoughts and feelings are observed as events in the mind, without over-identifying with them and without reacting to them in an automatic, habitual pattern of reactivity’ (p.232). This is an important aspect of mindfulness which may ease distress. Studies have also demonstrated significant negative correlations between mindfulness and depression (Brown & Ryan, 2003; Cash & Whittingham, 2010), rumination (Raes & Williams, 2010), and cognitive reactivity (Raes, Dewulf, Van Heeringen, & Williams, 2009). Another important potential benefit of mindfulness is the ability to observe one’s thoughts without automatically accepting the thoughts as true and responding accordingly (Hayes, Strosahl & Wilson, 1999; Segal, Williams & Teasdale, 2002; Shapiro, Carlson, Astin, & Freedman, 2006). This may limit the role of ‘catastrophic’ or ‘faulty thinking’ in individuals following prostate cancer. Garland et al. (2007) found that increased levels of mindfulness, albeit through an MBSR intervention, were accompanied by significant reductions in mood disturbance (21%) and symptoms of stress (14%). Being aware of the present moment and refraining from judging inner experience were the two most important mindfulness skills for improvements of psychological functioning among cancer patients (Garland et al., 2013). Kiken and Shook (2012) found that mindfulness reduces negative, maladaptive cognitive styles, which in turn may reduce predisposition to emotional disorders. Therefore, in the current study, it is proposed
that mindfulness is related to both emotional outcomes and health-related change due to the central cognitive component present which influences post traumatic growth. It is hypothesised that higher levels of mindfulness, encapsulating awareness and acceptance, will relate to lower distress in line with previous research. The expectation for those higher in mindfulness and higher in PTG is that they will experience lower distress and greater quality of life, health behaviours and body awareness. Further to the predictive relationship between mindfulness and adjustment indices, mindfulness will be assessed as a moderating variable between all forms of post traumatic growth and all outcomes (i.e. distress, quality of life, health behaviours and body awareness).

**Mindfulness ➔ Quality of life.** Nyklíček and Kuijpers (2008) examined whether the beneficial effects of the mindfulness-based stress reduction interventions on psychological well-being and quality of life were attributable to increases in mindfulness as a disposition. They found that it was not only the intervention but the actual change in mindfulness scores which influenced outcomes, thus supporting that dispositional mindfulness, as well as interventions, can make a valuable contribution to quality of life. Therefore, mindfulness interventions will be drawn upon to support the association between mindfulness as a disposition and quality of life as there remains a dearth of research solely examining dispositional mindfulness and quality of life. Nyklíček and Kuijpers (2008) have found increased support for the efficacy of mindfulness-based interventions in the reduction of psychological symptoms of distress and enhancement of quality of life (Kabat-Zinn, 1990). This has also been assessed across multiple cohorts from chronic pain patients to patients with heart disease and cancer (Kabat-Zinn, 1982; Ott, Norris, & Bauer-Wu, 2006; Tacón, McComb, Caldera, & Randolph, 2003). Previous findings have also supported the effectiveness of MBSR on increasing quality of life (Brown & Ryan, 2003; Carlson, Speca, Patel & Goodey, 2003; Roth & Robins, 2004). A meta-analysis of randomised controlled trials has also shown a mean medium sized effect of mindfulness ($d=0.54$) on a composite score of
psychological well-being (Grossman, Niemann, Schmidt, & Walach, 2004). Thus, it is hypothesised that those with higher levels of mindfulness will experience greater levels of quality of life following prostate cancer.

**Mindfulness → Health Behaviours.** Currently, little is known about the extent to which mindful awareness in everyday life predicts diet and physical activity. Mindfulness has previously been examined in disordered eating but needs to be assessed in other health and clinical populations. Baer et al. (2006) identified five components of mindfulness: Observe, Describe, Act with Awareness, Non judge and Nonreact. Three of these factors may be directly related to health behaviours. The ‘observe’ factor reflects one’s awareness of bodily sensations, the act with awareness factor reflects one’s full participation and awareness during daily activities and the ‘nonreact’ factor involves noticing one’s internal experiences without responding automatically to their associated action urges. Gilbert and Waltz (2010) found that the degree of mindfulness in everyday life predicted physical activity, fruit and vegetable intake, fat intake (males only) and self-efficacy. Gilbert and Waltz (2010) found that in men, the ability to step back and observe experience predicted healthier behaviours, while for women the ability to mindfully describe experiences with words predicted healthier behaviours. Some research has found a connection between mindfulness-based interventions and health behaviours. Most of these studies have utilised mindfulness-based stress reduction (MBSR), an eight-week group intervention. This intervention involves various mindfulness practices which centre on increasing awareness. Some studies have observed a change in physical activity and physical functioning following an MBSR programme even when this was not specifically targeted by the intervention (Carlson, Speca, Patel, & Goodey, 2004; Roth & Creaser, 1997).

Saxe et al. (2001) combined MBSR training with a low fat vegetarian dietary intervention for men with prostate cancer. Mindfulness training was applied to areas of food shopping and food...
selection, cooking and eating. It has also been implicated in decreasing the frequency of binge eating in obese women (Kristeller & Hallett, 1999). Gilbert and Waltz (2010) have cited many potential reasons why mindfulness may be related to health behaviours. Mindfulness may help foster greater awareness of urges to eat unhealthy foods or to forego exercise. It could help individuals respond more effectively to difficulties during the behaviour change process. Also, in terms of health behaviour change, which can be quite difficult for individuals, a non-judgemental, self compassionate attitude that is fostered through mindfulness practice could aid an individual in persisting with his or her planned behaviour changes. Therefore, it is hypothesised that individuals with higher levels of mindfulness will experience greater levels of positive health behaviours.

**Mindfulness → Body Awareness.** The way in which mindfulness is currently defined (namely, 'orienting to one's internal and external experiences': Gilbert & Waltz, 2010, p.227) inextricably links the two constructs of mindfulness and body awareness. A fundamental component of mindfulness is attention. Body awareness could also be conceptualised as attention to the physical self and a facet of mindfulness. This may indicate that higher levels of mindfulness predict greater levels of body awareness. Mindfulness has also been shown to facilitate greater psychosomatic awareness in various clinical populations, in particular those with chronic pain and irritable bowel syndrome (Keng et al., 2011).

**6.3.3 Post traumatic growth.** The latest models of post traumatic growth have focused on cognition processes which, although important, fail to address how the type of trauma involved (internal vs. external transgressor) impacts growth and indeed the growth trajectory following trauma. Although there are several studies which explore post traumatic growth in illness contexts (e.g., in breast cancer), there is still little recognition of how this illness-specific context may influence positive growth due to the physical nature of illness.
Post traumatic growth → Distress. As outlined in Chapter 3, previous research has not yet been able to identify a clear and consistent relationship between traditional post traumatic growth and distress. Morris and Shakespeare-Finch (2011) conducted analyses using data obtained from 313 participants diagnosed with a variety of cancers. Their model provided support that the post diagnosis experience is simultaneously shaped by both positive and negative life changes and that either outcome may be prevalent or may occur concurrently. Specifically, they found that trauma severity, life purpose rumination and intrusive rumination were directly related to distress, but not to PTG, while deliberately ruminating on benefits and social support were directly related to PTG. (Morris & Shakespeare-Finch, 2011).

Ruini et al. (2013) conducted a study which examined the complex relationships between positive functioning (as indicated by PTG and psychological well-being), symptomatology, and psychosocial distress in breast cancer survivors and compared their scores to a control group of healthy women reporting other traumatic events. This was an important study in the investigation of trauma and distress in an illness context. The results showed that PTG levels were higher in breast cancer survivors and were inversely related to somatisation and distress. The use of this type of control sample allowed for a better examination of the unique role of cancer illness in positive functioning and distress, identifying important differences between breast cancer survivors and controls, which previous research had failed to detect (Costanzo, Ryff, & Singer, 2009).

The current study seeks to build on this knowledge and assess how the addition of physical post traumatic growth relates to distress. It is proposed that individuals with higher levels of physical post traumatic growth will experience lower levels of distress. It is also hypothesised that post traumatic growth is related to distress, although no direction is posited given previous inconsistent findings.
The relationship between post traumatic growth and quality of life has produced conflicting findings in past research. Thornton and Perez (2006) found that PTG was largely unrelated to quality of life outcomes for prostate cancer survivors or partners. Furthermore, the few significant associations that were observed between PTG and quality of life were suggestive of higher levels of PTG in those who were experiencing the poorest quality of life. Thornton and Perez (2006) surmise that perhaps the negative association between quality of life and PTG may be accounted for by the ongoing contribution of distress to the formation of PTG. Chronic side effects and physical symptoms post trauma may still be a significant source of distress for prostate cancer survivors, yet current measures of post traumatic growth do not include how this may impact quality of life. These symptoms may facilitate higher physical PTG scores (i.e., greater awareness and reconnection with the body post trauma). Physical post traumatic growth may thus predict greater quality of life.

It is possible that inconsistencies in the literature stem from an individual reporting higher traditional PTG and lower quality of life scores, because higher traditional PTG may not capture the corporeal nature of illness and physical trauma (Thornton & Perez, 2006) and therefore does not predict quality of life. However, in the current study higher physical post traumatic growth is hypothesised to predict higher quality of life scores. This relationship needs to be examined as quality of life is a key outcome for cancer survivors and healthcare staff alike. Identifying areas where there are modifiable elements associated with ‘physical post traumatic growth’ such as body awareness and health behaviours are other important issues for quality of life research.

The role of post traumatic growth in predicting health behaviours warrants further investigation as an individual’s health behaviours play a key role in well-being and long term adjustment post illness. This is of growing relevance to the healthcare system given significant increases in the 5-
year survival rate due to improved screening, early detection practices, research advances and clinical care. Currently, few cancer survivors are meeting the physical activity or fruit and vegetable consumption recommendations and even fewer are meeting all three target behaviours (Blanchard, Courneya, & Stein, 2008). This is an important issue going forward as the association between current lifestyle recommendations and quality of life in cancer survivors appear to interact, such that greater positive lifestyle behaviours are related to greater quality of life (Blanchard et al., 2008). Therefore, health behaviours in prostate cancer survivors warrant further investigation. Blanchard et al. (2004) found that 73.8% adhered to physical activity guidelines, 28% adhere to fruit and vegetable consumption guidelines and 94.4% adhere to smoking guidelines. Unfortunately, Blanchard et al. (2004) did not measure alcohol intake. The current study proposes that post traumatic growth may be a gateway to engagement in health behaviours and play a role in health behaviour change in cancer survivorship. This potential pathway is supported in a review by Barskova and Osterreich (2009) in which the authors proposed that trauma, and, subsequently, PTG may influence health and lifestyle choices. Preliminary results point to the potential adaptive significance of PTG with associations between positive growth and various health-related variables (e.g., physical deficits, pain, depression, anxiety). They highlight other work which supports the association between PTG and health behaviour change (Milam, 2004; Petrie et al., 1999; Sears et al., 2003; Siegal & Schrimshaw, 2000). Barskova and Osterreich (2009) highlight the need for further work as there has been surprisingly little research on the area of PTG and health behaviour change.

Health behaviours have been linked qualitatively to physical post traumatic growth. Pakenham (2007) identified limitations of the benefit finding concept in a sample of individuals with multiple sclerosis (MS); specifically, that the role of the physical self is not considered. This qualitative study (N=404) using content analysis revealed seven benefit finding themes reflective of the post traumatic
growth literature: personal growth, strengthening of relationships, appreciation of life, new opportunities, health gains, change in life priorities/goals and spiritual growth. The emergence of a ‘health gains’ theme indicates the value of pursuing physical post traumatic growth as a possible pathway to positive health behaviours. Pakenham (2007) found that, despite the serious physical impairments, 16% of participants were able to report benefits concerning their health such as learning more about MS; becoming more aware of their health; the ability to listen to the body; taking more control of personal health and finally re-evaluating diet and exercise plans. In the current study, it is hypothesised that those with higher levels of physical post traumatic growth will exhibit higher levels of positive health behaviours.

**Post traumatic growth → Body Awareness.** Body awareness can be defined as the ability to recognise subtle body cues (Mehling et al., 2009). Preliminary evidence suggests that it may be useful in the management of chronic diseases such as chronic low back pain, congestive heart failure, chronic renal failure, and irritable bowel syndrome (Mehling et al., 2009). This has implications for post traumatic growth theory, as current perspectives do not provide an adequate picture of the complete experience of post traumatic reactions for all trauma survivors, particularly in terms of those who have experienced a health related trauma. The current study will explore the extent to which the traditional measure of post traumatic growth and physical post traumatic growth may predict body awareness through potential connections with existing subscales such as perceived changes in the self, increased existential awareness and perhaps through changed priorities which may be related to the physical self.

The conceptualisation of body awareness/embodiment resonates strongly with a more physical aspect of post traumatic growth and this facet may in fact predict greater body awareness in individuals post trauma. Trauma and transformation from illness can create an environment in which there is a reconnection to the body.
(Frank, 1995; Hefferon et al., 2009), thereby creating enhanced appreciation for the body, increased care towards the body (i.e., listening to the body and treating it better) and increased health behaviour changes (i.e., teachable moments: see Demark Wahnefried et al., 2000). The addition of a new dimension of post traumatic growth which encompasses the role of the physical self into PTG will provide a framework where the reconnecting with the body is recognised as a core aspect of the illness journey (Hefferon, 2012).

It is hypothesised that those with higher levels of post traumatic growth and physical post traumatic growth will exhibit higher levels of body awareness.

6.3.4 Summary. This study will examine the relationship between resilience and PTG and will examine if the impact of resilience on outcomes in prostate cancer is mediated by both post traumatic growth and physical post traumatic growth. This is of particular importance given that past research has cited that resilient individuals will be less likely to experience PTG and, subsequently, people lower in PTG may follow a different adjustment trajectory than those evidencing higher growth levels (e.g., lower growth may lead to less engagement with health behaviour change post trauma). Additional research linking PTG to health behaviour change is needed.

Mindfulness is also a core aspect of the current study. It is hypothesised to moderate the relationships between post traumatic growth and physical post traumatic growth with the adjustment variables. Mindfulness is inherently about awareness and acceptance. This is of importance given that the two factors of physical post traumatic growth which emerged in Study Two were Health Awareness and Health Autonomy. Mindfulness, through one of its core factors of awareness, has been linked with all forms of post traumatic growth in the literature (i.e. greater reconnection with the body, greater appreciation of the body and greater monitoring of the body; Hefferon et al., 2009; 2010), as well as with adjustment. Therefore, this warrants further investigation.
The current study examines the role of PTG on health behaviours, body awareness, distress and quality of life. The model will test whether post traumatic growth and physical post traumatic growth mediates the relationship between resilience and the study’s outcomes that is distress (anxiety and depression), quality of life, health behaviours and body awareness. Table 6.1 details the specific directional relationships hypothesised. This model will also assess whether mindfulness plays a moderating role in the relationship between all forms of post traumatic growth and adjustment indices. Figure 6.2 details the hypothesised moderation.
Figure 6.1

*Diagram of predictors and outcome variables*

Figure 6.2

*Diagram of hypothesised moderation*
### Table 6.1

**List of Study Three hypotheses**

<table>
<thead>
<tr>
<th>Construct</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Resilience</td>
<td>Those higher in resilience will experience lower post traumatic growth and physical post traumatic growth.</td>
</tr>
<tr>
<td>2 Distress</td>
<td>Those with higher levels of physical post traumatic growth will experience lower levels of distress.</td>
</tr>
<tr>
<td>3 Body awareness</td>
<td>Those with higher levels of post traumatic growth and physical post traumatic growth will exhibit higher levels of body awareness.</td>
</tr>
<tr>
<td>4 Health Behaviours</td>
<td>Those with higher levels of post traumatic growth and physical post traumatic growth will exhibit higher levels of positive health behaviours</td>
</tr>
<tr>
<td>5 Quality of life following prostate cancer</td>
<td>Those with higher levels of post traumatic growth and physical post traumatic growth will experience greater levels of quality of life following prostate cancer</td>
</tr>
<tr>
<td>6 Mindfulness</td>
<td>Those with higher levels of mindfulness will experience greater levels of health behaviours, body awareness, quality of life and lower levels of distress.</td>
</tr>
<tr>
<td>7 Mindfulness (moderation)</td>
<td>Mindfulness moderates the relationship between post traumatic growth and physical post traumatic growth and all outcomes variables.</td>
</tr>
<tr>
<td>8 Resilience (mediation)</td>
<td>The relationship between resilience and outcome variables is mediated by post traumatic growth and physical post traumatic growth.</td>
</tr>
</tbody>
</table>
6.4 Method
The following analyses were conducted on Dataset C which was also used for the second CFA in Study Two.

6.4.1 Procedure. Following ethical approval by the Research Ethics Committee of the National University of Ireland, Galway, participants who were at least one year post prostate cancer treatment were invited to complete a battery of questionnaires either through an online survey or in response to a paper and pencil pack received in the post.

6.4.2 Participants. Details of participants can be found in Chapter 6 and describe a total number of 241 participants (59.75% of these were online participants).

6.4.3 Measures. Details of each of the measures used are described in Chapter 5. These included the Post Traumatic Growth Inventory (PTGI), Hospital Anxiety and Depression Scale (HADS), Connor-Davidson Resilience (CD-RISC), Body Awareness Scale, Patient Oriented Prostate Utility Scale (PORPUS) and the Freiburg Mindfulness Inventory (FMI).

6.4.4 Data Analytic Procedures.
The factor structure of each measure was determined using a combination of CFA and EFA. This was to ensure that all variables were accurately measuring their assigned construct. For some scales the use of CFA was not appropriate as there had to be an exploratory factor analysis conducted previously. This was the case for the PORPUS Quality of Life measure and for the Freiburg Mindfulness Inventory. The health behaviour questionnaire was not subjected to EFA or CFA as the aim of the current research was to assess overall health behaviour change trends, therefore a composite score was deemed most suitable. SEM is a statistical means of examining proposed relationships among hypothetical latent constructs which are indicated by observed variables, allowing for the separation of the measurement and
structural components of the model. Unlike other statistical procedures 
(i.e., ANOVA or multiple regression), SEM allows the researcher to 
specify relatively “error free” latent variables by correcting for biases 
that could result from random error and variance not attributable to 
the targeted constructs (MacCallum & Austin, 2000). Missing data were 
treated, and the normality of data was assessed.

In order to conduct moderation analyses, multiple regression 
analyses were conducted in which each outcome (anxiety, depression, 
quality of life and health behaviours) was simultaneously regressed on 
mindfulness, PTG and the interaction between these two variables. 
Moderation analyses tests the effect of a variable (i.e., mindfulness) that 
influences the strength (or direction) of the relation between a 
predictor variable (e.g., physical PTG) and an outcome variable (e.g., 
quality of life; Baron & Kenny, 1986). Moderation analyses were 
repeated using mindfulness, physical PTG and the interaction between 
the two variables as predictors. Significant interactions were explored 
further using Aiken and West’s (1991) method for probing interactions 
among continuous variables. For example, this involved creating low, 
medium and high groups by using one standard deviation below the 
mean, the mean and one standard deviation above the mean. 
Moderation analyses were used as the level of mindfulness was 
hypothesised to influence the strength of the relationships between P-
PTG (and PTG) and outcomes in line with previous research (e.g., 
Garland et al., 2007). This type of analysis was chosen rather than 
mediation analyses as mediation suggests that the relationship between 
the predictor variable (e.g., P-PTG) and the outcome variable (e.g., 
quality of life) is influenced by working through mindfulness. This 
would suggest that a certain level of mindfulness is necessary to 
facilitate adjustment; however this has not been tested previously.

Given that there is no evidence to suggest that mindfulness is necessary 
to explain the relationship between PTG and adjustment indices, 
moderation analyses were conducted.
**Dimensionality of the Post Traumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1995).** A CFA was conducted on the five factor PTGI measure; $\chi^2 (179) = 666.87$, $p < .001$ Q=3.73, CFI= 0.89, TLI =0.87, RMSEA = .107 (95% CI .098-.115), AIC= 770.87, SRMR= .05. This illustrated a poor fit. Modification indices suggested a number of covariances. For instance, items 1 and 2 (‘I changed my priorities about what is important in life’ and ‘I have a greater appreciation for the value of my own life’), items 20 and 21 (‘I learned a great deal about how wonderful people are’ and ‘I better accept needing others’), items 15 and 16 (‘I have more compassion for others’ and ‘I put more effort into my relationships’) and items three and seven (‘I developed new interests’ and ‘I established a new path for my life’). These pairs of items were deemed to be thematically related; therefore, modifications were added and the model illustrated an adequate fit; $\chi^2 (175) = 504.99$, $p < .001$, Q= 2.89, CFI = .93, TLI= .91, RMSEA=.089 (95% CI .080-.098), AIC= 616.99, SRMR=.05. The chi-square difference test indicated that model specifications significantly improved model fit; $\chi^2 (4) = 161.88$, $p<.001$.

**Dimensionality of the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003).** The CD-RISC measures perception of stress and coping ability. Participants indicate how they feel with regards to 10 items in the past month on a 5-point Likert scale ranging from 0 (not true at all ) to 4 (true nearly all of the time). Higher total scores indicated greater coping ability.

A CFA was conducted on the one factor CD-RISC; $\chi^2 (35) = 108.83$, $p < .001$, Q=3.11, CFI= .95, TLI=.93, RMSEA=.094 (95% CI .074-.114), AIC= 148.83, SRMR=.04. This demonstrated a poor fit. Modification indices suggested that items 6 and 7 (‘Able to achieve goals despite obstacles’ and ‘Can stay focused under pressure’) and items 2 and 7 (‘Can deal with whatever comes’ and ‘Can stay focused under pressure’) should be co-varied. These pairs of items were deemed to be thematically related; therefore, modifications were added and the model considerably improved and was deemed a good fit based
on fit indices; \( \chi^2 (33) = 72.80, p < .001 \), CFI= .97, TLI= .96, RMSEA= .071 (95% CI = .049 - .093), AIC= 116.80, SRMR= .03. In the current study Cronbach’s alpha was .93 for resilience (95% CI = .91 -.94).

**Dimensionality of the Freiburg Mindfulness Inventory (FMI; Walach et al., 2006).** Past research has reported conflicting results regarding the factor structure of the FMI (see Kohls et al., 2009; Walach et al., 2006). Therefore, it is prudent to conduct EFA in the current sample. First the FMI was checked to see if it was suitable for EFA in the first instance. KMO was .92 and Bartlett’s test of sphericity was statistically significant, \( \chi^2 (91) = 1536.59, p<.001 \). Levels of skewness and kurtosis were at an acceptable level. Scree plot and parallel analysis (O’Connor, 2000) indicate a uni-dimensional construct (eigenvalues for actual data = 6.41, 1.27 versus parallel analysis output of 1.43, 1.32, respectively). Therefore, a one factor solution was tested. Item 13 ‘I am impatient with myself and with others’ did not meet the factor loading threshold (factor loading = .18) and, therefore, was removed. The eigenvalue for the retained factor was 6.38, with item factor loadings ranging from .56 to .81. Reliability was assessed and found to be excellent (alpha= .91, 95% CI = .89 - .93). Overall the variance explained was 49.05%.

**Dimensionality of the measure Private Body Consciousness Sub-Scale (PBCS) of the Body Consciousness Questionnaire (BCQ; Miller et al., 1981).** A CFA was conducted on the one factor PBCS and the model was deemed to be an adequate fit; \( \chi^2 (5) = 17.55, p = .004 \), CFI=.95, TLI=.91, RMSEA=.102 (95% CI .053-.156), AIC =37.55, SRMR=.04. Although RMSEA levels are sub-optimal, this measure is deemed appropriate due to consideration of the other fit indices and the fact that no modification indices were suggested.

**Dimensionality of the Patient-Oriented Prostate Utility Scale (PORPUS; Ritvo et al., 2005).** The PORPUS contains 10 questions. There are 5 general questions (pain, energy, emotional well-being, social well-being, and relationship with physician) and 5 prostate
cancer-specific questions (sexual function and desire, urinary frequency and incontinence, and bowel function), each with four to six possible specific responses to the question (e.g. Support from Family and Friends ranged from response option 1) Most of the time I feel supported by my spouse, family and/or friends to response option 4) Rarely feel supported by my spouse, family, and friends.) Lower scores on this quality of life measure are representative of greater quality of life, while higher scores indicate worse quality of life.

An EFA was conducted on the PORPUS measure as no previous structure had been assessed. First the PORPUS was checked to see if it was suitable for EFA. KMO was .74 and Bartlett's test of sphericity was statistically significant χ² (45) = 560.44, p < .001. Levels of skewness and kurtosis were an acceptable level (Skewness < 3; Kurtosis < 10).

The scree plot suggested three factors; however, parallel analysis suggested 2 factors would be most appropriate (eigenvalues for the actual data were 3.19, 1.61 and 1.14 versus eigenvalues for the parallel analysis output 1.33, 1.23 and 1.15, respectively). Therefore, a two factor solution was forced: physical symptoms (eigenvalue = 3.19; 31.89% of variance accounted for) and emotional well-being (eigenvalue = 1.61; 16.07% of variance accounted for). Item 2 ‘energy’ was found to cross-load above acceptable thresholds (i.e., .32) and was deleted.

Reliability analyses were conducted on these two factors. Factor 1 (physical symptoms) had a Cronbach’s alpha of .69 (95% CI = .62 -.75), which was deemed to be acceptable given the various aspects of physical functioning involved in the measure. This factor accounted for 31.89% of the variance. Factor 2 (emotional well-being) had a Cronbach’s alpha of .63 (95% CI = .55 -.71), this is acceptable given the subscale’s small number of items (Nunnally, 1978).

**Dimensionality of the Hospital and Anxiety Depression Scale (HADS; Zigmond & Snaith, 1983)**. The HADS is a 14-item scale that provides a brief state measure of anxiety (HADS-A: seven items; e.g., “I feel tense or wound up”) and depression (HADS-D: seven items; e.g., “I
still enjoy the things I used to enjoy”). Responses are coded on a four
point likert scale, with different response items for each question (e.g.,
0 = not at all, 3 = most of the time; 0 = definitely as much, 3 = hardly at
all). Higher scores denote greater anxiety or depression (possible range
for each seven-item subscale is 0 to 21).

A CFA was conducted on the HADS measure; \( \chi^2 \) (76) = 207.23, \( Q= 2.73, \) CFI=.89, TLI=.87, RMSEA=.085 (95% CI.071-.099), AIC= 265.23,
SRMR=.06. This illustrated a poor fit. Modification indices suggest that
item 7 (‘I can sit at ease and feel relaxed’) is problematic as it cross
loads onto multiple items (item 6; ‘I feel cheerful’, MI [24.71]).
Therefore, this item was removed. In addition, a covariance between
items 2 and 12 (‘I still enjoy the things I used to enjoy’ and ‘I look
forward with enjoyment to things’) was suggested. These modifications
were made and the resultant model was deemed to possess good fit; \( \chi^2 \)
(63) = 114.22, \( p < .001, \) Q= 1.81, CFI = .95, TLI= .94, RMSEA= .058 (95%
CI .041-.075). AIC = 170.22, SRMR=.05.

Adequate scale score reliability and validity have been
demonstrated (Bjelland, Dahl, Haug, & Neckelmann, 2002; Zigmond &
Snaith, 1983). Bjelland et al. (2002) conducted a review of studies
employing the HADS. Across all studies, Cronbach’s alpha values were
greater than .60 indicating adequate scale score reliability. Concurrent
validity also was demonstrated as correlations between scores on the
HADS and other measures of depression (e.g., the Beck Depression
Inventory; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), and
anxiety (e.g., the State-Trait Anxiety Inventory; Spielberger, Gorsuch,
Lushene, Vagg & Jacobs, 1983) ranged from .60 to .80. In the current
study, Cronbach’s alpha was .82 (95% CI = .78-.85) for the HADS-A, and
.78 (95% CI = .74-.82) for the HADS-D. Cronbach’s alpha was .86 (95%
CI = .84-.89) for Total HADS.

**Dimensionality of the Health Behaviour Questionnaire**
(Department of Health and Ageing, 2004). This questionnaire
measures health behaviours (i.e., behaviours people perform that have
implications for their health; Morrison & Bennett, 2009). This is
measured in terms of smoking status, daily nutrition, alcohol consumption. This measure was chosen as it has been used as part of ‘Building healthy communities - a guide for community projects’ which was an initiative to help communities deal with chronic disease.

Cronbach’s alpha was .15 (95% CI = -.05 - .31). This may be due to the fact that there were a small number of items and this measure was also looking at four discrete health behaviours. This is further supported by the low inter-correlations between the four discrete behaviours (r range = -0.05 to 0.21). Therefore, the use of this measure was deemed appropriate in the current study; however caution is advised in interpreting the results of this measure.

6.5 Results

6.5.1 Descriptive statistics. Reliability coefficients (and confidence intervals), means, standard deviations and scale score ranges for the self-report measures are presented in Table 6.2. Pearson Product Correlations among the variables included in the current study are presented in Table 6.4.
Table 6.2
Descriptive Statistics for SEM variables (N = 241)

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
<th>Cronbach’s Alpha (α)</th>
<th>95% CI</th>
<th>Possible Range</th>
<th>Attained Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-PTGI – Health Autonomy</td>
<td>-0.14</td>
<td>0.78</td>
<td>.92</td>
<td>.91 - .94</td>
<td>-2.00 – 2.00</td>
<td>-2.00 – 2.00</td>
</tr>
<tr>
<td>P-PTGI – Health Awareness</td>
<td>0.96</td>
<td>0.66</td>
<td>.93</td>
<td>.91 - .94</td>
<td>-2.00 – 2.00</td>
<td>-1.90 – 2.00</td>
</tr>
<tr>
<td>P-PTGI – Total</td>
<td>0.41</td>
<td>0.56</td>
<td>.90</td>
<td>.88 - .92</td>
<td>-2.00 – 2.00</td>
<td>-1.50 - 2.00</td>
</tr>
<tr>
<td>PTG – Relating to Others</td>
<td>13.90</td>
<td>10.07</td>
<td>.93</td>
<td>.91 - .94</td>
<td>0-35</td>
<td>0 - 35</td>
</tr>
<tr>
<td>PTG – New possibilities</td>
<td>7.29</td>
<td>6.56</td>
<td>.90</td>
<td>.87 - .92</td>
<td>0-25</td>
<td>0 - 25</td>
</tr>
<tr>
<td>PTG – Personal Strength</td>
<td>7.19</td>
<td>5.65</td>
<td>.88</td>
<td>.86 - .91</td>
<td>0-20</td>
<td>0 - 20</td>
</tr>
<tr>
<td>PTG – Spiritual Change</td>
<td>2.77</td>
<td>3.29</td>
<td>.82a</td>
<td>-</td>
<td>0-10</td>
<td>0 - 10</td>
</tr>
<tr>
<td>PTG – Apprec. of Life</td>
<td>7.23</td>
<td>4.21</td>
<td>.87</td>
<td>.84 - .90</td>
<td>0-15</td>
<td>0 - 15</td>
</tr>
<tr>
<td>PTG-Total</td>
<td>38.37</td>
<td>26.64</td>
<td>.97</td>
<td>.96 - .97</td>
<td>0-105</td>
<td>0 - 105</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>36.83</td>
<td>8.65</td>
<td>.91</td>
<td>.89 - .93</td>
<td>14-56</td>
<td>14 - 52</td>
</tr>
<tr>
<td>Body Awareness</td>
<td>17.01</td>
<td>4.08</td>
<td>.77</td>
<td>.72 - .81</td>
<td>5-25</td>
<td>5 – 25</td>
</tr>
<tr>
<td>Resilience</td>
<td>39.08</td>
<td>7.53</td>
<td>.93</td>
<td>.91 - .94</td>
<td>5-50</td>
<td>15-50</td>
</tr>
<tr>
<td>Anxiety</td>
<td>5.14</td>
<td>3.40</td>
<td>.82</td>
<td>.78 - .85</td>
<td>0-28</td>
<td>0-18</td>
</tr>
</tbody>
</table>
Table 6.2

Descriptive Statistics for SEM variables continued.

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
<th>Cronbach’s Alpha (α)</th>
<th>95% CI</th>
<th>Possible Range</th>
<th>Attained Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>4.05</td>
<td>3.36</td>
<td>.78</td>
<td>.74 - .82</td>
<td>0-28</td>
<td>0-16</td>
</tr>
<tr>
<td>Quality of Life</td>
<td>71.47</td>
<td>15.06</td>
<td>.69</td>
<td>.62 - .75</td>
<td>23.52 - 100</td>
<td>0-100</td>
</tr>
<tr>
<td>Health Behaviours</td>
<td>0.00b</td>
<td>2.12</td>
<td>.15</td>
<td>-.05 - .31</td>
<td>-</td>
<td>-5.84 – 7.24</td>
</tr>
</tbody>
</table>

Note.  

- a = Subscale only has two items therefore Cronbach’s alpha was not appropriate; Pearson’s correlation coefficient was calculated.  
- b = Health behaviours is standardised score incorporating nutrition, alcohol, smoking and physical activity behaviours.
6.5.2 Measurement Model. Before the structural portion of a causal model can be assessed, the validity of the measurement portion of the model needs to be tested (Byrne, 2009). The measurement model for these predictions was specified such that all latent variables were allowed to intercorrelate freely. Following factor analysis, scale items were used to indicate latent constructs. For instance, post traumatic growth subscales were used ‘relating to others’ (7 items), ‘new possibilities’ (5 items), ‘personal strength’ (4 items), ‘appreciation of life’ (3 items) and ‘spiritual change’ (2 items). There were also several uni-dimensional measures used, for instance, ten items were used to capture the single factor construct of resilience (CD-RISC), 13 items represented mindfulness (FMI), 5 items were used to represent body awareness (PBCS). The quality of life measure (PORPUS) consisted of two factors ‘physical symptoms’ (6 items) and ‘emotional well-being’ (3 items). Depression (7 items) and Anxiety (6 items) subscales of the HADS were also represented by latent variables. Health behaviour was an observed variable rather than a latent construct and was thus represented as a total composite score.

An initial model was run, however the solution returned was not admissible as the covariance matrix was not positive definite. Negative non-significant covariances were identified between prostate cancer quality of life symptoms (quality of life symptoms) and HADS Depression, and quality of life symptoms and HADS Anxiety, therefore these two covariances were removed. The subsequent model had adequate fit $\chi^2 (456) = 793.74, p<.001, Q=1.74, CFI=.90, TLI=.88, RMSEA=.056 (95\% CI=.049-.062), AIC=1069.74, SRMR=.07$. Emotional well-being (a subscale of quality of life) was highly correlated with HADS-Anxiety ($r = .90$) and HADS-Depression ($r = .89$). As this is evidence of multi-collinearity, emotional well-being was removed. Following this deletion the model was run again, Model 2 also had an adequate fit, $\chi^2 (375) = 655.33, p<.001, Q=1.75, CFI=.90, TLI=.89, RMSEA=.056 (95\% CI=.049-.063), AIC=895.33, SRMR=.07$. 

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Modification indices suggested that the post traumatic growth subscale 'relating to others' illustrated conceptual overlap with the quality of life item of 'sexual function' (MI=11.68, par change=1.17). This may be due to the desire for connection and intimacy. This item ‘quality of life item B’ was deleted. The subsequent model 3 obtained adequate fit, χ² (348) = 606.93, p<.001, Q=1.74, CFI=.91, TLI=.89, RMSEA=.056 (95% CI = .048-.063), AIC = 838.93, SRMR=.07.

Modification indices also suggested a covariance between the physical post traumatic growth subscale of Health Awareness and the post traumatic growth subscale of appreciation of life, therefore a covariance was added. This Model 4 was subsequently run, χ² (347) = 581.48, p<.001, Q = 1.68, CFI=.92, TLI=.90, RMSEA = .053 (95% CI = .045-.061), AIC= 815.48, SRMR=.06. This model was a significant improvement, x² (1) = 25.45 = p <.001. Modification indices suggested a co-variance between physical post traumatic growth subscale Health Autonomy and the post traumatic growth subscale of personal strength (MI= 13.97, par change = .42). These were deemed to be thematically related as the conceptualisation of Health Autonomy includes references to empowerment, control and strength; therefore a co-variance was added. The subsequent model was deemed to be a good fit, χ² (346) = 566.09, p<.001, Q = 1.64, CFI = .92, TLI = .91, RMSEA = .051 (95% CI = .044-.059), AIC = 802.087, SRMR=.06. This significantly improved the model, x² (1) = 15.39, p<.001.

**6.5.3 Structural Model.** A model was tested with mindfulness, post traumatic growth and physical post traumatic growth predicting levels of prostate cancer quality of life, anxiety and depression, body awareness and health behaviours. The correlation between depression and anxiety residuals in particular can be justified as both are subscales of the HADS (e.g., Esteve, Ramírez-Maestre, & López-Martínez, 2007) whilst correlations between quality of life, health behaviours, body awareness, depression and anxiety were deemed theoretically and empirically acceptable.
The model demonstrated a good fit; $\chi^2 (348) = 568.52$, $p < .001$, $Q = 1.63$, CFI = .92, TLI = .91, RMSEA = .051 (95% CI = .044 = .059), AIC = 800.52, SRMR = .06. As shown in Figure 6.3, mindfulness, post traumatic growth and physical post traumatic growth accounted for 5.1% of body awareness, 51.1% of depression, 46.1% of anxiety, 66.4% of prostate cancer quality of life symptoms and 3% of health behaviours, with low to moderate correlations between all ‘outcome’ variables. The standardised and unstandardised regression weights for the structural equation model are shown in table 6.3.

In support of the study’s hypotheses, physical post traumatic growth pathways significantly negatively predicted depression ($\beta = -.44$, $p = .003$), anxiety ($\beta = -.43$, $p = .001$) and quality of life symptoms ($\beta = -.92$, $p < .001$), while pathways from physical post traumatic growth to body awareness and health behaviours were non-significant ($p > .05$) which was contrary to the proposed positive relationships suggested in the hypotheses. Thus, higher physical post traumatic growth predicted lower depression, lower anxiety and better quality of life.

A non-directional hypothesis was proposed to examine the relationship between post traumatic growth and distress (i.e., depression and anxiety) given the previously inconsistent findings. It was found that post traumatic growth pathways significantly positively predicted depression ($\beta = .28$, $p = .003$) and anxiety ($\beta = .28$, $p < .001$). It was hypothesised that individuals with higher levels of post traumatic growth will experience greater levels of quality of life. However, contrary to the current study’s hypothesis, post traumatic growth significantly predicted lower levels of quality of life ($\beta = .57$, $p < .001$). It was also hypothesised that those with higher levels of post traumatic growth would exhibit higher levels of body awareness and higher levels of positive health behaviours, however, it was found that the pathways to body awareness and health behaviours were non-significant ($p > .05$). Thus, higher levels of post traumatic growth predicted higher levels of depression and anxiety, and worse quality of life.
In the current study it was hypothesised that higher levels of mindfulness would lead to greater levels of health behaviours, body awareness, quality of life and lower levels of distress (i.e., depression and anxiety). Mindfulness pathways were found to significantly negatively predict depression (β = -.52, p < .001) and anxiety (β = -.48, p < .001) confirming the study's hypothesis. Pathways to quality of life, body awareness and health behaviours were non-significant which did not support the proposed hypotheses. Thus, higher levels of mindfulness predicted lower levels of depression and anxiety.
Table 6.3

*Standardised and unstandardised regression weights for the structural equation model.*

<table>
<thead>
<tr>
<th>Pathway</th>
<th>B</th>
<th>B</th>
<th>SE</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical PTG</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ Depression</td>
<td>-.44</td>
<td>-.54</td>
<td>.18</td>
<td>.00</td>
</tr>
<tr>
<td>→ Anxiety</td>
<td>-.43</td>
<td>-.95</td>
<td>.30</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>→ Quality of life</td>
<td>-.92</td>
<td>-2.78</td>
<td>.78</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>→ Body</td>
<td>.06</td>
<td>0.24</td>
<td>.52</td>
<td>.65</td>
</tr>
<tr>
<td>Awareness</td>
<td>.16</td>
<td>1.54</td>
<td>1.19</td>
<td>.20</td>
</tr>
<tr>
<td>→ Health Behaviours</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PTG</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ Depression</td>
<td>.28</td>
<td>.01</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>→ Anxiety</td>
<td>.28</td>
<td>.02</td>
<td>.01</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>→ Quality of life</td>
<td>.57</td>
<td>.06</td>
<td>.02</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>→ Body</td>
<td>.12</td>
<td>.02</td>
<td>.01</td>
<td>.22</td>
</tr>
<tr>
<td>Awareness</td>
<td>-.16</td>
<td>-.06</td>
<td>.03</td>
<td>.06</td>
</tr>
<tr>
<td>→ Health Behaviours</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mindfulness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ Depression</td>
<td>-.52</td>
<td>-.23</td>
<td>.05</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>→ Anxiety</td>
<td>-.48</td>
<td>-.38</td>
<td>.07</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>→ Quality of life</td>
<td>.03</td>
<td>.04</td>
<td>.12</td>
<td>.76</td>
</tr>
<tr>
<td>→ Body</td>
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<td>.27</td>
<td>.68</td>
</tr>
<tr>
<td>→ Health Behaviours</td>
<td></td>
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</tr>
</tbody>
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Table 6.4

*SEM* correlation table

<table>
<thead>
<tr>
<th>Subscale</th>
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<tbody>
<tr>
<td>1 P-PTGI – Health Autonomy</td>
<td></td>
<td></td>
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<tr>
<td>2 P-PTGI – Health Awareness</td>
<td></td>
<td>.19**</td>
<td></td>
<td></td>
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<td>3 P-PTGI – Total</td>
<td>.73***</td>
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<td>.81***</td>
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<td>4 PTG – relating</td>
<td>.40***</td>
<td>.37***</td>
<td></td>
<td>.18**</td>
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<tr>
<td>5 PTG – new possibilities</td>
<td>.40***</td>
<td>.37***</td>
<td>.78***</td>
<td></td>
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<td>6 PTG – personal strength</td>
<td>.32***</td>
<td>.42***</td>
<td>.47***</td>
<td>.81***</td>
<td>.83***</td>
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<td>.24***</td>
<td>.64***</td>
<td>.66***</td>
<td>.63***</td>
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</tr>
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<td>8 PTG – appreciation</td>
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<td>.53***</td>
<td>.41***</td>
<td>.73***</td>
<td>.75***</td>
<td>.73***</td>
<td>.57***</td>
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</tr>
<tr>
<td>9 PTG – Total</td>
<td>.22**</td>
<td>.46***</td>
<td>.42***</td>
<td>.94***</td>
<td>.92***</td>
<td>.92***</td>
<td>.75***</td>
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</tr>
<tr>
<td>10 Mindfulness</td>
<td>.18**</td>
<td>.12</td>
<td>.19**</td>
<td>.14*</td>
<td>.20**</td>
<td>.18**</td>
<td>.17**</td>
<td>.11</td>
<td>.18**</td>
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<tr>
<td>11 Body Awareness</td>
<td>.02</td>
<td>.18**</td>
<td>.12</td>
<td>.11</td>
<td>.12</td>
<td>.14*</td>
<td>.10</td>
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<td>.13*</td>
<td>.16*</td>
<td></td>
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163
<table>
<thead>
<tr>
<th></th>
<th>Resilience</th>
<th>Anxiety</th>
<th>Depression</th>
<th>Quality of life</th>
<th>Health Behaviours</th>
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</thead>
<tbody>
<tr>
<td>12</td>
<td>0.32**</td>
<td>0.12</td>
<td>0.30**</td>
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<td>13</td>
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<td>-0.31**</td>
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<tr>
<td>16</td>
<td>0.05</td>
<td>0.08</td>
<td>-0.10</td>
<td>-0.34</td>
<td></td>
</tr>
</tbody>
</table>

** indicates significance at p < 0.01; * indicates significance at p < 0.05.
Following the testing of the structural equation model, the outcome variable body awareness was deleted as it did not load significantly onto any variable in the model and was not to be brought forward in analyses. The model fit following the deletion of the non-significant variable of body awareness is as follows: $\chi^2(302) = 485.96, p < .001, Q=1.61, CFI=.93, TLI=.92, \text{RMSEA}=.050 \ (95\% \ CI = .042-.059), AIC= 691.96, \text{SRMR} = .06$.

The current study hypothesised that the relationship between resilience and all outcome variables is mediated by post traumatic growth and physical post traumatic growth. A strict full mediation model with post traumatic growth and physical post traumatic growth mediating the relationship between resilience and outcome variables quality of life, anxiety and depression and health behaviours was conducted; $\chi^2(352) = 567.40, p<.001, Q=.160, CFI=.93, \text{TLI} = .92, \text{RMSEA}=.049 \ (95\% \ CI = .041-.057), AIC= 649.40, \text{SRMR} = .06$.
RMSEA = .050 (0.042-0.058) AIC = 787.40, SRMR = .06. This exhibits a good fit and suggests that the relationship between resilience and outcome variables are fully mediated by physical and traditional post traumatic growth.

This model was then compared to a partial mediation model with the addition of four parameters from resilience to all outcomes; \( \chi^2 (348) = 557.58, p < .001 \), Q = 1.60, CFI = .93, TLI = .92, RMSEA = .050 (95% CI 0.042-0.058), AIC = 787.40, SRMR = .06. A chi square was conducted to compare whether the partial mediation model was a significantly better fit than full mediation; \( \chi^2 (4) = 5.82, p > .05 \) as per best practice guidelines. The chi square was not significant; therefore adding direct pathways from resilience to outcomes (not working through both forms of post traumatic growth) did not significantly improve model fit.

Therefore, physical post traumatic growth and post traumatic growth fully mediated the relationship between resilience and outcome variables. Non-significant paths in this model (see Figure 6.4) include 1) mindfulness to quality of life, 2) physical post traumatic growth to health behaviours and 3) mindfulness to health behaviour.
Figure 6.4
Standardised path coefficients for the final full mediation model; significant paths only shown.
6.5.4 Moderating Effect of Mindfulness. The moderation analyses for physical post traumatic growth, mindfulness, and the interaction variable, were regressed separately onto adjustment indices. It was hypothesised that mindfulness moderates the relationship between post traumatic growth and physical post traumatic growth and all outcome variables (i.e., anxiety, depression and quality of life).

First, for anxiety, the overall model was found to be significant, $F(3, 257) = 24.80, p < .001, \text{adj. } r^2 = .23$. However, contrary to the hypothesis, the moderation effect was not found to be significant ($p > .05$).

For depression, the overall model was found to be significant, $F(3, 237) = 33.98, p < .001, \text{adj. } r^2 = .29$. However, contrary to the hypothesis, the moderation effect was not found to be significant ($p > .05$).

For quality of life, the overall model was significant, $F(3, 257) = 11.92, p < .001, \text{adj. } r^2 = .12$. In support of the current study's hypothesis, the moderation variable was also found to be significant ($B = -.09, \text{SE} = .04, \beta = -.16, p = .008$). This information is presented in Table 6.6. The interaction effect is depicted in Figure 6.5 (Note: lower quality of life scores represent better quality of life). This shows that those participants reporting the best quality of life reported a high level of mindfulness and high scores of physical post traumatic growth. This is compared to participants with the lowest quality of life, who also reported a high level of mindfulness, but low scores of physical post traumatic growth (as illustrated by lower symptom scores). This illustrates an important interaction between levels of mindfulness and physical post traumatic growth. Participants who exhibited lower levels of mindfulness and lower physical post traumatic growth displayed better quality of life compared to those who reported high levels of mindfulness and low physical post traumatic growth. However, those reporting lower levels of mindfulness and high physical post traumatic
growth reported worse quality of life compared to those who reported high levels of mindfulness and high physical post traumatic growth scores.

Figure 6.5

*Mindfulness moderating the relationship between physical post traumatic growth and quality of life.*

The overall model for health behaviours was not significant and no significant moderation effect was found. Therefore, looking at the overall moderation effect of mindfulness on physical post traumatic growth and adjustment indices, the general pattern indicates that mindfulness did not significantly moderate the strength of the relationship overall between physical post traumatic growth and adjustment indices. Although a significant finding emerged for the quality of life outcome, the strength of this finding was moderate (i.e., \( \beta = -0.16 \)). This suggests that perhaps the subcomponents of mindfulness (i.e., awareness and attention) are not moderating factors in with regards to physical post traumatic growth and quality of life.
As with the variable physical post traumatic growth, the moderation analyses of post traumatic growth, mindfulness and the interaction variable were regressed separately onto adjustment indices. While the overall models were significant (with the exception of Health behaviours $p < .05$), the moderation variable was not a significant predictor of any outcome ($p's > .05$; see Table 6.6). Therefore, mindfulness did not moderate the relationship between PTG and adjustment indices.
Table 6.5
List of predictors, outcomes and hypothesis status

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Outcomes</th>
<th>Hypothesis Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-PTG</td>
<td>Depression</td>
<td>Confirmed</td>
</tr>
<tr>
<td>P-PTG</td>
<td>Anxiety</td>
<td>Confirmed</td>
</tr>
<tr>
<td>P-PTG</td>
<td>Quality of Life</td>
<td>Confirmed</td>
</tr>
<tr>
<td>P-PTG</td>
<td>Health Behaviour</td>
<td>Rejected</td>
</tr>
<tr>
<td>P-PTG</td>
<td>Body Awareness</td>
<td>Rejected</td>
</tr>
<tr>
<td>PTG</td>
<td>Depression</td>
<td>Rejected</td>
</tr>
<tr>
<td>PTG</td>
<td>Anxiety</td>
<td>Rejected</td>
</tr>
<tr>
<td>PTG (non-directional)</td>
<td>Quality of Life</td>
<td>Confirmed</td>
</tr>
<tr>
<td>PTG</td>
<td>Health Behaviour</td>
<td>Confirmed</td>
</tr>
<tr>
<td>PTG</td>
<td>Body Awareness</td>
<td>Rejected</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>Depression</td>
<td>Confirmed</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>Anxiety</td>
<td>Confirmed</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>Quality of Life</td>
<td>Rejected</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>Health Behaviour</td>
<td>Rejected</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>Body Awareness</td>
<td>Rejected</td>
</tr>
<tr>
<td>Mindfulness_Moderation</td>
<td>PTG x Depression</td>
<td>Rejected</td>
</tr>
<tr>
<td></td>
<td>P-PTG x Depression</td>
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<tr>
<td>Mindfulness_Moderation</td>
<td>PTG x Anxiety</td>
<td>Rejected</td>
</tr>
<tr>
<td></td>
<td>P-PTG x Anxiety</td>
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</tr>
<tr>
<td>Mindfulness_Moderation</td>
<td>PTG x Quality of Life</td>
<td>Confirmed</td>
</tr>
<tr>
<td></td>
<td>(QoL)</td>
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<tr>
<td></td>
<td>P-PTG x QoL</td>
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</tr>
<tr>
<td>Mindfulness_Moderation</td>
<td>PTG x Health Behav.</td>
<td>Rejected</td>
</tr>
<tr>
<td></td>
<td>P-PTG x Health Behav.</td>
<td></td>
</tr>
<tr>
<td>Resilience (Mediation)</td>
<td>PTG → All Outcomes</td>
<td>Confirmed</td>
</tr>
<tr>
<td></td>
<td>P-PTG → All Outcomes</td>
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Table 6.6
Standardised beta values for mindfulness, physical post-traumatic growth, and the moderation of mindfulness and physical post traumatic growth on anxiety, depression, quality of life, and health behaviours.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Anxiety</th>
<th>Depression</th>
<th>Total HADS</th>
<th>QoL Total</th>
<th>QoL Symptoms</th>
<th>QoL Emot WB</th>
<th>Health Behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mindfulness</td>
<td>-.43***</td>
<td>-.44***</td>
<td>-.49***</td>
<td>.26***</td>
<td>-.09</td>
<td>-.42***</td>
<td>.04</td>
</tr>
<tr>
<td>P-PTG</td>
<td>-.14*</td>
<td>-.22***</td>
<td>-.20***</td>
<td>.28***</td>
<td>-.28***</td>
<td>-.12*</td>
<td>.08</td>
</tr>
<tr>
<td>Interaction</td>
<td>.09</td>
<td>.06</td>
<td>.09</td>
<td>.09</td>
<td>-.16**</td>
<td>.05</td>
<td>-.02</td>
</tr>
</tbody>
</table>

*Note. HADS = Hospital Anxiety and Depression Scale; QoL = Quality of life.*

*** = $p < .001$; ** = $p < .01$; * = $p < .05$. 

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Table 6.7

*Standardised beta values for mindfulness, post-traumatic growth, and the moderation of mindfulness and post traumatic growth on anxiety, depression, quality of life, and health behaviours.*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Anxiety</th>
<th>Depression</th>
<th>Total HADS</th>
<th>QoL Total</th>
<th>QoL Symptoms</th>
<th>QoL Emot WB</th>
<th>Health Behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mindfulness</td>
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<td>-.53***</td>
<td>-.57***</td>
<td>.33***</td>
<td>-.17*</td>
<td>-.42***</td>
<td>.07</td>
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<td>PTG</td>
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<td>.11</td>
<td>.04</td>
<td>.17*</td>
<td>-.06</td>
<td>-.09</td>
</tr>
<tr>
<td>Interaction</td>
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<td>-.10</td>
<td>-.08</td>
<td>-.01</td>
<td>-.04</td>
<td>.07</td>
<td>-.02</td>
</tr>
</tbody>
</table>

Note. HADS = Hospital Anxiety and Depression Scale; QoL = Quality of life; QoL Emot WB = Quality of life: Emotional Well-being subscale.

*** = p < .001; ** = p < .01; * = p < .05.
6.6 Discussion

A model was tested with post traumatic growth and physical post traumatic growth predicting levels of prostate cancer quality of life, anxiety, depression, body awareness and health behaviours. Body awareness was not included in further analysis due to its lack of significance within the overall model. Significant relationships were found whereby P-PTG predicted depression, anxiety and quality of life, PTG predicted depression, anxiety, quality of life and health behaviours, and mindfulness predicted depression and anxiety. A strict full mediation model was then conducted with post traumatic growth and physical post traumatic growth mediating the relationship between resilience and outcome variables of quality of life, anxiety and depression and health behaviours. This exhibited a good fit and compared to a partial mediation model, suggests that the relationship between resilience and outcome variables are fully mediated by physical and traditional post traumatic growth. Mindfulness was also assessed as a moderator to further explore its role in the model. It was found to play a moderating role in the relationship between physical post traumatic growth and quality of life, but did not moderate relationships between traditional post traumatic growth and any of the adjustment indices.

The current model has explored many new facets of post traumatic growth and has looked at the relationship between commonly implicated variables in the growth process but in a new way. Resilience is an integral part of the current model. Resilience is a target of interest for post traumatic growth research as it has been cited as a key component which can manipulate the level of cognitive processing engaged in by an individual following a trauma (Calhoun & Tedeschi, 2006). In the current model, resilience acts together with post traumatic growth and physical post traumatic growth in predicting outcomes in a variety of areas such as distress, quality of life and health
behaviours. This model suggests that high resilience relates to high PTG and P-PTG; this is interesting as it is contrary to expectation from the literature. It is unclear what implications can be drawn from this finding. Perhaps this is a sample specific finding, as Wilson et al. (2014) also found that prostate cancer survivors who were more resilient reported higher levels of growth.

Although it was hypothesised that higher resilience would mean lower physical post traumatic growth, it is possible that physical post traumatic growth is not as contingent on cognitive processing as traditional post traumatic growth given the physical nature of the trauma where an embodied sense of self is threatened and regained. Importantly, this model supports that resilience is fully mediated by the two forms of post traumatic growth. Full mediation fit the data significantly better than partial mediation meaning that the influence of resilience on the outcome variables such as distress and quality of life was best conceptualised as working through physical post traumatic growth and traditional post traumatic growth rather than directly on the outcome variables. Therefore, these multiple dimensions of post traumatic growth play an important role in determining individual factors and important health outcomes such as distress, quality of life and even health behaviours.

This is a key point for future research to explore further as of yet this is the first examination of resilience and growth in this way. This may be due to the focus of previous research on cognitive processing factors as the core predictors of PTG. The current model takes into account that factors such as resilience may precede cognitive processing mechanisms, thus providing a wider understanding of the post traumatic growth process. The inclusion of resilience is an important step in opening discussion surrounding distal and proximate factors of PTG.

Another novel aspect of the current research was the exploration of how mindfulness interacts with post traumatic growth and physical post traumatic growth. It was hypothesised that
mindfulness moderates the relationship between post traumatic growth, physical post traumatic growth and adjustment. An important finding of the current analysis was that those reporting higher mindfulness and higher physical post traumatic growth experienced better quality of life; however when participants reported both lower levels of mindfulness and lower physical post traumatic growth, better quality of life was also reported. This seems perplexing; however further understanding of these relationships may be gained in an examination of the lower mindfulness group.

It was shown that participants who report lower mindfulness and higher levels of physical post traumatic growth display worse quality of life. These lower levels of quality of life may be indicative of lower acceptance (a facet of mindfulness) of treatment side effects, and yet these physical side effects may facilitate physical post traumatic growth, thus resulting in low mindfulness and quality of life, yet high P-PTG. With regards to better quality of life for the lower mindfulness/lower physical post traumatic growth group, this may reflect a lack of awareness of the body following illness or even a mistrust or ‘alienation of the body’ following cancer treatment. This has been identified as a common experience following invasive cancer treatment, particularly in chemotherapy following breast cancer (Hefferon et al., 2010). This dissociation from the body may in some respects facilitate better reported quality of life, perhaps due to a lack of engagement with changed circumstances which may lead to underreporting of symptoms in a quality of life measure. Another possible relationship which could be a valuable avenue for future research would be to investigate whether symptom severity moderates the relationship between physical post traumatic growth, post traumatic growth and adjustment indices.

Chronic side effects or further symptoms may contribute to the predictive value of physical post traumatic growth in terms of adjustment indices. Therefore, future research could explore whether
mindfulness and symptom severity both act as moderators within the physical post traumatic growth process.

As past findings have been inconsistent in terms of quality of life, the addition of physical post traumatic growth is an important addition to the model of growth. Interestingly, physical post traumatic growth is an excellent predictor of increased quality of life for prostate cancer survivors explaining 67.24% of the variance. Post traumatic growth as traditionally defined has often predicted poorer quality of life in previous studies (Mohr et al., 1999; Tomich & Helgeson, 2004). This was often contrary to the expectation that post traumatic growth would improve well-being, including quality of life. Some research has suggested that the low levels of quality of life may be associated with ongoing engagement with distress and rumination and that growth outcomes could be linked to this deliberate rumination which in turn may affect quality of life.

However, the current model suggests that perhaps it is not just the continuation of the in-depth cognitive processing which influences the relationship between post traumatic growth and quality of life. Perhaps it is the absence of any aspect or acknowledgement of the role of the physical self in well-being and adjustment following trauma. These inconsistent findings could also be due to the type of quality of life scales used, for instance if scales incorporate a strong physical component and scores reflect a high level of physical symptoms resulting in lower reported quality of life. An individual may therefore report high post traumatic growth but low quality of life due to low physical quality of life.

The value of considering physical post traumatic growth is that this will also measure the physical aspect of the trauma which is an elementary part of the illness experience. This should add clarity to existing findings, as then both the quality of life measures and the post traumatic growth measures take into account the context in which they are being used (i.e. following physical trauma). This means that with the inclusion of the physical dimension, findings should be comparable,
while without the physical dimension, traditional post traumatic growth will have an inconsistent relationship with quality of life. With the inclusion of the physical aspects of post traumatic growth higher levels of physical post traumatic growth should consistently predict higher levels of quality of life as it acknowledges the role of the body in the post traumatic growth and adjustment process.

This model suggests that physical post traumatic growth is a better predictor of decreased levels of anxiety, depression and quality of life when compared to post traumatic growth. This is interesting as perhaps the more embodied perspective of physical post traumatic growth predicts better outcomes for survivors following a physical trauma such as illness. This has important implications for the way in which the construct of post traumatic growth should be conceptualised going forward. It is clear from the current model that both conceptualisations of post traumatic growth are extremely valuable and that all six dimensions have a contribution to make in terms of survivorship and well-being. It is therefore important to further explore how these impact distress, quality of life and health behaviours.

Physical post traumatic growth and traditional post traumatic growth are differentially predicting outcomes, supporting the qualitative literature to date on the importance of the role of the body following physical trauma (Hefferon 2009; Hefferon, 2010). For example, greater reconnection with the body is predicting higher quality of life and lower distress which supports previous assertions that physical post traumatic growth may facilitate well-being and act as a springboard to greater functioning for many physical trauma survivors. This dimension should, therefore, be incorporated into the existing measure of post traumatic growth or used in conjunction with the measure following validation across other physical trauma populations. This finding is an incremental advance and warrants confirmation and further investigation. As Hefferon (2012, p.1214) has asserted a "new addition of a more embodied perception of PTG, which dictates that as embodied individuals, any trauma caused unto or
within the body will entail a different reconstruction and journey to PTG”.

It is also important to look at particularly strong and weak associations within any structural equation model. There is a particularly strong association between quality of life and physical post traumatic growth, while there is a much smaller negative relationship between traditional post traumatic growth and quality of life.

The negative correlation between PTG and quality of life has been previously discussed by Thornton and Perez (2006), as the contribution of distress to the formation of PTG. For instance, individuals’ PTG scores may be influenced by concurrent impairments in quality of life in an attempt to alleviate associated distress. Similarly, the adaptational significance of PTG may be obscured by ongoing distress associated with the cancer experience. However, due to the cross sectional nature of the current research, this complex relationship cannot be further clarified. However, a cross-lagged panel design would be recommended as a rigorous way to understand this dynamic relationship more fully. Cross-lagged panel designs can be used to draw conclusions about the direction of association between variables (Kenny, 2005).

In addition, a surprisingly small relationship exists between post traumatic growth and health behaviours, while there is no significant relationship between physical post traumatic growth and health behaviours. This is counter to the study hypotheses. It is unclear why health behaviours are correlated with one and not the other. Perhaps this is a methodological issue, as the measure of health behaviours is a short measure with only a few items measuring four distinct behaviours- alcohol, nutrition and exercise which may impact its validity and robustness. However, another explanation may be that the relationship between post traumatic growth and health behaviours is influenced by peer support. Post traumatic growth contains dimensions relating to ‘personal strength’ and ‘improved relationships with others’. This social support may be an important consideration in survivors
engaging in health behaviours following a physical trauma and may explain why post traumatic growth predicts health behaviours. Interest in the importance of peer support has been growing and has recently been investigated by Wilson et al. (2014). This has been recently supported in a cancer survivorship intervention (CanChange; Hawkes, Patrao, Baade, Lynch, & Courneya, 2014) whereby, significant associations were found between sufficient physical activity at twelve months and the post traumatic growth subscale ‘relating to others’ (p=0.011). This is an important finding as this intervention was conducted with a gender neutral cancer population of colorectal cancer survivors (N= 410). The addition of physical post traumatic growth to the Wilson et al. (2014) model in future research may shed light on how peer support works in conjunction with dimensions of post traumatic growth and physical post traumatic growth to facilitate health behaviour change.

Another point for discussion is the apparent lack of relationship between body awareness and any of the variables. This is unexpected given that one factor of physical post traumatic growth is Health Awareness. This could be related to the sample being one of older adult males. Males have been noted as a group to have lower levels of body awareness. The impact of masculinity on body awareness is a point to consider in relation to the future development and improvement of the concept of physical post traumatic growth. Again, this study is cross sectional so results must be interpreted cautiously as causal relationships cannot be established. Future research would benefit from multiple time points to further understand the role of post traumatic growth and physical post traumatic growth following physical trauma. The current study also has a greater focus on exploring physical PTG and its outcomes rather than predetermining factors of PTG as in Wilson et al. (2014); future research would ideally link these two models to give a broader picture of precedent and antecedent variables.
A recent review from Park (2010), highlighted that in the broader coping literature it is assumed that distress drives the meaning making process (a broader PTG process). However, the same studies typically still conceptualise distress as an outcome due to the cross sectional nature of the research. It is acknowledged that the process of growth is an iterative one and the coexistence of growth and distress is an important finding of recent post traumatic growth research whereby these two distinct constructs can be present following trauma. This has been referred to in recent qualitative work with cancer patients as ‘experiences of paradox’ (Leal et al., 2014). Leal et al. (2014) provided recognition that the survivorship journey often has a contradictory trajectory as it is ‘neither linear, nor singular, nor conclusive in nature, but reiterative across time’. However, due to the cross-sectional nature of the research this bi-directional relationship could not be assessed and was beyond the scope of the current study but would be a major contribution in future research.

6.6.1 Limitations. There are some limitations to the current research that need to be considered. The cross sectional nature of the present research prevents a direct test of the causal relationship between post traumatic growth and associated constructs. For example, one cannot definitively conclude that post traumatic growth leads to higher levels of psychological well-being; this relationship may be reversed or reciprocal. Thus, while this research provides insightful snapshots into the current concepts; results must be interpreted cautiously.

Future research would benefit from the inclusion of longitudinal data, which would enable a deeper understanding of the complex relationship between physical post traumatic growth and the outcome variables as well as the temporal relationships. Methods for future consideration could be latent growth modelling which may be useful in determining the trajectory of physical post traumatic growth from diagnosis throughout the illness journey. Another point to note in relation to SEM is that the current model presented is one of many
possible models involving these variables. It is possible that alternative models also fit the data; however, the current model was based on a firm theoretical basis. Therefore, the model presented offers a tentative explanation of relationships.

6.6.2 Conclusion. Findings suggest the central role of post traumatic growth in the prostate cancer survivorship experience and it is enhanced by the inclusion of physical post traumatic growth through the addition of the embodied perspective as per Frank (2002) and Merleau-Ponty (1962). Adjusting to a physical trauma such as illness (internal transgressor) is unlike a trauma with an external transgressor as the physical trauma creates an entirely different framework for adjustment. The inclusion of this measure of physical post traumatic growth will contribute to a comprehensive picture of the survivorship experience.
Chapter 7

General Discussion

7.1 Research Summary

Recent research has highlighted the need for further examination of the construct of post traumatic growth and, more specifically, how a physical trauma may create a unique opportunity for a distinct form or dimension of post traumatic growth to emerge (Hefferon, 2012). In particular, previous research has focused attention on identifying a possible sixth dimension of post traumatic growth (i.e., physical post traumatic growth) in samples of breast cancer survivors (Hefferon et al., 2010). The present research endeavoured to develop a measure of physical post traumatic growth to corroborate existing qualitative findings, which indicate that physical trauma has a unique impact on post traumatic growth. It also aimed to further investigate this dimension of positive change in relation to psychological and health-related outcomes.

Physical post traumatic growth was examined using data collected online and via postal survey from a total of 693 participants, who had been diagnosed and treated for prostate cancer. To this end, three inter-related strands of investigation were pursued. The first strand had a dual focus and centred on further understanding the experience of prostate cancer, as well as item generation for use in scale development (Chapter 4). This led to the development and psychometric evaluation of a measure of physical post traumatic growth using the following analyses: exploratory factor analysis; confirmatory factor analysis; internal reliability and convergent validity (Chapter 5). The third strand utilised structural equation modelling (SEM) to test theoretical hypotheses pertaining to the impact of physical post traumatic growth and post traumatic growth on outcomes of anxiety, depression, quality of life, health behaviours and body
awareness. In addition, the mediating role of physical post traumatic growth and post traumatic growth in the relationship between resilience and outcomes was assessed; as well as the moderating role of mindfulness on the relationship between post traumatic growth and outcomes (Chapter 6).

Taken together, the results indicate that the measure provided a valuable advance for post traumatic growth research and facilitates the investigation and improved understanding of the construct in the complex survivorship experience.

7.2 Study One

In Study One, a qualitative exploration of the experience of prostate cancer was conducted. Individual interviews were carried out with men who were a minimum of one year post treatment for prostate cancer. Thematic analysis identified four main themes which captured their prostate cancer experience: Resilience; Secrecy vs. Support; Acceptance; and New Awareness.

7.2.1 Resilience. Theme One ‘Resilience’ referred to an active coping style, which was prominent among the cohort. This was seen as a core part of the prostate cancer experience including sub-themes ‘active coping’ and ‘survival instinct’, whereby participants engaged with routine and improved their health behaviours. Resilience was driven by the patient’s ‘survival instinct’ whereby quantity of life was deemed to be of more importance to patients than quality of life. This is similar to Wilson et al. (2014) who found that resilience may be predictive of growth. This is contrary to current PTG theory (Calhoun & Tedeschi, 2006) which posits a negative relationship between resilience and post traumatic growth and so these relationships need to be examined further.

It remains to be seen whether resilience is a distinct part of the male cancer experience or whether resilience would be as prevalent in a sample of females. The narrative that surrounds resilience may tap into masculine expectancies and hegemonic norms (Wall & Kristjanson,
2005). For instance, some of the male participants felt they should discuss ‘getting on with things’ in order not to appear weak or vulnerable. This is an interesting additional perspective on the male experience as previous qualitative results are from studies with breast cancer (Hefferon, 2010). Whether this is related to masculine roles and expectations is an important question for future models of post traumatic growth and physical post traumatic growth.

**7.2.2 Secrecy vs. Support.** Theme Two ‘Secrecy vs. Support’ encapsulated complex adjustment to cancer which is often fraught with both benefits and burden (Curtis et al. 2014). Analyses revealed that achieving adequate support while maintaining a level of discretion was a challenge for patients in terms of changing identity and adherence to hegemonic masculine roles. This is similar to findings from Aujoulet et al. (2008), whereby, the process of personal transformation for a chronically ill person was seen as a dual process of both ‘holding on’ to previous identity and ‘letting go’. This is particularly relevant for prostate cancer survivors as improvements in treatment means that prostate cancer can be more of a chronic condition (Cayless et al., 2010). Many participants in the current study were holding on to previous roles and showed reluctance to let go, relinquish control and seek support. In line with early post traumatic growth theory (Janoff-Bulman, 1992), this identity change and subsequent acceptance of that changed identity is seen as an essential aspect of post traumatic growth.

Indeed, the ‘Dyadic Model of Resolution and Growth’ (Nerken, 1993) describes changes to the ‘core-self’ and ‘reflective-self’ as integral to the process of positive change following trauma, whereby, the ‘core-self’ consists of the resources of identity. Negotiating these new identities and roles is a critical aspect of prostate cancer survivorship and post traumatic growth in general. It is important to note that physical or ‘internal’ trauma may impact the shaping of post trauma identity more strongly than ‘external’ trauma due to the physical self acting as a salient reminder of the trauma (Hefferon,
2010). This has also been demonstrated among various cohorts, including adults with traumatic spinal chord injury (Yoshida, 2008).

Notably, this qualitative exploration provided further insight across themes into how masculinity and the impact of adhering to hegemonic norms may shape the growth trajectory. This is apparent particularly in ‘Secrecy vs. Support’ theme, but also the Resilience theme, where social support needs were often challenged or conflicted with the desire to adhere to masculine norms. This fits with Thornton and Perez (2006) who found that male participants reported lower levels of growth than their female counterparts and attributed this to women seeking more social support than men.

7.2.3 New Awareness. Theme Three ‘New Awareness’ related to adoption of improved health-related behaviours following prostate cancer. This supports previous findings from Demark-Wahnefried et al. (2000) which posit that a physical trauma can instigate greater health awareness and improved health behaviours among survivors. These findings suggested that older adult males following treatment for prostate cancer do experience physical post traumatic growth in line with previous studies involving cohorts of breast cancer survivors (Hefferon et al., 2010). This finding, whereby individuals may be motivated to engage in positive health behaviours, is an important addition to the current models of post traumatic growth. The current research highlights the importance of the physical self and its relevance to well-being (Hefferon, 2013).

7.2.4. Acceptance. Theme Four ‘Acceptance’ indicated that patients felt more accepting of side effects depending on their age. Acceptance was a large part of participant’s experience and much of the physical functioning issues were seen as a very natural consequence of age. This has been suggested in previous work from Jonsson et al. (2010) where the deterioration of the body was simply regarded as a biological process. Furthermore, these qualitative findings support those previously reported in meta-analysis which explored traditional PTG and age differences (Vishnevsky et al., 2010). Age may be an
important aspect of physical post traumatic growth in relation to positive lifestyle changes as Bevan et al. (2014) found that investment in positive lifestyle choices became more significant with age. Results provided in the present research are of value as the extent to which older adult males report post traumatic growth and physical change related to the body was previously unknown. This is a point of concern, given the promising qualitative findings in breast cancer survivors (Hefferon et al., 2010).

7.2.5. Summary. Overall, the experience of prostate cancer was found to have an impact on men’s embodied self-perceptions. For example, the physical side-effects and ‘removal’ of cancer from the body were highlighted under the theme of resilience, while the theme secrecy and support highlighted the link between physical strength and masculinity, which conflicted with perceptions of illness and vulnerability, themes which were at odds with traditional masculine ideals (Wall & Kristjanson, 2005). The current paucity of research into post traumatic growth in prostate cancer means that avenues for improving patient well-being and adjustment are lacking for older adult males and need to be addressed.

This is the first exploratory study of physical post traumatic growth in a male sample with a physical illness. These findings support results from Sabiston et al. (2007) which highlight the experience of personal transformation following breast cancer. New ways of conceptualising the physical self were a core part of the experience and emphasised physical competence and strength as central components of recovery and rejuvenation (Sabiston et al., 2007). The current study adds to the growing body of research which addresses the call for PTG research in mortality salient environments (Tedeschi & Calhoun, 2006).

7.3 Study Two

A measure of physical post traumatic growth in men with prostate cancer was developed and validated using best practice
Physical post traumatic growth was found to consist of two factors—Health Autonomy and Health Awareness. These factors demonstrate a novel aspect of the post traumatic growth experience, which has thus far only been qualitatively explored. These factors give support to the view that physical trauma, which creates an ‘internal transgressor’ rather than an ‘external transgressor’, may present a different adjustment challenge (Hefferon, 2012).

**7.3.1 Physical post traumatic growth factors.** The factors Health Autonomy and Health Awareness add to existing knowledge by incorporating aspects key to survivorship such as control, empowerment and acceptance. Regaining control following a physical trauma and subsequently reporting improvements in well-being and adjustment has been reported across multiple research settings (Biddle & Mutrie, 2007; Milne et al., 2007; Salick & Auerbach, 2006). Connerty and Knot (2013) discuss how regaining control may be an important aspect for the development of PTG. It is suggested that ‘modifiable factors’ (e.g., physical activity and health-related information seeking) influence survivors sense of control and thus, have the potential to impact the development of PTG (Connerty & Knot, 2013). As of yet, it is unclear whether the presence of physical post traumatic growth facilitates improved health behaviours, or alternatively, whether improved health behaviours foster physical post traumatic growth. Prospective research that examines the relationship between these modifiable factors and PTG will assist in disentangling the dynamic and often complex relationships in the survivorship journey.

**7.3.2 Construct Validity of the P-PTGI.** In general construct validity was supported. However, counter to original hypotheses, the results of Study Two indicated that physical post traumatic growth was not correlated with body awareness. This is contrary to current qualitative findings (Hefferon, 2010, 2012), however, the subscale Health Awareness was correlated with body awareness and post traumatic growth, but not with mindfulness. Conversely, the Health
Autonomy subscale was significantly correlated with all other construct validity measures, except for body awareness.

The current research suggests that conceptual differences between Health Autonomy and Health Awareness hinge on issues of acceptance and control. Health Autonomy may facilitate action and efforts to change current health status and quality of life. Previous research has reported that autonomy is related to motivation, which is subsequently important for engaging in positive health behaviours such as smoking cessation (Williams, Gagné, Ryan, & Deci, 2002). On the other hand, Health Awareness, which has an association with body awareness, may facilitate greater attention to physical changes and functionality. This may create barriers for potential change, rather than motivating the individual to strive for better health behaviours. This could account for the differential role that the factors play in facilitating outcomes and is an important point to consider given the previously discussed importance of self-care in cancer survivorship (Naue, 2006).

7.4 Study Three

A model was tested with post traumatic growth and physical post traumatic growth predicting levels of 1) quality of life, 2) distress, 3) health behaviours and 4) body awareness. This overall model exhibited a good fit to the data.

Mindfulness was also assessed to investigate whether it moderates the relationship between post traumatic growth, physical post traumatic growth and adjustment indices. Finally, physical post traumatic growth and post traumatic growth were tested as mediators of the relationship between resilience and adjustment indices.

7.4.1 Post traumatic growth and Quality of life. Physical post traumatic growth is an important addition to the general model of growth in predicting quality of life as previous findings examining these relationships are inconsistent (see Cordova et al., 2001; Fromm et al., 1996; Sears et al., 2003). Physical post traumatic growth was found to be an excellent predictor of increased quality of life for prostate cancer
survivors explaining 67.24% of the variance, thus confirming the hypothesised relationship. Traditional post traumatic growth, however, predicted poorer quality of life in line with some earlier studies (Mohr et al., 1999; Tomich & Helgeson, 2004). Physical and traditional post traumatic growth may have a different predictive relationship to quality of life for a variety of reasons. It has been suggested that perhaps low levels of quality of life may be associated with on-going engagement with distress contributing to the counter-intuitive lower levels of quality of life and positive growth reported in survivors (Thornton & Perez, 2006).

These empirical findings reflect the dual nature of post traumatic growth which has been previously suggested by theory. Aldwin (1994) in ‘transformational coping theory’ recognised the existence of both growth and distress. This has been corroborated by findings from Nightingale et al. (2010) and Stockton et al. (2011) who suggest there are shared pathways from trauma to both positive and negative changes which are mediated by cognitive processing. The current model with the inclusion of physical post traumatic growth adds clarity; perhaps it is not just the continuation of the in-depth cognitive processing which influences the relationship between PTG and quality of life, but the absence of any acknowledgement of the role of the physical self in well-being and adjustment (Hefferon et al., 2009). The confirmation of the hypothesis that physical post traumatic growth predicts better quality of life underscores the importance of considering contextual factors in a traumatic event, particularly in terms of the type of trauma.

7.4.2 Post traumatic growth and Distress. Study Three highlights that physical post traumatic growth is a better predictor of decreased levels of anxiety and depression than traditional PTG. This is in contrast to previous research examining the relationship between growth and distress which has resulted in conflicting findings (Helgeson et al., 2006). It is proposed that these inconsistent findings
are a direct result of not differentiating between internal and external transgressors (Hefferon, 2012).

Given the adaptive role that physical post traumatic growth appears to play in distress within this population there are some other issues which may be useful to explore in terms of the unique impact of a physical trauma on distress. For instance, previously Morris and Shakespeare-Finch (2011) found that trauma severity was directly related to distress, but not to traditional PTG. As there was formerly no acknowledgement of the physical self within any PTG measure (Park & Lechner, 2006), it is feasible that these previous findings do not adequately capture the entirety of the relationship between distress, post traumatic growth and trauma severity and, therefore, warrant further investigation.

7.4.3. Post traumatic growth and Health Behaviours. No significant relationship was found between physical post traumatic growth and health behaviours, while a small correlation was found between traditional PTG and health behaviours. Positive associations between PTG and healthier lifestyle choices have been suggested previously with Urcuyo et al. (2005) reporting lower levels of substance abuse as a coping strategy and findings from Milam (2004) supporting risk-reducing behaviours in a HIV positive population. Barskova and Osterreich (2009) conducted a review which supported the adaptive significance of post traumatic growth and physical health; however, given the varied results depending on gender, disease-related profiles and research design (Milam, 2004; Bower et al., 1998) further research is needed.

The lack of correlation between physical post traumatic growth and health behaviours in the current study was unexpected given previous qualitative work with breast cancer survivors (Hefferon, 2010, 2012). However, barriers to engagement have been recently explored in cancer survivors (Hefferon, Murphy, McLeod, Mutrie & Campbell,
many of the barriers cited (e.g., lack of motivation and not being ‘the sporty type’) may be improved through higher levels of social support. Previous research has implicated peer support as a key driving force in this relationship (Wilson et al., 2014), which has also been supported in a physical activity intervention following cancer in a gender neutral physical trauma (Hawkes et al., 2014). The relationship between physical post traumatic growth, traditional PTG and peer support in terms of health behaviours requires further investigation.

7.4.4. Physical post traumatic growth and Body Awareness. Body Awareness did not correlate significantly with any other variables in the model counter to Study Three hypotheses. This is unexpected given the variables within the model such as health behaviours and physical post traumatic growth. These variables in particular have been cited as associated constructs within past qualitative literature (Hefferon et al., 2009). One explanation for this unexpected finding may be due to the sample under investigation (i.e., older adult males). Males have been noted as a group to have lower levels of body awareness (Shields, Mallory, & Simon, 1989). This is a point to consider in relation to the future development of the concept of physical post traumatic growth.

7.4.5 Post traumatic growth and Resilience (Mediation). A strict full mediation model was conducted and showed that post traumatic growth and physical post traumatic growth mediated the relationship between resilience and quality of life, anxiety, depression and health behaviours. Resilience was hypothesised to play a crucial role in PTG as traumatic experiences may be less traumatic to resilient individuals (Bonanno et al., 2004), thus influencing the experience and appraisal of growth. This model exhibited a good fit and suggests that, compared to a partial mediation model, the relationship between higher resilience and better adjustment is fully mediated by physical and traditional post traumatic growth. While this finding is contrary to the existing theoretical framework (Calhoun & Tedeschi, 2006), it is in
line with more recent research with Australian prostate cancer survivors (Wilson et al., 2014). This is an important finding in terms of the future conceptualisation of post traumatic growth. Perhaps these findings are counter to the predominant theoretical framework because physical post traumatic growth does not centre on cognitive processing as much as other dimensions of growth. This could be due to the corporeal nature of physical trauma and the subsequent physical recovery and rejuvenation experienced (Hefferon, 2012).

A potential avenue for further investigation would be to assess predetermining factors of PTG (as in Wilson et al., 2014) as well as physical PTG and the outcome variables used in the current study. This may shed further light on the post traumatic growth process and the mechanisms which drive growth in terms of identifying aspects of survivorship that could be modifiable, thereby, leading to better outcomes (e.g., greater long term adjustment).

7.4.6. Post traumatic growth and Mindfulness (Moderation).

Mindfulness was found to play a moderating role in the relationship between physical post traumatic growth and quality of life confirming Study Three’s hypothesis. This supports findings from earlier studies whereby greater levels of mindfulness facilitate trauma survivors to explore both positive and negative aspects of their experience (Bonadonna, 2003), and to disengage from automatic thoughts and habits (Baer et al., 2006), thus fostering psychological flexibility.

An important finding of the current analysis was that those reporting higher mindfulness and higher physical post traumatic growth experienced better quality of life, compared to those who reported higher mindfulness and low physical post traumatic growth scores. This better quality of life may be attributed to the way in which the essential aspects of mindfulness (i.e., awareness and attention) impact adjustment following physical trauma. Awareness has previously been linked with theories of self-regulation (Ryan & Deci, 2000) and how the physical self becomes more salient and is an integral part of recovery (Hefferon et al., 2009). Self-regulation has long been
associated with post traumatic growth, for instance, the early ‘model of quantum change’ (Miller & C’dedeBaca, 1994) cited self-regulation as an integral component of positive change following trauma.

It was also found that those who exhibited lower mindfulness and physical post traumatic growth displayed better quality of life, compared to those with high mindfulness and low physical post traumatic growth. The improved quality of life for the lower mindfulness/lower physical post traumatic growth group, may reflect a lack of awareness of the body following illness or even a mistrust or ‘alienation of the body’ following cancer treatment (Hefferon et al., 2010). Moreover, this dissociation from the body may, in some respects, facilitate higher self-reported quality of life, potentially reflecting a lack of engagement with changed circumstances which may lead to underreporting of symptoms in quality of life measures.

However, those reporting lower levels of mindfulness and high physical post traumatic growth reported worse quality of life compared to those reporting high mindfulness and high physical post traumatic growth. These findings highlight the complex relationship between PTG and quality of life. Lower levels of quality of life combined with lower levels of mindfulness, but with high physical PTG, could potentially be indicative of an individual’s lack of acceptance (i.e., a facet of mindfulness). Lower levels of acceptance following physical trauma may potentially act as an enduring stressor initiating cognitive processing. This may then facilitate physical post traumatic growth, thus, resulting in high physical post traumatic growth, yet lower quality of life. Further research is required to clarify the interacting relationships between these constructs.

7.5 Strengths and limitations

One of the key strengths of this research is that it addresses a significant gap in post traumatic research by developing a tool which incorporates aspects of growth following physical trauma. This has been cited as a need in the PTG field for almost a decade (Park & Lechner,
This research highlights the importance of the embodied approach to post traumatic growth following physical illness (Hefferon, 2012).

There are also several possible limitations to the current research which warrant discussion. It is important to note that the interviews in Study One were conducted by a young female. Researchers examining men’s health have found that interviewer gender can impact the interview process (Broom, Hand, & Tovey, 2008; Oliffe & Mroz, 2005). Pini (2005) found that men include and omit certain topics depending on the gender of the researcher. In this study the interviewer was of the view that a high level of openness was maintained by the men and thus important aspects of prostate cancer were captured. However, it remains possible that the results were indeed influenced by the researcher’s demographics.

There are limitations to Study Two and Three which warrant consideration. A sample was drawn from local clinics and local support groups, as well as an Internet sample which was accessed via popular prostate cancer forums. This had both strengths and weaknesses. The sample was more varied in terms of various nationalities and ethnicities which supports the generalisability of the measure. However, there is also less control over who takes part. Some of the participants may differ from the general population of survivors as they were already seeking support from a prostate cancer support group. However, using a mixed collection sample was important in order to make the factor analyses robust as large sample size was needed (Byrne, 2009).

In addition, it must also be recognised that the sample of older adult men are a unique group with specific characteristics that must be considered. It has been found that usually older adults who refuse to participate in research tend to be male, to be older, and belong to a lower income group (Wilson & Weber, 1976). Therefore, it is important to evaluate results in light of this. Furthermore, dropout from research studies using older populations is found to be related to perception of advancing age, increased disability, and lower self-report scores on
levels of activity (Carter, Elward, Malmgren, Martin, & Larson, 1991; Markides, Dickson, & Pappas, 1982; Norris, 1985). This has implications for the recruitment of older adult males and the generalisability of results in relation to levels of disability and activity, as they are central aspects of quality of life and adjustment.

Another issue which warrants consideration is the impact of social desirability (i.e., the tendency for individuals to respond to scale items in a manner that garners social acceptance) when completing self-report psychometric instruments. This was not examined in the current series of studies. It was believed that the use of anonymous and online methodologies would encourage truthful responses and protect against social desirability (Joinson, 1999). In addition, previous research on the PTGI has reported that it is independent of social desirability (Tedeschi & Calhoun, 1996). Nonetheless, given the new dimension of post traumatic growth developed in this study it is recommended that future researchers, who use the P-PTGI, include a measure of social desirability bias, such as the Social Desirability Scale (Stöber, 2001).

Another limitation is the reliance on self-report measures. Self-report means that responses may be impacted by consistency effects whereby respondents seek to maintain consistency among answers, which may include socially desirable responding or acquiescent response sets (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). This is a commonly raised concern; however, the subjective nature of the variables being measured makes this approach the most appropriate.

A final limitation is the cross sectional nature of the current research. This results in a difficulty in ascertaining cause and effect relationships between physical post traumatic growth, traditional post traumatic growth and the adjustment indices. Previous research has suggested that the complex relationships between these variables occur in a dynamic and ongoing process. Therefore, although cross-sectional work provides a useful snapshot of these relationships, there is a need
for further clarification. This may be facilitated by using a cross-lagged panel design which facilitates the exploration of relationships between variables over time (Kenny, 2005).

Furthermore, the cross-sectional nature of this design and the use of SEM stipulating a number of predictive pathways simultaneously may give rise to the possibility of inflated risk of type one error. It is acknowledged that controlling for type one error in SEM is not widely practiced (Green & Babyak, 1997). This is due to the fact that false positive findings may not emerge if meaningful models are based on a strong theoretical framework. In addition, when comparing models in SEM each model is highly correlated to previous and subsequent models as the parameters change very little from model to model (Green & Babyak, 1997), therefore limiting the possibility of type one errors associated with multiple testing. Given the strict criteria and best practice guidelines used in the current study, the results achieved may be considered as reliable.

7.6 **Directions for future research**

In light of the findings and limitations that have been discussed there are a number of avenues which warrant further investigation. With reference to the P-PTGI, although initial psychometric testing is promising, further reliability and validity studies are needed. Scale score reliability of the P-PTGI was good, however, further tests of reliability should be conducted (i.e., test re-test reliability). Reliability over time is an important area for future research as previous studies do not consistently support any one established trajectory of post traumatic growth. This is mainly due to the dearth of longitudinal research.

In line with the recommendations of a recent SEM study investigating post traumatic growth and prostate cancer (Wilson et al., 2014), it would be extremely beneficial to validate this measure with other cohorts of individuals that have experienced physical trauma, such as colorectal cancer survivors. Such research would prove
advantageous given the natural mixed-gender sample, and would help to elucidate potential gender differences in physical post traumatic growth.

Although Morris and Shakespeare-Finch (2011) found that there were no significant group differences between breast cancer survivors and prostate cancer survivors on a measure of traditional post traumatic growth, they found that breast cancer survivors reported significantly greater post traumatic growth than those diagnosed with colorectal and hematological malignancies. Therefore, as this is the first study of men and physical post traumatic growth, it would be prudent to measure physical post traumatic growth in a sample where both men and women are experiencing a similar ‘gender-neutral’ trauma.

Morris and Shakespeare-Finch (2011) also investigated the role of trauma severity in distress and traditional post traumatic growth. No relation was apparent between trauma severity and PTG. However, it should be noted that trauma severity may be more related to an embodied sense of post traumatic growth, particularly in a physical trauma context, this may impact adjustment in terms of quality of life and distress and warrants further investigation. Another potential direction for future research would be to incorporate the P-PTGI into the existing measure of post traumatic growth for utility purposes in clinical settings. Factor analysis using all items from both the PTGI and P-PTGI would be very informative for future research. Following further reliability and validity analyses, it is likely that the P-PTGI may assist with intervention research to help measure positive changes following trauma, including physical trauma.

Further exploration of the emergent factors of physical post traumatic growth may provide helpful insights into the mechanisms behind the individual factors of physical PTG. For example, Health Awareness is deemed to be potentially the core component of physical PTG, given its higher correlations with post traumatic growth subscales in comparison to Health Autonomy, while Health Autonomy is
potentially more closely aligned with constructs such as self-efficacy, empowerment and control which have not been measured in the current study. These constructs have all been previously linked with greater adjustment (Keers et al., 2006; Anderson, Funnell, FitzGerald & Marrero, 2000). Future research would benefit from additional examination of these two factors and how they relate to adjustment.

It is important to note given the early stage of theory development that the two factors of Health Awareness and Health Autonomy may not represent all experiences of physical post traumatic growth. As can be seen from initial EFA, two other factors also emerged: ‘Health Behaviour Change’ and ‘Health Acceptance’. Although these factors did not meet the stringent inclusion criteria, these factors may form some part of the post traumatic experience in other samples. This would be an interesting avenue for future research especially as health behaviour change would be an important aspect of future physical post traumatic growth intervention development. Other factors such as peer support and connection may be a primary mechanism in the post traumatic growth process to facilitate health behaviour change following physical trauma. Recently, Roepke and Seligman (2014) have cited the potential importance of engagement with new possibilities or ‘seeing new doors opening in the aftermath of adversity’ (p. 6) as an overlooked predictor of growth. This aspect of PTG may be linked with re-evaluating personal resources and relationships and warrants further exploration.

Overall, the results of the present research lay a foundation for the above developments by providing a tool (e.g. P-PTGI), as well as preliminary evidence for an explanatory model. However, given the cross-sectional nature of the current research, future longitudinal research is needed to verify the proposed explanatory model. This is particularly relevant in relation to understanding how body awareness may relate to physical post traumatic growth. The lack of association cross-sectionally between physical post traumatic growth and body awareness is an important issue for future analyses.
7.8 Implications of the current research

The development and validation of a measure of physical post traumatic growth will allow for a more comprehensive picture of post traumatic reactions following trauma. This study included physical aspects such as accessing health-related information, screening, nutrition and exercise. These aspects of positive change were represented by items directly pertaining to greater awareness of health and the physical self (e.g., item 28; the time I put into researching information about my health has...).

Although the presence of both growth and distress has been reported in previous research (Leal et al., 2014), the current research provides new insight into the role of the physical self on the PTG process through investigating resilience, mindfulness and their impact on physical post traumatic growth and traditional post traumatic growth and adjustment. For instance, the current research has shown that physical post traumatic growth is a better predictor of adjustment (i.e., lower anxiety and depression) than the traditional model of PTG. This has significant theoretical implications for the field of post traumatic growth given the previous inconsistent findings found between growth and distress (Helgeson et al., 2006). By acknowledging the relationship between the individual and their body in the post traumatic growth experience it is possible to gain a more comprehensive understanding of the survivorship process and the dual nature of ongoing distress and growth.

The development of the physical post traumatic growth construct presents a more comprehensive picture of post traumatic reactions, particularly in terms of the male experience of physical post traumatic growth following prostate cancer. This significantly adds to the theory of the development of post traumatic growth by highlighting the role of the physical trauma in adjustment. These findings lay the foundation for potential development of interventions to improve adjustment of older males following prostate cancer. For instance, by providing brief interventions that increase aspects of physical post...
traumatic growth (e.g., greater awareness of health and greater appreciation of the body) well-being and positive change following trauma can be incorporated into the conceptualisation of the survivorship process. Interventions that incorporate the impact of physical trauma on adjustment may have wide clinical implications as treatment side effects associated with prostate cancer have previously been linked to poor psychological adjustment (Bloch et al., 2007).

The P-PTGI addresses concerns from Calhoun and Tedeschi (2006) regarding the need for further research of PTG in mortality salient environments. This measure will be an important tool in terms of theoretical development, but also when validated further it should prove useful in intervention research and for care plans for prostate cancer survivors. It can assist patients in understanding the value of monitoring their body in order to benefit from an increased physical awareness which may result in improvements to patient's quality of life.

7.9 Conclusion

The current investigations make a valuable contribution to our understanding of post traumatic growth in prostate cancer. A measure of physical post traumatic growth was created (P-PTGI), and the scale development process broadened conceptualisations of post traumatic reactions. Previous measurement tools did not consider the type of trauma, such as a physical trauma, to be an important factor in post traumatic growth. Further development of the measurement tool is warranted with people who suffer other types of physical traumas. Results from the current research suggest that the P-PTGI and its subscales possess good psychometric properties, and, consequently, following further validation studies should prove useful to researchers looking for a brief and easy to administer measure of physical post traumatic growth.

The current study demonstrates the impact of physical post traumatic growth on adjustment and furthermore adds new insights
into the interplay of resilience, and mindfulness with post traumatic growth, physical post traumatic growth and adjustment.
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Appendix A: Study One Invitation

Deirdre Walsh, Rapid Access Prostate Diagnostic Clinic, 
School of Psychology, University Hospital Galway. 
NUI Galway.

Dear Sir,

We are currently carrying out a study to help us understand men’s experience with prostate cancer. To do this we need to gather information from as many men as possible. Your cooperation would be greatly valued and the information provided will give us a more accurate picture of the changes men might experience following the difficult time of prostate cancer diagnosis and treatment. Your participation in an interview will help us to identify the kind of support which men may find beneficial.

Please read the information sheet and if you agree to participate please contact me, Deirdre, on the phone number provided below. We would very much appreciate your help to complete this study. All information provided is totally confidential.

If you have any questions about the study please ring me, Deirdre, at 0861630704. I have met many of you in the Rapid Access Clinic and I’m looking forward to hearing from you again. We would very much appreciate your unique contribution to this study which will help us better understand men’s experience of prostate cancer.

Best wishes,

----------------------------------
Deirdre Walsh, MSc 
Principal Investigator 
Tel – 0861630704

Dr.GarrettDurkan, 
Consultant Urologist, 
MD FRCSEI (UROL), 
University Hospital Galway.

Dr.AnnMarieGroarke, 
Head of Psychology 
NUI, Galway.

Prof. Frank Sullivan, 
Head Radiation Oncologist, 
Director, 
Prostate Cancer Institute, 
NUI Galway.
Appendix B: Study One Information Sheet

Understanding your Prostate Cancer Experience

Participant Information Sheet

Purpose of the Study

You are invited to join a study which aims to understand men's experience of prostate cancer diagnosis and treatment. We know that speaking about your experience of prostate cancer may be difficult for you but the information you give will help us to understand the prostate cancer experience.

What will be involved if I agree to take part in this study?

If you agree to take part you will be asked to take part in an interview which lasts approx. one hour. There may be some questions which seem quite personal; however some men report difficulties in these areas. These questions are just to help us understand your experience as much as possible.

Can I withdraw from the study?

Even if you have agreed to take part in the study you are free to withdraw at any stage without having to explain why.

Confidentiality

All information given to the researcher will be treated in the strictest confidence. Your name will not appear in any report resulting from this study. Individuals will not be identifiable from the details in the reports resulting from this study.

If you have any queries about the interview please contact: Deirdre Walsh, MSc.

Deirdre Walsh, MSc.
Principal Investigator
Tel - 0861630704

Dr. Annmarie Groarke,
Head of Psychology,
NUI, Galway.

Dr. Garrett Durkan,
MD FRCSI (UROL),
University Hospital Galway.

Prof. Frank Sullivan, Consultant Urologist,
Head Radiation Oncologist,
Director,
Prostate Cancer Institute, NUI Galway.
Appendix C: Consent form

Understanding your Prostate Cancer Experience

Patient Consent Form

Please place a circle around either Yes or No

I have read and understood the information sheet about Yes No the study which is trying to understand men’s personal experience of prostate cancer diagnosis and treatment.

I understand that I am free to withdraw from this study Yes No at any time and that this will not affect my care in this hospital in any way.

I understand that any information I give to the researcher Yes No will be treated in the strictest confidence.

I understand that I can ask the researcher questions Yes No about the study at any time.

I, the undersigned, agree to take part in the study examining men’s personal experience of prostate cancer diagnosis and treatment.

Name: _________________________________

Signed:_________________________________

Date:__________________________________

Contact Phone No:_______________________

Research Participant Number:
This number will now be used instead of your name. Your name will not appear on any questionnaire. The questionnaire is COMPLETELY ANONYMOUS.
## Appendix D

Study 1: Table of qualitative themes and sub themes with illustrative quotes.

<table>
<thead>
<tr>
<th>Themes</th>
<th>Illustrative Quotes</th>
</tr>
</thead>
</table>
| **Resilience**       | I said don’t ask me why I am doing this [cycling 60km after last radiotherapy session], I don’t know. I just feel that if I can do this I can do something else, then I can do that...and maybe I can whip this thing. I think basically all I was doing was trying to psych myself up. All I was doing was trying to find the strength within myself to give it a right lash (Participant 1)  
I was worrying more about it in the first year, wondering would it go away properly. You know you kind of come to terms with it properly when you go in for the radiotherapy and I think now you just take it all as it comes, like whatever you have to do (Participant 2)  
I’m just hoping I have got over that stage and dealt with and carry on our life you know quite happily, with that [prostate cancer] behind me, that’s all (Participant 5) |
| **Survival Instinct**| You just go on, I don’t know how. I don’t have any particular way of dealing with it. Just go ahead and go and do your check up and that’s it (Participant 16)  
I’m just hoping I have got over that stage and dealt with and carry on our life you know quite happily, with that [prostate cancer] behind me, that’s all (Participant 5). |
| **Active Coping**    | You know what they say keeping your eye on the ball is what is most important. Cancer of any type is a life threatening disease, you do not do nothing about it (Participant 15)  
Well I’m trying to cope with it. It’s a big change in your life from what I was. I have to do exercises to help your bladder and that (Participant 2) |
<p>| <strong>Secrecy vs Support</strong>|                                                                                                                                                  |</p>
<table>
<thead>
<tr>
<th>Nothing to See</th>
<th>I was the same as you, not a thing in the world wrong with me. I had pain in my back and that was the only thing that was giving me problems. I never expected this (Participant 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The fact that I had no symptoms as well, I mean I wasn't actually sick or anything you know, and I suppose if you were sick and bad and got better, but I wasn’t actually sick or anything [...] I suppose it’s more of a mental thing (Participant 14)</td>
</tr>
<tr>
<td>New Awareness</td>
<td></td>
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<tr>
<td>Appreciation of Health</td>
<td>When I get up in the morning I feel fitter (Participant 6)</td>
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<tr>
<td></td>
<td>It’s the one thing you want is your health. The one thing you want, nothing else in your mind (Participant 10)</td>
</tr>
<tr>
<td>New Health Behaviours</td>
<td>I do be exercising the whole time. I’m always on the move walking and that way, doing a bit of everything, cutting the lawn and them kinds of things (Participant 3)</td>
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<tr>
<td></td>
<td>I don’t eat anything fat or I don’t eat anything. We eat nothing only solid food, good food. I wouldn’t eat chips or burgers. I mean I just have my breakfast and my dinner and my cup of tea and that’s enough (Participant 10)</td>
</tr>
<tr>
<td>Acceptance</td>
<td></td>
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<tr>
<td>Age Acceptance</td>
<td>I guess it has to be me, you know I can’t ignore the fact that's most obvious for me. If I get a scratch on my skin it takes longer to heal than it used to. I have to accept that it probably... things with bones and muscles are probably the same way, and I was never 74 before so I don’t know what it was like (Participant 4)</td>
</tr>
<tr>
<td></td>
<td>I am trying to look after myself more so than when I was younger and you would skylark around in the woods and not worry if you would scratch yourself. I wouldn’t take that chance now (Participant 5)</td>
</tr>
</tbody>
</table>
| **Tit for tat: are the side effects worth it?** | It was the side effects of the injections that was the real boy, you know you get an injection every two or three months [...] the nipples getting sore, and you know really sore. Aw you know a horrid dose (Participant 10).

The only thing that I have found is that my sexual drive has not come back at all really and that’s the big. But I don’t find that a real hang up at all whatsoever. And my wife doesn’t either so it works fine. That would be the biggest downfall [...] as regards my body—that didn’t really concern me, I mean I never thought about it. As long as the stuff [cancer] was gone and I was getting the all clear (Participant 13)

The standard ones that they did mention and the hot flushes and slight enlargement of the breasts [...] but listen you know I try and keep in perspective—the hot flushes, ah slightly uncomfortable, very odd sort of emerging for no reason from the centre of the body, you know it just, you literally feel that flush spreading over your body, only a small irritation (Participant 4) |
|---|---|
| **Acceptance aided by trust** | They don’t call it a centre of excellence for nothing. I found it brilliant and I found the wards and everything outstanding (Participant 13)

I knew at that point in time I was in the hands of a man with great integrity and decency and lacking in some of the airs and graces that some consultants seem to have, really arrogant you know? This was just a really lovely and decent genuine man (Participant 1) |
Appendix E: Items sent to content experts following Study One

**Reviewer directions:**
“The instrument items are shown below. These items have been developed to measure our concept. Please read each item and score it for its relevance in representing the concept.” Furthermore, below each item you find an empty row where you can comment on the item, for example in terms clarity of wording or relevance to the theory: How can the item be improved?

**Relevance Scale**
1 = not relevant 
2 = somewhat relevant 
3 = quite relevant 
4 = highly relevant

<table>
<thead>
<tr>
<th>Item</th>
<th>Indicate relevance rating</th>
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<tbody>
<tr>
<td>My appreciation of my health has…</td>
<td></td>
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<tr>
<td>Comment:</td>
<td></td>
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<tr>
<td>My appreciation of my body has…</td>
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<td>Comment:</td>
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<tr>
<td>The effort I put into maintaining a healthy diet has…</td>
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<td>Comment:</td>
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<tr>
<td>The effort I put into maintaining a healthy body has…</td>
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<tr>
<td>Comment:</td>
<td></td>
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<tr>
<td>The effort I put into maintaining a healthy lifestyle has…</td>
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<tr>
<td>Comment:</td>
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<tr>
<td>Due to my survival, my acceptance of the side effects has…</td>
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<tr>
<td>Comment:</td>
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<tr>
<td>Due to my age, my acceptance of the changes to my body has…</td>
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<tr>
<td>Comment:</td>
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<tr>
<td>My positive feeling about my body has…</td>
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<tr>
<td>Comment:</td>
<td></td>
</tr>
</tbody>
</table>
My awareness of nutrition has…

Indicate relevance rating: ___

Comment: ________________________________________________________________

The attention I pay to how my body works has…

Indicate relevance rating: ___

Comment: ________________________________________________________________

My gratitude for the strength that my body possesses has…

Indicate relevance rating: ___

Comment: ________________________________________________________________

My appreciation for good health has…

Indicate relevance rating: ___

Comment: ________________________________________________________________

The amount of physical activity that I do has…

Indicate relevance rating: ___

Comment: ________________________________________________________________

The control I feel over my body has…

Indicate relevance rating: ___

Comment: ________________________________________________________________

The amount I listen to my body has…

Indicate relevance rating: ___

Comment: ________________________________________________________________

The amount I monitor my body has…

Indicate relevance rating: ___

Comment: ________________________________________________________________

My awareness of my own body has…

Indicate relevance rating: ___

Comment: ________________________________________________________________

I know when I am beginning to feel ill because the attention I pay to my body has…

Indicate relevance rating: ___

Comment: ________________________________________________________________

The care I give my body has…

Indicate relevance rating: ___

Comment: ________________________________________________________________
My concern for my overall health has…  
Comment:______________________________________________________________

My concern for my physical appearance has…  
Comment:______________________________________________________________

The connection I feel with my body has…  
Comment:______________________________________________________________

The connection I feel with my health has…  
Comment:______________________________________________________________

The number of times I visit health professionals has…  
Comment:______________________________________________________________

The harmony with my body has…  
Comment:______________________________________________________________

I feel that the strength in my body has…  
Comment:______________________________________________________________

My pride in how my body has come through this crisis has…  
Comment:______________________________________________________________

My feeling that my body has rejuvenated has…  
Comment:______________________________________________________________

My feeling that my body has been transformed has…  
Comment:______________________________________________________________

My responsibility for my health has…  
Comment:______________________________________________________________
My responsibility for my body has…

Comment: ____________________________________________________________________

Indicate relevance rating: ___

After seeing my body heal, my sense of myself as a better person has…

Comment: ____________________________________________________________________

Indicate relevance rating: ___

After seeing my body heal, my sense of myself as a different person has…

Comment: ____________________________________________________________________

Indicate relevance rating: ___

My knowledge of my own physical limits has…

Comment: ____________________________________________________________________

Indicate relevance rating: ___

The feeling that I can overcome any negative physical changes has…

Comment: ____________________________________________________________________

Indicate relevance rating: ___

The respect I have for my body has…

Comment: ____________________________________________________________________

Indicate relevance rating: ___

The respect I have for my health has…

Comment: ____________________________________________________________________

Indicate relevance rating: ___

The time I put into researching information about my health has…

Comment: ____________________________________________________________________

Indicate relevance rating: ___

The sense of achievement in overcoming the physical obstacles of my illness has…

Comment: ____________________________________________________________________

Indicate relevance rating: ___

Due to my physical experience, my sense of myself as an enlightened person has…

Comment: ____________________________________________________________________

Indicate relevance rating: ___
The way I felt frightened by my body after my experience has... 

Indicate relevance rating: ___

My fear of how my body felt after my experience has... 

Indicate relevance rating: ___

The strangeness I felt when my body worked differently has... 

Indicate relevance rating: ___

My level of comfort being naked after my experience has... 

Indicate relevance rating: ___

The knowledge that I would recover because of the confidence I had in my body has... 

Indicate relevance rating: ___

The knowledge that I would recover because of the confidence I had in my physical strength has... 

Indicate relevance rating: ___

The level I push myself to recover physically has... 

Indicate relevance rating: ___

The routine I designed to allow for physical activity has... 

Indicate relevance rating: ___

The healthfulness of my diet has... 

Indicate relevance rating: ___
Comment: ____________________________________________________________

The amount of exercise I engage in to aid my recovery has…

Comment: ____________________________________________________________

Indicate relevance rating:____

My confidence that my body would be strong enough to recover has…

Comment: ____________________________________________________________

Indicate relevance rating:____

The empowerment I feel physically has…

Comment: ____________________________________________________________

Indicate relevance rating:____

My confidence in my body has…

Comment: ____________________________________________________________

Indicate relevance rating:____

The way I feel sexual has…

Comment: ____________________________________________________________

Indicate relevance rating:____

The feeling that my body is like a survivor has…

Comment: ____________________________________________________________

Indicate relevance rating:____

The feeling that I have control over my health has…

Comment: ____________________________________________________________

Indicate relevance rating:____

The feeling that my body is reliable has…

Comment: ____________________________________________________________

Indicate relevance rating:____

My trust in my body has…

Comment: ____________________________________________________________

Indicate relevance rating:____

My thoughts about how my body used to be have…

Comment: ____________________________________________________________

Indicate relevance rating:____

My acceptance of how my body is now has…

Comment: ____________________________________________________________

Indicate relevance rating:____
Comment:____________________________________________________________________

My ability to let go thoughts of how my health used to be has… Indicate relevance rating:____

Comment:____________________________________________________________________

My feeling that I have surpassed my previous level of physical functioning has… Indicate relevance rating:____

Comment:____________________________________________________________________

Listening to my body to manage symptoms has… Indicate relevance rating:____

Comment:____________________________________________________________________

My awareness of parts of my body has… Indicate relevance rating:____

Comment:____________________________________________________________________

My feeling of being connected with myself sexually has… Indicate relevance rating:____

Comment:____________________________________________________________________

My appreciation for other forms of intimacy has… Indicate relevance rating:____

Comment:____________________________________________________________________

To help me adapt to the change in my level of erectile functioning, my consideration for options other than penetrative sex has… Indicate relevance rating:____

Comment:____________________________________________________________________

My body’s masculinity has… Indicate relevance rating:____

Comment:____________________________________________________________________

My appreciation for my energy has… Indicate relevance rating:____

Comment:____________________________________________________________________
Appendix F: Cover letter for Study 2 and 3 (postal sample)

Deirdre Walsh,            Rapid Access Prostate Diagnostic Clinic,
School of Psychology,     University Hospital Galway.
NUI Galway.

Dear Sir,

We are currently carrying out a study to help us understand men’s experience with prostate cancer. To do this we need to gather information from as many men as possible. Your co-operation would be greatly valued and the information provided will give us a more accurate picture of the changes men might experience following the difficult time of prostate cancer diagnosis and treatment. Completed questionnaires will help us to identify the kind of support which men may find beneficial.

Please read the information sheet and if you agree to participate please sign the consent form. We would very much appreciate your help to complete this study. I would ask you then to fill out the enclosed questionnaire which will take approximately 15 minutes and return to me with the consent form in the enclosed stamped addressed envelope as soon as possible. All information provided is totally confidential.

If you have any questions about the study please ring me, Deirdre, at 0861630704. I have met many of you in the Rapid Access Clinic and I’m looking forward to hearing from you again. We would very much appreciate your unique contribution to this study which will help us better understand men’s experience of prostate cancer.

Best wishes,

----------------------------------

Deirdre Walsh, MSc            Dr. Ann Marie Groarke,
Principal Investigator        Head of Psychology
Tel – 0861630704               NUI, Galway.

Dr. Garrett Durkan,
Consultant Urologist,
MD FRCSI (UROL),
University Hospital Galway.

Prof. Frank Sullivan,
Head Radiation Oncologist,
Director,
Prostate Cancer Institute,
NUI Galway.
Appendix G: Information Sheet for Study 2 and 3 (postal and online sample)

Understanding your Prostate Cancer Experience

Participant Information Sheet

Purpose of the Study

You are invited to join a study which aims to understand men’s experience of prostate cancer diagnosis and treatment. We know that speaking about your experience of prostate cancer may be difficult for you but the information you give will help us to understand the prostate cancer experience.

What will be involved if I agree to take part in this study?

If you agree to take part you will be asked to complete one questionnaire (contained in this envelope). This can then be returned in the stamped addressed envelope that is provided. There may be some questions which seem quite personal, however some men report difficulties in these areas. These questions are just to help us understand your experience as much as possible.

Can I withdraw from the study?

Even if you have agreed to take part in the study you are free to withdraw at any stage without having to explain why.

Confidentiality

All information given to the researcher will be treated in the strictest confidence. Your name will not appear in any report resulting from this study. A number, but no name, will appear on all of the completed questionnaires. The consent form is kept separately from the completed questionnaires. Individuals will not be identifiable from the details in the reports resulting from this study.

If you have any queries about the questionnaire please contact: Deirdre Walsh, MSc.

Deirdre Walsh, MSc.
Principal Investigator
Tel – 0861630704

Dr. Annmarie Groarke,
Head of Psychology,
NUI, Galway.

Dr. Garrett Durkan,
Consultant Urologist,
MD FRCSI (UROL),
University Hospital Galway.

Prof. Frank Sullivan,
Head Radiation Oncologist,
Director,
Prostate Cancer Institute,
NUI Galway.
Appendix H: Study Three Questionnaire

Understanding your prostate cancer experience

Helping us to help you.

Please complete and return to:
Deirdre Walsh,
School of Psychology,
St. Anthony’s,
NUI Galway.
Phone: 086 1630704
Email: dmiwalsh@gmail.com

Research Participation Number

Your participant number means that this questionnaire is COMPLETELY ANONYMOUS.

Your consent form with your name will be separated from this questionnaire.
**Demographic Information**

How long has it been since your initial treatment: ___________

Age: __________

Please tick the type of treatments that you received:

(you can choose more than 1 type)

- Surgery
- Radiotherapy
- Brachytherapy
- Hormone treatment
- Active Surveillance
- Chemotherapy

Please list if you have received other treatments for prostate cancer that are not listed here:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Please read each statement considering how you feel now after your diagnosis and treatment. Please tick the box which most applies to you.

<table>
<thead>
<tr>
<th></th>
<th>Greatly decreased</th>
<th>Somewhat decreased</th>
<th>Not changed</th>
<th>Somewhat increased</th>
<th>Greatly increased</th>
<th>Not applicable to me</th>
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<tbody>
<tr>
<td>My trust in my body has...</td>
<td></td>
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<tr>
<td>The feeling that my body is reliable has...</td>
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<tr>
<td>The control I feel over my body has...</td>
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<tr>
<td>I feel that the physical strength in my body has...</td>
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<tr>
<td>The feeling that I can overcome any negative physical changes has...</td>
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<tr>
<td>The sense of achievement in overcoming the physical obstacles of my illness has...</td>
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<tr>
<td>My confidence that my body will be strong enough to recover has...</td>
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<td>The empowerment I feel physically has...</td>
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<td>My confidence in my body has...</td>
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<td>The feeling that I have control over my health has...</td>
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<td>The attention I pay to how my body works has...</td>
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<tr>
<td>My appreciation for good health has...</td>
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<tr>
<td>The amount I listen to my body has...</td>
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<tr>
<td>The amount I monitor my body has...</td>
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<tr>
<td>My awareness of my own body has...</td>
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<tr>
<td>The care I give my body has...</td>
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<tr>
<td>My concern for my overall health has...</td>
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<tr>
<td>My responsibility for my overall health has...</td>
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<tr>
<td>The respect I have for my body has...</td>
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<tr>
<td>The time I put into researching information about my health has...</td>
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<tr>
<td>My awareness of parts of my body has...</td>
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<tr>
<td>My openness to visiting the doctor if I think something is wrong has...</td>
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</tbody>
</table>
As in the last section, please read the following statements and tick the box which most applies

<table>
<thead>
<tr>
<th></th>
<th>0 = I did not experience this change as a result of my crisis.</th>
<th>1 = I experienced this change to a very small degree as a result of my crisis.</th>
<th>2 = I experienced this change to a small degree as a result of my crisis.</th>
<th>3 = I experienced this change to a moderate degree as a result of my crisis.</th>
<th>4 = I experienced this change to a great degree as a result of my crisis.</th>
<th>5 = I experienced this change to a very great degree as a result of my crisis.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I changed my priorities about what is important in life.</td>
<td></td>
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<tr>
<td>2.</td>
<td>I have a greater appreciation for the value of my own life.</td>
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<td>3.</td>
<td>I developed new interests.</td>
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<td>4.</td>
<td>I have a greater feeling of self-reliance.</td>
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<td>5.</td>
<td>I have a better understanding of spiritual matters.</td>
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<tr>
<td>6.</td>
<td>I more clearly see that I can count on people in times of trouble.</td>
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<tr>
<td>7.</td>
<td>I established a new path for my life.</td>
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<tr>
<td>8.</td>
<td>I have a greater sense of closeness with others.</td>
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<td>9.</td>
<td>I am more willing to express my emotions.</td>
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<tr>
<td></td>
<td>0 = I did not experience this change as a result of my crisis.</td>
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<td>5 = I experienced this change to a very great degree as a result of my crisis.</td>
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<tr>
<td>10.</td>
<td>I know better that I can handle difficulties.</td>
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<tr>
<td>11.</td>
<td>I am able to do better things with my life.</td>
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<tr>
<td>12.</td>
<td>I am better able to accept the way things work out.</td>
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<tr>
<td>13.</td>
<td>I can better appreciate each day.</td>
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<tr>
<td>14.</td>
<td>New opportunities are available which wouldn’t have been otherwise.</td>
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<tr>
<td>15.</td>
<td>I have more compassion for others.</td>
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<tr>
<td>16.</td>
<td>I put more effort into my relationships.</td>
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<tr>
<td>17.</td>
<td>I am more likely to try to change things which need changing.</td>
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<tr>
<td>18.</td>
<td>I have a stronger religious faith.</td>
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<tr>
<td>19.</td>
<td>I discovered that I’m stronger than I thought I was.</td>
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<td></td>
</tr>
<tr>
<td>0 =</td>
<td>1 =</td>
<td>2 =</td>
<td>3 =</td>
<td>4 =</td>
<td>5 =</td>
<td></td>
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<tr>
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<td>I experienced this change to a great degree as a result of my crisis.</td>
<td>I experienced this change to a very great degree as a result of my crisis.</td>
<td></td>
</tr>
</tbody>
</table>

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

21. I better accept needing others.
Smoking and Alcohol

*Please circle your answer and be as honest as possible.*

1. Which of the following best describes your smoking status? Please circle your answer.

<table>
<thead>
<tr>
<th>I smoke daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>I smoke occasionally</td>
</tr>
<tr>
<td>(2-3 times a week)</td>
</tr>
<tr>
<td>I don't smoke now, but</td>
</tr>
<tr>
<td>I used to</td>
</tr>
<tr>
<td>I have tried it a few</td>
</tr>
<tr>
<td>times, but never smoked</td>
</tr>
<tr>
<td>I have never smoked</td>
</tr>
</tbody>
</table>

2. How often do you usually have an alcoholic drink of any kind? *This includes wine, beer and spirits. Please circle your answer.*

<table>
<thead>
<tr>
<th>Every day</th>
<th>2 days a week</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 days a week</td>
<td>1 day a week</td>
</tr>
<tr>
<td>5 days a week</td>
<td>Fortnightly or less</td>
</tr>
<tr>
<td>4 days a week</td>
<td>Monthly or less</td>
</tr>
<tr>
<td>3 days a week</td>
<td>I don't drink alcohol</td>
</tr>
</tbody>
</table>

Alcoholic drinks are measured in terms of a ‘standard drink’. A standard drink is equal to one 285 ml “glass” of beer OR one 100ml standard serving of wine OR one 30ml spirits.

3. On a day that you have alcoholic drinks, how many standard drinks do you usually have on average?

_________
Physical Activity

4. How often do you usually exercise to the extent that you get out of breath or sweat? Please circle your answer.

<table>
<thead>
<tr>
<th>Every day</th>
<th>Once a week</th>
</tr>
</thead>
<tbody>
<tr>
<td>4–6 times a week</td>
<td>Less than once a month</td>
</tr>
<tr>
<td>2–3 times a week</td>
<td>Never</td>
</tr>
</tbody>
</table>

5. How many hours a week do you usually walk in your free time? Please circle your answer. Please write your answer below.

____________________ (if you do not walk in your free time you can say this too)

6. How often do you usually exercise in your free time so much that you get out of breath or sweat? Please circle your answer.

<table>
<thead>
<tr>
<th>Every day</th>
<th>Once a week</th>
</tr>
</thead>
<tbody>
<tr>
<td>4–6 times a week</td>
<td>Less than once a month</td>
</tr>
<tr>
<td>2–3 times a week</td>
<td>Never</td>
</tr>
</tbody>
</table>

7. How many hours a week do you usually exercise in your free time so much that you get out of breath or sweat? Please write your answer below.

____________________ (if you do not exercise in your free time you can say this too)
Nutrition

This question is about your usual consumption of vegetables, including fresh, frozen and tinned vegetables. Thinking about a portion as 50g of cooked vegetables or 100g of salad vegetables.

6. How many portion of vegetables do you usually eat each day?

____________________ (if you do not eat vegetables you can say so here too)

This question is about your usual consumption of fruit, including fresh, dried, frozen and tinned fruit. Thinking about a portion as 1 medium piece or 2 small pieces of fruit or 100g of diced pieces.

7. How many portions of fruit do you usually eat each day?

____________________ (if you do not eat fruit you can say so here too)
The questions on this page ask you about how you have been feeling in the last two weeks. There are no right or wrong answers; please choose the statements that come closest to describing your experiences in the last two weeks.

1. Pain and Disturbing Body Sensations (pain, hot flashes, painful swelling of breasts, nausea, drowsiness)

*Please tick the statement that comes closest to describing you in the last two weeks.*

- [ ] No pain and no disturbing body sensations.
- [ ] Mild pain or disturbing body sensations that do not limit any activities (for example: work, social, sexual, sleep).
- [ ] Moderate pain or disturbing body sensations that limit a few activities.
- [ ] Moderate to severe pain or disturbing body sensations that limit some activities.
- [ ] Severe pain or disturbing body sensations that limit many activities.

2. Energy

*Please tick the statement that comes closest to describing you in the last two weeks.*

- [ ] Very full of energy, lots of pep.
- [ ] Fairly energetic, no limitation of activities (for example: work, social, sexual).
- [ ] Moderate reduction in energy or pep that limits a few activities.
- [ ] Generally low energy or pep that limits some activities.
- [ ] No energy or pep at all. I feel drained, and many activities are limited.

3. Support From Family and Friends

*Please tick the statement that comes closest to describing you in the last two weeks.*

- [ ] Most of the time I feel supported by my spouse, family and/or friends.
- [ ] A fair amount of the time feel supported by my spouse, family and friends.
- [ ] Occasionally feel supported by my spouse, family and friends.
- [ ] Rarely feel supported by my spouse, family, and friends.
4. Communication With Doctor (primary caregiver for prostate cancer, may be specialist or family doctor)

Please tick the statement that comes closest to describing you in the last two weeks.

☐ I am always able to express my concerns to my Doctor and get all the information or advice I need.
☐ Most the time, I am able to express my concerns to my Doctor and get all the information or advice I need.
☐ Some of the time, I am able to express my concerns to my Doctor and get all the information or advice I need.
☐ Rarely, I am able to express my concerns to my Doctor and get all the information or advice I need.

5. Emotional Well-Being

Please tick the statement that comes closest to describing you in the last two weeks.

☐ Generally happy and free from worry, sadness, or frustration.
☐ A little worry, sadness, or frustration.
☐ Moderate worry, sadness, or frustration.
☐ Quite a bit of worry, sadness, or frustration.
☐ Extreme worry, sadness, or frustration.

6. Urinary Frequency (need to pass urine frequently during the day or night) and Urgency (difficulty delaying urination after the urge is felt to urinate, ability to "hold it")

Please tick the statement that comes closest to describing you in the last two weeks.

☐ No urinary frequency or urgency.
☐ A little urinary frequency or urgency, does not interfere with sleep or other activities (for example: work, social); no need to plan ahead.
☐ Some urinary frequency or urgency that interferes with sleep or other activities; may need to plan ahead.
☐ Quite a bit of urinary frequency or urgency; need to be near a bathroom most of the time.
☐ Extreme urinary frequency or urgency; need to be near a bathroom always.
7. Leaking Urine/Poor Bladder Control

Please tick the statement that comes closest to describing you in the last two weeks.

☐ Never, under any circumstances leak urine or lose bladder control.
☐ On rare occasions, leak urine or lose bladder control, does not interfere with any activities (for example: work, social, sexual, sleep).
☐ Occasionally leak urine or lose bladder control, interferes with a few activities.
☐ A moderate amount of the time, leak urine or lose bladder control, interferes with some activities.
☐ Most of the time, leak urine or have poor bladder control, interferes with many activities.
☐ Require a pad, clamp, catheter, or collecting bag because of leaking urine or poor bladder control.

8. Sexual Function (problems with achieving/maintaining an erection)

Please tick the statement that comes closest to describing you in the last two weeks.

☐ Full erections sufficient for intercourse.
☐ Erections sufficient for intercourse, but some reduction in firmness.
☐ Erections sufficient for masturbation or foreplay only.
☐ Erections, but not firm enough for any sexual activity.
☐ No erections at all.

9. Sexual Interest/Drive

Please tick the statement that comes closest to describing you in the last two weeks.

☐ Normal amount of sexual drive and interest for you.
☐ A little decrease of sexual drive or interest for you.
☐ Moderate decrease of sexual drive or interest for you.
☐ Substantial decrease of sexual drive or interest for you.
☐ No sexual drive or interest.

10. Bowel Problems: Diarrhoea, Rectal Discomfort (pain, burning or irritation) or Constipation

Please tick the statement that comes closest to describing you in the last two weeks.

☐ No diarrhoea, rectal discomfort, or constipation.
☐ Occasionally have diarrhoea, rectal discomfort, or constipation.
☐ Frequently have diarrhoea, rectal discomfort, or constipation.
☐ Nearly always have diarrhoea, rectal discomfort, or constipation.
Please mark the circle of the statement which applies to you most:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Fairly Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am open to the experience of the present moment.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I sense my body, whether eating, cooking, cleaning or talking.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>When I notice an absence of mind, I gently return to the experience of the here and now.</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>I am able to appreciate myself.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>I pay attention to what’s behind my actions.</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>I see my mistakes and difficulties without judging them.</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>I feel connected to my experience in the here-and-now.</td>
<td>0</td>
<td>0</td>
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<tr>
<td>I accept unpleasant experiences.</td>
<td>0</td>
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<tr>
<td>I am friendly to myself when things go wrong.</td>
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<tr>
<td>I watch my feelings without getting lost in them.</td>
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<tr>
<td>In difficult situations, I can pause without immediately reacting.</td>
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<tr>
<td>I experience moments of inner peace and ease, even when things get hectic and stressful.</td>
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<tr>
<td>I am impatient with myself and with others.</td>
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<tr>
<td>I am able to smile when I notice how I make life difficult.</td>
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</tbody>
</table>
**Please tick the box which most applied to you:**

<table>
<thead>
<tr>
<th></th>
<th>Not true at all</th>
<th>Rarely true</th>
<th>Sometimes true</th>
<th>Often true</th>
<th>True nearly all of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to adapt to change</td>
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<tr>
<td>Can deal with whatever comes</td>
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<tr>
<td>Tries to see the humorous side of problems</td>
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<tr>
<td>Coping with stress can strengthen me</td>
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<tr>
<td>Tend to bounce back after illness or hardship</td>
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<tr>
<td>Able to achieve goals despite obstacles</td>
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<tr>
<td>Can stay focused under pressure</td>
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<tr>
<td>Not easily discouraged by failure</td>
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<tr>
<td>Think of self as a strong person</td>
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<tr>
<td>Can handle unpleasant feelings</td>
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</tbody>
</table>
Please read the statements and tick the box which most applies to you.

<table>
<thead>
<tr>
<th></th>
<th>Extremely characteristic</th>
<th>Quite Characteristic</th>
<th>Quite uncharacteristic</th>
<th>Extremely uncharacteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am sensitive to internal bodily tensions.</td>
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<tr>
<td>I know immediately when my mouth or throat gets dry.</td>
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<tr>
<td>I can often feel my heart beating.</td>
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</tr>
<tr>
<td>I am quick to sense the hunger contractions of my stomach.</td>
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<tr>
<td>I’m very aware of changes in my body temperature.</td>
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</tbody>
</table>
Read every sentence. Circle the answer that best describes how you have been feeling during the LAST WEEK. You do not have to think too much to answer. In this questionnaire, spontaneous answers are more important.

1. I feel tense or ‘wound up’:
   - Most of the time
   - A lot of the time
   - From time to time (occasionally)
   - Not at all

2. I still enjoy the things I used to enjoy:
   - Definitely as much
   - Not quite as much
   - Only a little
   - Hardly at all

3. I get a sort of frightened feeling as if something awful is about to happen:
   - Very definitely and quite badly
   - Yes, but not too badly
   - A little, but it doesn’t worry me
   - Not at all

4. I can laugh and see the funny side of things:
   - As much as I always could
   - Not quite so much now
   - Definitely not so much now
   - Not at all

5. Worrying thoughts go through my mind:
   - A great deal of the time
   - A lot of the time
   - From time to time, but not often
   - Only occasionally

6. I feel cheerful:
   - Not at all
   - Not often
   - Sometimes
   - Most of the time

7. I can sit at ease and feel relaxed:
   - Definitely
   - Usually
   - Not often
   - Not at all
8. I feel as if I am slowed down:
   - Nearly all the time
   - Very often
   - Sometimes
   - Not at all

9. I get a sort of frightened feeling like "butterflies" in the stomach:
   - Not at all
   - Occasionally
   - Quite often
   - Very often

10. I have lost interest in my appearance:
   - Definitely
   - I don’t take as much care as I should
   - I may not take quite as much care
   - I take just as much care

11. I feel restless as I have to be on the move:
   - Very much indeed
   - Quite a lot
   - Not very much
   - Not at all

12. I look forward with enjoyment to things:
   - As much as I ever did
   - Rather less than I used to
   - Definitely less than I used to
   - Hardly at all

13. I get sudden feelings of panic:
   - Very often indeed
   - Quite often
   - Not very often
   - Not at all

14. I can enjoy a good book or radio/TV program:
   - Often
   - Sometimes
   - Not often
   - Very seldom
Thank you for completing this questionnaire, your help means a great deal to us.

As a small token of our appreciation, your name will be entered into a draw to win a 100 euro One for All Voucher.

If you have any queries, please do not hesitate to contact:
Deirdre Walsh (Study Co-ordinator)
(086 163 0704).
## Appendix I: Final list of P-PTGI items

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health Autonomy</strong></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>My trust in my body has...</td>
</tr>
<tr>
<td>38</td>
<td>The feeling that I have control over my health has...</td>
</tr>
<tr>
<td>37</td>
<td>My confidence in my body has...</td>
</tr>
<tr>
<td>36</td>
<td>The empowerment I feel physically has...</td>
</tr>
<tr>
<td>12</td>
<td>The control I feel over my body has...</td>
</tr>
<tr>
<td>25</td>
<td>The feeling that I have overcome any negative physical changes has...</td>
</tr>
<tr>
<td>21</td>
<td>I feel the physical strength in my body has...</td>
</tr>
<tr>
<td>35</td>
<td>My confidence that my body will be strong enough to recover has...</td>
</tr>
<tr>
<td>7</td>
<td>The feeling that my body is reliable</td>
</tr>
<tr>
<td>29</td>
<td>The sense of achievement in overcoming the physical obstacles of my illness has...</td>
</tr>
<tr>
<td><strong>Health Awareness</strong></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>My awareness of my own body has...</td>
</tr>
<tr>
<td>13</td>
<td>The amount I listen to my body has...</td>
</tr>
<tr>
<td>14</td>
<td>The amount I monitor my body...</td>
</tr>
<tr>
<td>17</td>
<td>My concern for my overall health has...</td>
</tr>
<tr>
<td>23</td>
<td>My responsibility for my health has...</td>
</tr>
<tr>
<td>9</td>
<td>The attention I pay to how my body works has...</td>
</tr>
<tr>
<td>42</td>
<td>My awareness of parts of my body has...</td>
</tr>
<tr>
<td>16</td>
<td>The care I give my body has...</td>
</tr>
<tr>
<td>10</td>
<td>My appreciation for good health has...</td>
</tr>
<tr>
<td>28</td>
<td>The time I put into researching information about my health has...</td>
</tr>
</tbody>
</table>