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Posttraumatic Growth Following Life-Threatening Illness

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Overview

'Loss can produce gain' and 'every cloud has a silver lining' are well known expressions used everyday to reflect on experiences. In a similar vein, but on a different level, posttraumatic growth (PTG) refers to positive psychological changes that can follow highly aversive traumatic experiences. This portfolio thesis focuses on PTG following life-threatening illness and is presented in three parts: a literature review, an empirical study and a set of appendixes.

Part one is a systematic literature review of empirical studies examining PTG following one of three life-threatening illnesses: stroke, coronary heart disease or cancer. An introduction to PTG is presented, followed by a rationale of life-threatening illnesses as traumatic stressors. The paper goes on to specify the methods and search strategies used to identify suitable articles that satisfied set inclusion criteria. The included studies are reviewed according to the following research aims: to provide an overview of the methods used and to summarise their main findings. Conclusions are made and gaps in the literature are highlighted that would warrant further research.

Part two is an empirical study of PTG following a myocardial infarction (MI), an identified area for research at the end of part one. The cross-sectional study reports the level of growth reported by a post-MI sample and compares it with a sample of healthy individuals. A number of variables were chosen to be correlated with growth within the post-MI sample, based on Tedeschi and Calhoun's (2004) theory of PTG. The paper reports the outcomes of reported growth, its correlates and predictors. This is followed by an explanation of the clinical implications and limitations of the study.

Finally, part three is a set of appendixes to support the work in the previous parts. It contains a reflective account of the process of the research, examining the processes of planning, implementing and writing this portfolio thesis.

Contents

Tables

Figures

POSTTRAUMATIC GROWTH FOLLOWING LIFE-THREATENING ILLNESS

Part 1

Systematic Literature Review

Posttraumatic Growth Following Life-Threatening Illness:

A Systematic Literature Review

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Abstract

Purpose. Posttraumatic Growth (PTG) is a concept that refers to positive psychological changes following a traumatic event and has been studied empirically. This systematic review aimed to identify empirical research investigating PTG following the experience of a life-threatening illness, with the purposes of (a) synthesising current understanding of this research, and (b) describing and commenting upon its methodological characteristics and quality.

Methods. Medline, Cinahl, PILOTS, PsychInfo and PsychArticles databases were searched to identify potentially relevant studies. Inclusion criteria were: empirical studies written in English; published in a peer-reviewed journal; and examined PTG in adults following one of three life-threatening illnesses: coronary heart disease, cancer and stroke.

Results: Seventeen studies met inclusion criteria; 15 observational, and 2 experimental designs. All studies investigated PTG following cancer. Two studies showed increases in perceived PTG following intervention. A range of demographic, disease-related, psychological and social factors were correlated with perception of PTG across studies with mixed results. Problems with reviewed studies include wide ranging methodologies and use of several measures of PTG, causing difficulty in comparison.

Conclusions: Sufficient research has been conducted in cancer to test prominent theories of PTG, but more standardized approaches need to be taken to allow cross-comparisons. A clear deficit in the literature is research into PTG following coronary heart disease and stroke.

Posttraumatic Growth following Health Conditions:

A Systematic Literature Review

Experiencing a life-threatening illness may be traumatic for a multitude of reasons, including the possible sudden onset, diagnosis, and resultant surgical and medical procedures (Tedstone & Tarrier, 2003). The diagnosis of a life-threatening illness has been identified as a traumatic stressor in the DSM-IV-TR (American Psychiatric Association, 2000) that can induce negative reactions and indeed, posttraumatic stress disorder has been cited to follow physical illness (e.g. Tedstone & Tarrier). However, the traditional emphasis on negative sequalae within the traumatic stress literature has been challenged over the past decade by the influence of positive psychology, whereby the suggestion exists that positive changes can follow trauma. This has been referred to as Posttraumatic Growth (PTG).

Tedeschi and Calhoun are the major forerunners in PTG research (Mann, Ostroff, Winkel, Goldstein, & Grana, 2004) and have described it as "positive psychological change experienced as a result of the struggle with highly challenging life circumstances" (p.1, Tedeschi and Calhoun, 2004). Examination of a range of research into PTG, including anecdotal and theoretical accounts, led to the classification of growth into five domains: 'appreciation for life', 'spiritual change', 'personal strength', 'new possibilities', and 'relating to others' (Tedeschi and Calhoun, 1996).

Greater appreciation for life refers to the changes one might make in their approach to living, given a new sense of what is important (Tedeschi and Calhoun, 2004). This may include reports of living life to the full (Tedeschi and Calhoun, 1996) and an appreciation for each new day (Linley and Joseph, 2002). The 'spiritual change'

domain of growth describes a process whereby beliefs are strengthened by the trauma (Tedeschi and Calhoun 1996), possibly in response to the realization that life is finite (Tedeschi and Calhoun, 2004). Perception of increased personal strength can occur after trauma (Tedeschi and Calhoun, 2004), but with this change there may be a simultaneous heightened sense of vulnerability. The 'new possibilities' domain refers to changes in trauma survivors' paths in life (Tedeschi and Calhoun, 2004), such as career changes. Relationships may be perceived as enhanced by feeling more value for friends and family and perceiving those relationships as closer and more meaningful (Tedeschi and Calhoun 2004). Additionally, one may have greater compassion and altruism for others (Linley and Joseph, 2002). Tedeschi and Calhoun (1996) developed the Posttraumatic Growth Inventory (PTGI), a standardized questionnaire for the measurement of the five domains of growth. Standardized tools allow for cross comparison of studies (Cordova, Cunningham, Carlson & Andrykowski, 2001). However, much of the current research in PTG in health conditions has used qualitative methods (Mann et al., 2004).

The process of growth has been conceptualized by several theorists. Tedeschi and Calhoun (2004) in their 'functional descriptive model of PTG' which shows that growth is the outcome of an active process that occurs after the trauma (Phelps, Williams, Raichle, Turner & Edhe, 2008) where the cognitive world is 'rebuilt' (Tedeschi & Calhoun, 2004). In summary, the traumatic event is called a 'seismic event' which metaphorically 'shakes' the victim's world assumptions and schemata to the extent that it may even nullify the way an individual understands things to happen (Tedeschi & Calhoun, 2004). The event is said to cause severe amounts of distress as the change to one's world is vast. However, this is deemed necessary to allow cognitive

processing. The processing can take the form of intrusive and automatic thoughts and causes rumination. This is not viewed negatively as it indicates the occurrence of cognitive activity necessary for growth (Joseph and Linley, 2006). Additionally, although distressing, the rumination shows that the traumatic event was severe enough to affect the individual's schemata and coping abilities (Tedeschi & Calhoun, 2004), a precursor for growth. In time, the individual is hypothesized to separate oneself from those previous life goals and schema as rumination becomes less automatic and more effortful (Joseph & Linley, 2006). When the individual is able to develop new 'post-trauma schema' that incorporate the experience, an indication of cognitive rebuilding, they are said to have experienced growth. Growth is demonstrated variably in the five domains described above.

Opposing theories have been proposed to describe the process of PTG. Joseph (2003) has suggested the 'person-centred theory' which comes from the stance that due to humans being growth oriented organisms, they are motivated to cognitively accommodate traumatic experiences to become 'fully functioning' which entails being accepting of oneself and accepting that change is necessary. The biopsychosocial-evolutionary theory offered by Christopher (2004) argues that the normal trauma response can be understood as an evolutionary inherited mechanism for metalearning, which shatters and reconstitutes the metaschemas (concepts of the self, society, and nature) where learning usually takes place. This process has been suggested to be simultaneously biological, psychological and social.

Social support has been highlighted as important in PTG (Luszczynska, Mohamed, & Schwarzer, 2005) and has shown associations with the report of growth.

The theoretical basis of this has been encapsulated into Tedeschi and Calhoun's functional descriptive model. There, it is suggested that supportive others provide the opportunity to discuss and disclose more about the event and therefore encourage cognitive processing. Others can aid in creating narratives post-trauma and offering perspectives that can be integrated into their post-trauma schema (Tedeschi and Calhoun, 2004).

Joseph and Linley (2006) identified a number of alternative terms used in the literature to describe the positive change phenomenon including adversarial growth, benefit-finding, perceived benefits, stress-related growth, and various others. The terms are reported to be used interchangeably (Joseph & Linley, 2006) and refer to the same broad categories of changes described above. For the purpose of this review, the umbrella term PTG will be used to refer to all research in this area. Additionally, other tools have been developed to measure positive changes. A review by Linley and Joseph (2004) identified six alternative published scales to the PTGI: the Stress-Related Growth Scale (Park, Cohen & Murch, 1996); the Revised Stress-Related Growth Scale (Armeli, Gunthert & Cohen, 2001); Perceived Benefit Scale (McMillen & Fisher, 1998); Changes in Outlook Questionnaire (Joseph, Williams & Yule, 1993); the Illness Cognitions Questionnaire (Evers et al. 2001); and Thriving Scale (Abraido-Lanza, Guier & Colon, 1998).

The previously described measures have been used in varying degrees to empirically study positive changes following trauma. Linley and Joseph (2004) conducted a review of the empirical literature across a wide range of event types and reported varying degrees of association between positive changes and event type,

appraisal, socio-demographic variables, social support, religion, processing, quality of life and distress. However, findings were mixed and conclusions proved difficult to draw.

Christopher (2004) suggested that traumatic events should be viewed as a homogenous group when considering PTG, because of the universality of the effects reported (i.e. changed relationships, personal strength and life philosophy). However, the trauma associated with life-threatening illnesses may warrant separate consideration because of the increased risk of disease recurrence (Carboon, Anderson, Pollard, Szer, & Seymour, 2005). Owing to this, PTG in health populations may differ from that following other crises. The aim of this review therefore, was to identify and examine empirical studies that investigate positive changes following a life-threatening illness.

The perception of positive changes following a health trauma is an important area of research given previous findings of the protective role of positive emotion in disease development (Richman et al. 2005). Additionally, early investigations of patients perceiving positive effects following a heart attack was linked with improved mortality and morbidity rates eight years later (Affleck, Tennen & Croog, 1987).

Aims

A systematic review of studies examining PTG following life-threatening medical illnesses was conducted. The review aimed to:

- Identify the extent to which PTG has been researched in medical populations
- Provide an overview of empirical research to date, including methodological characteristics and quality of studies
- Identify further research needs in this area

Method

Data Sources and Search Strategies

The following databases were searched to identify relevant studies for inclusion: PILOTS (Published International Literature on Traumatic Stress, <1960 [earliest] - 2008); Ovid Medline (1950-November 2007); CINAHL (01.02.81- January 2008); PsychInfo (2000-2008); and PSYCHArticles (earliest- 2008). Searches were conducted in January 2008. The choice of databases reflected the three main areas of interest: trauma, medicine and psychology.

Search terms used were 'posttraumatic growth', 'growth', 'perceived benefits', and 'positive effects' to ensure studies that examined PTG were not excluded. 'Growth' was adjusted to 'personal growth' in Medline as using the search term 'growth' produced 70304 studies. A list of the top ten leading causes of death from high-income countries was taken from the World Health Organisation fact sheet (WHO, 2007). From these, 'coronary heart disease', 'stroke' and 'cancer' were chosen for inclusion because they are all potentially life-threatening, thereby considered a traumatic stressor according to DSM-IV (2000) criteria. Additionally, research exists within the post-traumatic stress literature for these events, thereby demonstrating the suitability of the event to potentiate PTG (e.g. Merriman, Norman & Barton, 2007; Kangas, Henry & Byrant, 2005; Sheldrick, Tarrier, Berry, & Kincey, 2006). Associated terms were also searched: 'heart attack', 'myocardial infarction', and 'cerebrovascular disease'.

Searches were performed using the keywords indexed for articles in each database. However, search terms were conducted within the abstract on CINAHL as this

database does not allow a keyword search. No other restrictions were placed upon the searches.

Study selection (inclusion and exclusion criteria)

Initially, abstracts of identified studies were examined using the following criteria:

- Studies reported in English language.
- Studies published in a peer-reviewed journal.
- Empirical studies that examined PTG following coronary heart disease, cancer, or stroke.
- Studies that examined positive changes in adult participants only. (Calhoun and Tedeschi's (2004) conceptualisation of PTG implies that the process of PTG disrupts and changes an established set of schemas. Therefore, this phenomenon is less applicable to children who may still be developing their world schemas).
- Studies that examined positive changes of the illness on the patient.

Where papers could not be included or excluded on the basis of the abstract, the full paper was retrieved and reviewed. In the initial stages, all study designs were included to enable an overview of the current research. Studies identified from the first stage of the process were retrieved and scrutinized on the following inclusion criteria:

- Studies that used a validated measure of positive changes. This was to allow for cross-study comparison.
- Studies that utilised European and North American participants, as ethnic identification has been identified as an important factor in PTG (Kinsinger et al., 2006).

Study quality assessment

All included studies were assessed on quality of the reported article. Studies were assessed against a checklist devised by Macfarlane, Glenny, and Worthington (2001). This checklist was chosen as it was identified as being appropriate for use on case-control, cohort and cross-sectional studies (Sanderson, Tatt & Higgins, 2007).

Using this checklist, abstracts and full papers were scored separately. The abstract checklist consisted of eight items and the paper checklist, 21 items. Criteria were scored as 'yes', 'no', or 'unable to determine'. Positively scored items were added to give separate scores for the abstract and the paper. Items were removed depending on study type. Therefore, the maximum score possible for a cohort study was 21 and for a cross-sectional study, 20. Total scores were expressed as a percentage. [See Appendix A for a copy of the checklist].

An independent researcher also rated the quality of seven of the studies using the same checklist (Macfarlane et al. 2001). Results were compared and any discrepancies discussed. An intra-class correlation was calculated using a one-way random effect model. A correlation of .710 was achieved. The modest correlation may have been due to the familiarity of the researcher with the topic of PTG and unfamiliarity of the independent researcher. All discrepancies between ratings were discussed and a shared decision was reached for each item.

Data extraction

Data extraction was performed systematically utilising a specifically designed data extraction form allowing relevant details of included studies to be collected to address

the research questions of this review. [See Appendix B for an example of the data collection form].

Data synthesis

Data synthesis by means of a descriptive account was utilised due to heterogeneity of included studies in terms of design, research aims, and outcome measures. Such heterogeneity would not favour quantitative analysis such as meta-analysis.

Details of Included and Excluded Studies

Figure 1 illustrates the article selection process of the review. Electronic searches produced 443 results, of which 113 were duplicates. Of the remaining 330 articles, 251 were excluded as the primary focus of the study was not to examine PTG following medical illnesses. Another 47 articles met other exclusion criteria in the initial stages (see Figure 1). A further 32 articles were examined and two papers excluded because they used a non-European or North American sample , and thirteen studies were excluded as a validated measurement tool of positive changes was not used. Seventeen studies met all inclusion criteria.

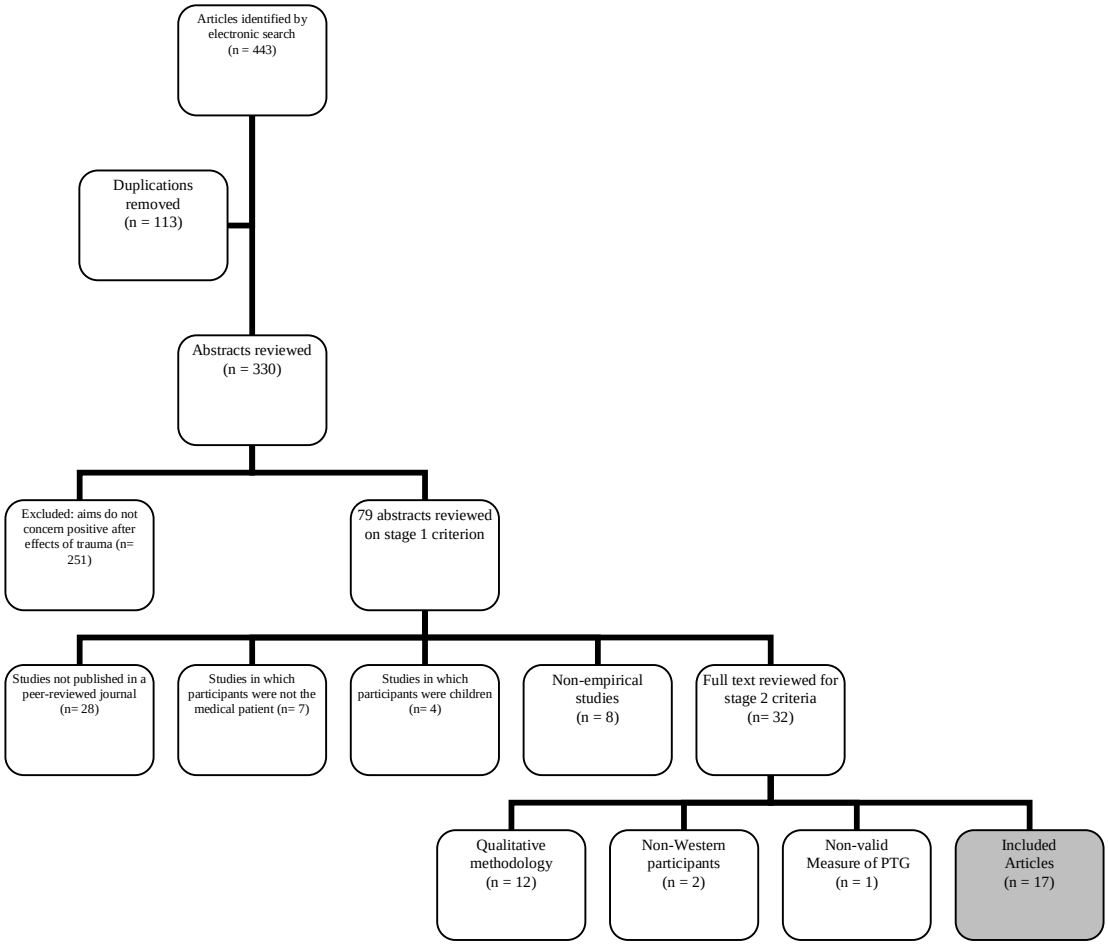

Figure 1: Article Selection Process.

One reason for exclusion is shown for clarity, whereas multiple reasons for exclusion may have occurred.

Results

Characteristics of PTG Research

The review process resulted in the inclusion of 17 articles, published between 2001 and 2006. Table 1 illustrates pertinent study characteristics. The studies have been assigned a number for referencing purposes throughout the Results section.

All included studies investigated PTG following a diagnosis of cancer: 11 investigated breast cancer patients; two investigated prostate cancer patients; one study

investigated haematological cancer patients; two studies investigated a generic cancer sample; and the final study investigated cancer patients undergoing bone marrow transplant. Table 1 gives details of study populations.

Studies used a range of terms to refer to the positive effects of cancer, specifically: 'Posttraumatic Growth' (studies 1, 2, 3, 4, 5, 6, 7, 8, 9 & 10); 'Benefit Finding' (studies 9, 12, 13 & 14); 'Personal Growth' (studies 9 & 16); 'Stress-related Growth' (study 11); 'Positive Reappraisal Coping' (study 9); and 'Growth' (study 15). Included studies addressed a range of aims and research questions. The majority of studies investigated correlates and predictors of PTG, including: demographic variables such as age, (e.g. study 1), gender (study 5), ethnicity (study 10) and marital status (study 8); cancer related variables such as time since trauma (e.g. study 9) and perceived threat to life (e.g. study 2); social variables such as social support (e.g. study 12) and disclosure of disease to others (study 11). Other variables explored were psychological, such as quality of life (study 12), coping (study 13), distress and PTSD (study 7); personality variables such as optimism (study 14); and cognitive variables such as processing (study 6). Two studies aimed to investigate the effect of an intervention on PTG (study 14 & 17). One study compared breast cancer patients with age- and education- matched healthy controls, with the aim of investigating the effect of trauma on reported PTG (study 2). Similarly, study 15 evaluated differences between a sample of cancer patients and controls that had experienced a non-cancer stressor, with the aim of investigating differences between event types on reported PTG. Finally, study 9 investigated the differences and similarities between three terms; 'PTG', 'benefit finding' and 'positive reappraisal coping' in terms of identifying unique predictors.

Table 1

Characteristics of Reviewed Studies

Study reference	Study	Design	Sample	Measurement tool	Mean level of PTG	Time since event
1	Bellizzi, (2004)	Cross-sectional	74 cancer patients [3 age groups] (55% male)	PTGI	Young-62.18; mid-61.40, old-38.83	Range: 2-9 years
2	Cordova, Cunningham, Carlson & Andrykowski (2001)	Cross-sectional	70 breast cancer patients and 70 healthy controls	PTGI	64.1	Mean: 23.6 months post treatment. Range 2-58 months.
3	Weiss (2002)	Cross-sectional	41 breast cancer patients and their husbands	PTGI	60.21	Mean: 38 months since diagnosis. Range:15-65 months

4	Weiss (2004)	Cross-sectional	72 married women with early-stage breast cancer	PTGI	57.9	Range: 1-1.5 years post diagnosis
5	Carboon et al. (2005)	Longitudinal	62 hematological cancer patients (58% male)	PTGI	55.1	Mean: 36.8 and 183.7 days post-diagnosis
6	Mann, Ostroff, Winkel, Goldstein & Grana (2004)	Longitudinal	162 breast cancer patients and partners	PTGI	49, 52.8, 55.7 (3 time points)	Mean: 4.5 months post diagnosis. Range: 1-10 months
7	Widows, Jacobsen, Booth-Jones, & Fields (2005)	Longitudinal	72 cancer patients undergoing bone marrow transplant (26% male, 74% female)	PTGI	64.67	Mean: 24.05 months post-bone marrow transplant. Range: 8-47 months.
8	Thornton & Perez (2006)	Longitudinal	82 prostate cancer patients and partners	PTGI	Patient- 46.60	Time 1- pre-surgery, time 4-1 year post-surgery

9	Sears, Stanton & Danoff-Burg (2003)	Longitudinal	60 early stage breast-cancer patients	PTGI; REAPP	PTGI-58.43	Mean: 28.47 weeks since diagnosis. Range 8-53 weeks.
10	Bellizzi & Blank (2006)	Cross-sectional	224 breast cancer survivors	3 sub-scales of the PTGI	RTO= 20.29; purpose in life = 9.98; AfL = 9.67	Range: 1-4 years post-treatment
11	Henderson, Davison, Gatchel & Baum (2002)	Cross-sectional	272 breast cancer patients	SRGS	Not reported	Mean 6.02 years since diagnosis
12	Kinsinger et al. (2006)	Cross-sectional	250 prostate cancer patients	BFS	Not reported	Mean: 15.7 months since diagnosis
13	Luszczynska, Mohamed & Schwarzer (2005)	Longitudinal	97 cancer patients (61.9% male).	BFS	Not reported	Range:1, 6 & 12 months post-surgery

14	Antoni et al. (2001)	Experimental	100 early stage breast cancer patients	BFS	3.08 increased to 3.47 post-intervention.	4-8 weeks post-surgery; 9-months post-recruitment
15	Tomich, Helgeson & Vache (2005)	Cross-sectional	184 breast cancer patients, 184 controls	Brief measure of the BFS	Not reported	Mean: 5.5 years post-diagnosis
16	Porter et al. (2006)	Cross-sectional	524 long-term breast cancer survivors	GTUS	4.46	Mean: 81.0 months since diagnosis
17	Gil et al. (2006)	Experimental	483 breast cancer patients	GTUS	Not reported	Range: 5–9 years post-treatment

Note. Only overall growth score have been reported for the Posttraumatic Growth Inventory unless otherwise indicated. Growth score given for patient only. PTGI (Posttraumatic Growth Inventory; range 0-105); 'RTO' (Relating to Others; range 0 to 35); Purpose in Life (range 0 to 25); AfL (Appreciation for Life; range 0 to 15); SRGS (Stress-Related Growth Scale); BFS (Benefit- finding Scale, range 0 to 5); GTUS (Growth through Uncertainty Scale); REAPP (positive reappraisal scale of COPE).

Methodology of PTG Research

Nine studies used cross-sectional designs (studies 1, 2, 3, 4, 10, 11, 12, 15 & 16), six studies utilized a longitudinal design (studies 5, 6, 7, 8, 9 & 13), and two studies were experimental (studies 14 & 17).

The most common measurement tool of PTG reported was the Posttraumatic Growth Inventory (PTGI; Tedeschi and Calhoun, 1996). It was used in 10 of the 17 included studies (studies 1, 2, 3, 4, 5, 6, 7, 8, 9 & 10). Studies 12, 13, and 14 used the Benefit Finding Scale (Antoni et al., 2001); the Growth through Uncertainty Scale (Bailey, Mishel, Belyea, Stewart, & Mohler, 2004;) was used in study 16 and 17; the Stress-Related Growth Scale (Park et al. 1996) was used in study 11, and study 9 used the Positive Reappraisal subscale of the COPE (Carver, Scheier, & Weintraub, 1989).

Sample sizes ranged from 41 (study 3) to 524 (study 16). With regards to gender, 11 studies used an all female sample (study 2, 3, 4, 6, 9, 10, 11, 14, 15, 16 & 17); two studies used an all-male sample (study 8 & 12) and the remaining four studies used a mixed gender sample (study 1, 5, 7 & 13). The average age of participants across studies ranged from 43.4 (study 5) to 65 years (study 12). Of the included studies, 13 used an all patient sample. The remaining four studies used a patient sample plus a comparison sample; two studies included patients' partners (studies 6 & 8); one study used a healthy control sample (study 2) and study 15 used a sample of non-cancer patients who had experienced another traumatic event. Growth was assessed from 4.5 weeks post-diagnosis (study 6) to 9 years post diagnosis (studies 1 & 17).

Methodological Quality of PTG research

Quality was assessed using the Macfarlane et al. (2001) checklist. The abstract and main paper were assessed separately. Overall, the range in rated quality of abstracts was between

37.5% (study 8 & 14) and 87.5% (study 13). Specifically, all but study 4 clearly described aims and objectives in the abstract. Approximately half of the studies described the design in the abstract. Only one abstract identified the source of participants (study 1). Sample size was stated in all but two abstracts (study 1 & 8). Participation rate was stated in only three of the 17 abstracts (study 1, 9 & 13). All abstracts described main results, and all but four study abstracts drew conclusions (studies 1, 11, 14 & 17).

Quality ratings of the main paper ranged from 50% (studies 3, 8, 12 & 15) to 75% (studies 14 & 17) using the Macfarlane et al. (2001) checklist. All but study 17 clearly described outcomes in the introduction. All studies described sample size and main findings. Approximately half clearly specified the design. Approximately 40% of the studies described participants that had not taken part or that were lost to follow up. Approximately 40% of studies made it clear that the possible sample was representative of the population from which they were drawn, and it was only stated in three of the papers that the recruited sample was representative of the entire population (study 2, 14 & 17). Only study 10 justified its sample size. One paper described attempts to increase participation (study 17).

Overview of Empirical Findings

Level of PTG

Studies that used the PTGI to measure positive change reported a range of total growth from 46.6 (study 8) to 64.67 (study 7), where the possible range was 0-105.

Correlates of PTG

Associated factors were categorised according to six main areas; demographic factors, disease-related factors, social factors, psychological factors, personality factors and cognitive factors. Main findings are discussed below.

- *Demographic Factors*

Five studies reported a positive correlation between younger age and PTG (study 1, 6, 7, 10, & 16). Study 8 found no relationship between age and PTG. Two studies (1 & 3) reported an effect of female gender on PTG but study 7 found no relationship. Results for employment and income were mixed. Study 10 found a positive correlation between employment and PTG but no such relationship was reported in both study 7 and study 8. A relationship between income and PTG was shown in study 2, but the opposite was reported in study 12. Study 7 found no relationship for income. Findings were also mixed for education. Five studies found a negative correlation between education and PTG (studies 4, 7, 8, 10 & 12), but a positive relationship was reported in studies 9 and 16. Study 8 described no relationship. Four studies reported no relationship between PTG and ethnicity (studies 7, 8, 10 & 12).

- *Disease-related factors*

Two studies found a positive association between time since diagnosis and PTG (studies 2 & 9); study 4 found a negative association, and study 10 found no relationship. Study 2 reported that having cancer as opposed to being healthy was a predictor of PTG. This study also suggested that life threat was positively associated with PTG. Similarly, study 10 found that invasive versus localised cancer was associated with more PTG.

- *Social factors*

Social support was found to be associated with greater PTG in studies 4, 8 and 12, but no relationship was reported in study 2 and study 7. Marriage was found to be correlated with PTG in two studies (4 & 10), whereas no association was found in study 8. Talking about

the disease and exposure to someone who had experienced growth from cancer was associated with PTG (study 2, 4, & 11).

- *Psychological factors*

No relationship between distress and PTG was found in five studies (studies 2, 5, 7, 9 & 14). However, it was shown to be negatively correlated with PTG in study 16. Coping strategies were found to be positively associated with PTG in five studies. Specifically: active adaptive coping (study 10); assimilative coping (study 13); positive reframing coping (study 8); approach-based and avoidance coping (study 7); and overall coping (study 2). A positive relationship was found between PTG and self-efficacy (study 13). A negative relationship was found between quality of life and PTG in partners in one study (study 8). No relationship was reported between quality of life and PTG in study 12.

- *Cognitive factors*

PTG was positively associated with positive reappraisal (study 6) and positive reframing (study 8). Intrusions were associated with PTG in study 6, but not in study 5. Contrary to expectations, cognitive avoidance was positively associated with PTG in study 5. Carboon et al (2005) attributed this to the measurement of avoidance being taken during treatment which does not fit with Tedeschi and Calhoun's (2004) theory that intentional processing occurs post-event.

- *Personality factors*

Hope and optimism were found to have no bearing on PTG (study 10).

Additional findings

Both studies utilising a control sample reported higher levels of PTG in the cancer sample (study 2 & 15). Both intervention studies reported increases in growth post-intervention

(study 14 & 17). Study 6 found that for all women, PTG increased over time, whereas the control group in study 17 showed a decline in PTG over time. Study 3 found that cross perceptions of growth by partners was corroborated, indicating that growth can be observed by others.

Discussion

This review systematically selected and assessed literature on PTG with the aim of a) identifying the extent to which PTG has been studied in medical conditions; b) providing an overview of this research including methodological characteristics and quality; and c) identifying further research needs in this area.

The Study of PTG in Medical Conditions

Although the searches were conducted for cancer, coronary heart disease and stroke, all 17 articles that were ultimately included in the review utilised cancer patients. This may represent a perception that cancer is considered more likely than other life-threatening illnesses to induce growth. However, the functional-descriptive model of growth suggests that any event considered traumatic to the individual has the potential to encourage growth (Tedeschi & Calhoun, 2004). There is a large amount of literature within the traumatic stress field of the negative psychological effects of experiencing life-threatening medical conditions (e.g. Merriman et al., 2007; Kangas et al., 2005; Sheldrick et al., 2006) so, as potential traumatic experiences, coronary heart disease and stroke have the potential to induce growth. Therefore, the full range of patient adaptation and adjustment following stroke and coronary heart disease may not be fully understood.

Overview of the Research

Although all studies examined the positive effects of cancer, their aims, methods and outcomes were wide ranging. Therefore findings were diverse: great variation in amount of

growth was reported, similarly for the factors that were reported to be associated with growth or not. It is unclear whether this can be attributed to the study quality or methodology. However, some trends did emerge from the studies. The studies suggest that growth does exist, to a moderate degree, following a diagnosis of cancer. Additionally, certain factors showed trends in their association with growth. The most compelling findings were for the association between PTG and younger age. This was the most consistent finding across the studies. Additionally, there were patterns of an association between PTG and social factors including social support, marriage and disclosure patterns. Although it was not consistently reported across the studies, there was a slight trend for greater time since cancer to be associated with PTG, and for increased disease threat. These findings can be counted as confirmatory evidence for the functional-descriptive model of PTG (Tedeschi & Calhoun, 2004), which suggests that the greater the threat, and therefore the potential to shatter schemas, the more likely growth will occur. The model also suggests that social factors facilitate growth by allowing greater processing of the event (Tedeschi & Calhoun, 2004).

Other findings across the studies are inconclusive as they do not follow consistent patterns. The diversity of the included studies inhibits conclusive interpretations. An examination of the limitations of comparing the included studies will follow.

Primarily, cross-study comparison is difficulty due to the range of terms and measurement tools used to define and measure PTG following cancer. Although research has suggested that the terms are used interchangeably, and refer to the same set of reactions (Linley & Joseph, 2004), there are qualitative differences between definitions. Measurement tools also varied between studies and it is reasonable to assume that different measures tap different domains. This problem has been noted in the wider literature on

PTG (Linley & Joseph, 2004). The positive aspect of including a range of studies in the review was that it arguably allowed for all available evidence to be surveyed, but limitations make cross-study comparison difficult.

Sample sizes of included studies varied widely. Both small and large sample sizes can affect reliability of findings (Tabachnick & Fidell, 1989). As only one study justified sample size (Bellizzi, & Blank, 2006), it is difficult to conclude which sample sizes are reliable. Although all clinical participants had a diagnosis of cancer, time since diagnosis differed greatly across studies, a factor which has been found previously to effect reporting of PTG (Linley & Joseph, 2004). Finally, studies reviewed PTG of patients with different diagnoses of cancer, and therefore may lend to differing experiences and consequences. Finally, diverse findings can also be attributed to the range of methodological design used between reviewed studies. These factors inhibit fair cross-study comparison. As well as limitations between the studies, there were limitations within the included studies.

Limitations of Included Studies

Reliability of the findings may be attributed to the quality of the study. Although all studies were rated in the mid-high range for the main paper (50%-70%), there were common limitations in quality of reported data. Specifically, external validity of the studies was questionable as few studies described non-participants, or participants lost to follow up. Also, few studies make it clear that they were representative of the entire population from which participants were recruited from.

Quality of results can also be assessed on the methodology utilised. Although experimental methodology is considered the most rigorous (Sohanpal et al., 2007), and therefore the most reliable when interpreting findings, Cunningham (2001) reported that observational methods revealed more informative data than experimental methods in mind-

body literature. Considering the studies utilising observational methods, cross-sectional design was useful for obtaining high numbers of participants, but were limiting by recall and sampling bias (Press, Zlein, Kaczorowski, Liston & von Dadelszen, 2007). The six studies that utilised a longitudinal design would be considered to have more methodological strength (Sohanpal et al., 2007) and therefore possibly be more reliable.

Limitations of the Review

Limitations of the review methodology exist. Although the review has allowed greater insight into the current empirical stance of research on PTG following cancer, some studies may have not been included in the review because they did not include the specified key terms necessary to be identified by the search methods. Additionally, inclusion criteria were confined to studies that used a quantitative measurement tool- it may be that qualitative research studies could provide additional data and understanding. However, much of the earlier work in the field was conducted using qualitative methods and the use of a quantitative measurement tool allows for greater cross-study comparison. Although the quality was rated by two researchers and inter-rater reliability calculated, data was collected by only one researcher, making it subjective. The review could also be subject to publication bias whereby studies were excluded due to not being published in a peer-review journal as results were 'uninteresting' or 'negative' (Teunissen et al., 2007). Finally, the search strategy was limited to papers written in English language, hence the review may have missed important studies published in other languages.

Future Research

This review clearly shows that there is need for the systematic study of PTG following life-threatening illnesses, namely stroke and coronary heart disease. The current research of PTG in cancer has proven sufficient to test proposed theories of the process of growth (e.g.

Tedeschi & Calhoun, 2004) although methodologies are highly variable. Findings from this review have demonstrated problems with cross-study comparison and therefore, future research needs to have clear definitions of the PTG concept and be measured by reliable and validated tools to allow more comparison.

Clinical Implications

The lack of research into positive effects following illnesses other than cancers may lead to a misleading picture of the adjustment and adaptation following coronary heart disease and stroke. However, the evidence presented shows that PTG can follow cancer in varying degrees. It has been suggested for practitioners to recognise and to be aware of the possibility of growth but are discouraged from introducing the prospect insensitively (Tedeschi & Calhoun, 2004). The review demonstrates that practitioners should be aware of variation of findings and be cautious in generalising these.

Conclusions

This review provides an overview of the empirical research on PTG following life-threatening illness. The findings show some trends for certain demographic, disease-related and social factors in their association with increased PTG following cancer. However, conclusions are tentative because due to the wide-ranging methodologies and findings, cross-study comparison is difficult. The review certainly highlights the need for research for PTG following coronary heart disease and stroke as the paucity of literature in these areas may cause an incomplete understanding of the range of adjustment and adaptation patterns in these patient groups.

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POSTTRAUMATIC GROWTH FOLLOWING MYOCARDIAL INFARCTION

Part 2

Empirical Paper

Posttraumatic Growth Following Myocardial Infarction

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Abstract

The experience of a heart attack (MI) can be an event that causes distress severe enough to satisfy DSM-IV criteria for trauma in some individuals. However, research has shown that positive outcomes can also follow traumatic events; this has been defined as Posttraumatic Growth (PTG). This cross-sectional study compared the level and pattern of PTG reported by a post-MI sample (n = 97) with that of a healthy control sample (n = 86); and examined demographic, disease-related, social and psychological correlates and predictors of growth. Post-MI patients reported greater PTG than healthy controls in the areas of 'relating to others' and 'appreciation for life'. Post-MI patients' growth was associated with greater support from family, and was unrelated to distress. Perceived severity of the event had a significant effect on PTG, but objective severity largely did not. Although less overall growth was reported than that following other life-threatening illnesses such as cancer, practitioners should be aware of the possibility for growth. Additionally, the meaning that patients ascribe to their MI has been shown to be more important for psychological adjustment than biological markers because perceived severity of MI had more impact on PTG than objective severity.

Keywords**:** *Posttraumatic Growth; Myocardial Infarction; Heart Attack*

Posttraumatic Growth Following Myocardial Infarction

A myocardial infarction (MI, more commonly known as a heart attack) can be sudden, unexpected, and carry the potential threat of death (Bennett & Brooke, 1999). The event satisfies criteria for DSM definition of a traumatic event as it can involve actual or threatened death (American Psychiatric Association, 2000) and indeed, many studies have reported posttraumatic stress disorder in MI survivors (e.g. Sheldrick, Tarrier, Berry & Kincey, 2006). The negative psychosocial sequalae to MI has been well documented, including the high incidence of depression (Sheikh & Marotta, 2008), but very few studies have reported the potential positive effects of experiencing an MI.

Posttraumatic Growth

Posttraumatic Growth (PTG) has been described by Tedeschi and Calhoun (2004) as "positive psychological change experienced as a result of the struggle with highly challenging life circumstances" (p.1, Tedeschi and Calhoun, 2004). PTG is not equivalent to recovery (Tedeschi and Calhoun, 2008), or good coping (Calhoun and Tedeschi, 1998). It is the experience of positive changes following trauma, and has been classified into five domains; 'Appreciation for Life', 'Spiritual Change', 'Personal Strength', 'New Possibilities', and 'Relating to Others' (Tedeschi and Calhoun, 1996). Growth across these domains includes: changes one makes in their approach to life given a new sense of what is important; strengthened spiritual beliefs as a result of facing existential questions in the realization that life is finite; increased perception of personal strength with a simultaneous heightened sense of vulnerability; changed paths in life, and perceiving family relationships and friendships as closer and more meaningful (Tedeschi and Calhoun 2004).

The growth process has been conceptualized by Tedeschi and Calhoun (2004) in their 'functional descriptive model of PTG'. In this model, the trauma is considered a

'seismic event' which metaphorically 'shakes' individuals' schemas. Initially, the survivor endures a process of rumination via intrusive and automatic thoughts. Although distressing, this encourages the active cognitive processing of the event. In time, the individual is hypothesized to separate oneself from previous life goals and schema, and develop new 'post-trauma schema' that incorporate the experience. This process is reportedly facilitated by self-disclosure and social support.

PTG has been studied empirically following a range of traumatic events including naturalistic disasters (e.g. Vazquez, Cervellon, Perez-Sales, Vidales, & Gaborit, 2001), man-made disasters (Harms & Talbot, 2007), intentional human acts (e.g. Lev-Wiesel, Amir & Besser, 2005), and bereavement (e.g. Taku, Calhoun, Cann & Tedeschi, 2008). PTG has also been investigated somewhat in the area of medical illness (e.g. Cordova, Cunningham, Carlson, & Andrykowski, 2001), although mostly in cancer patients.

Existing research of PTG in cardiac patients is promising but sparse and methodologically limited. Affleck, Tennen and Croog (1987) reported better morbidity and mortality outcomes for MI patients who perceived benefits from the experience than those who did not. However, the assessment of growth via open ended interview questions arguably lacks the sophistication of more recent studies that use validated measurement tools. Sheikh (2004) investigated PTG in heart disease patients using the Posttraumatic Growth Inventory (PTGI; Tedeschi and Calhoun, 1996) and reported moderate levels of PTG, but domain-specific growth was not reported. Previous research has suggested unique predictors for the sub-domains of growth (e.g. Bellizzi, 2004) indicating the importance of examining sub-domains, as well as overall growth.

Therefore, this study aimed to measure PTG in a post-MI sample using a standardized measurement tool, and to analyse any reported growth to determine

predominant growth domains. Theorists have argued that individuals generally revise their personal histories (Greenwald, 1980) suggesting that anyone could report growth, regardless of experiencing a trauma. In response to this, Tedeschi and Calhoun (1996) used a non-trauma control sample in the validation of the PTGI, and found significant between-group differences, the trauma sample reporting more growth. However, despite control norms being available, they are based on a student population. Therefore, a more age-appropriate healthy control sample was recruited for this study to enable trauma-specific conclusions to be drawn.

Social Support, Myocardial Infarction and PTG

Social support has been well recognised as positively affecting prognosis of post-MI patients (e.g. Berkman, 1995); not only regarding reductions in mortality and re-infarction (Lett et al., 2007), but also with regards to health behaviour change (Boutin-Foster, 2005), and depression (Frasure-Smith, Lespernace, Juneau, Talajic, & Bourassa, 1999). Social support is identified in the functional-descriptive model of PTG as a medium for processing the event (Tedeschi and Calhoun, 2004). The availability of social support is a major contributing factor to the 'relating to others' domain (Tedeschi and Calhoun, 2004), so may be of particular interest when examining growth, given the existing literature on social support in cardiac samples. Social support has also been cited as predictive of PTG (e.g. Luszczynska, Mohamed, & Schwarzer, 2005). Therefore, the second aim of this study was to explore the relationship between perceived social support, reported PTG and its domains in a post-MI population.

Other Variables Associated with PTG

Despite little research into PTG following MI, much research has been conducted in other traumatic events and factors associated with growth have been identified. To rationalize the

inclusion of specific demographic, disease-related and psychological factors in this study, a short review will follow. Youth has been linked with more growth (e.g. Mann et al., 2004). Calhoun and Tedeschi (2004) suggested that younger trauma victims may have the time and resources to integrate and learn from the experience. Females have been reported to report more growth than males (Park, Cohen and Murch, 1996), but the findings for gender are mixed (Linley and Joseph, 2002). Some studies have cited income as associated with PTG (e.g. Cordova et al., 2001) but others have not (e.g. Widows, Jacobsen, Booth-Jones & Fields, 2005).

Severity of trauma has been suggested to predict PTG (e.g. Linley & Joseph, 2002). Cordova et al., (2001) recommended that subjective appraisal of threat is more important for PTG than objective indexes of severity. This harmonizes with Tedeschi and Calhoun's (2004) functional descriptive explanation of PTG as the event needs to be considered traumatic enough by the individual to impact on their schemata enough to necessitate the re-building of these. Longer time since trauma has been described as predictive of PTG (e.g. Sears, Stanton, and Danoff-Burg, 2003; Park et al. 1996). Tedeschi and Calhoun (2004) suggest that PTG is developmental, therefore more likely with greater time since trauma. Distress has generally been reported as not associated with PTG (Linley and Joseph, 2002). This supports the functional-descriptive model of PTG, which shows distress can both lead to, and co-exist with PTG (Tedeschi and Calhoun, 2004). Finally, personality may influence the perception of growth, namely extraversion, openness to experience and optimism have been indicated as associated with growth (Tedeschi and Calhoun, 1996).

Aims and Hypotheses

Research hypotheses were based on the functional-descriptive model of PTG (Tedeschi and Calhoun, 2004). The primary aim of the study was to report total and domain-specific level of PTG in a post-MI sample, and compare this to PTG reported by a control sample of healthy adults. It was hypothesized that the post-MI sample would report more overall- and domain-specific growth than healthy individuals. The 'relating to others' domain was of particular interest due to the cardio protective role of social support. Therefore, the second aim of the study was to examine the relationship between PTG and social support in a post-MI sample. It was hypothesized that greater perceived social support would be associated with more growth. Thirdly, the relationship between growth and other variables- age, gender, distress, perceived and objective severity of MI, and time since MI- were explored. It was also hypothesized that younger, female patients who perceived their MI as more severe and who have had time for growth to occur since MI event, would demonstrate greater levels of PTG. It was hypothesized that objective severity of MI and distress would be unrelated to PTG. Finally, possible predictors of PTG in post-MI patients were evaluated using the above variables. Personality and previous trauma were included as control variables.

Method

Participants

Participants were post-MI patients recruited from a cardiac rehabilitation service in the North East of England. All patients were on the heart-manual programme, a facilitated self-help, home-based rehabilitation programme for individuals recovering from an MI provided by the NHS. Inclusion criteria for participation were: patients aged 18 and over, an ability to read and understand English language, and patients who had undergone recent

assessment from the service. Exclusion criteria were: too ill to participate, congenital heart problems, cognitive impairment severe enough to prevent questionnaire completion, and patients awaiting transplant, bypass surgery or device implantation. Sample size estimation was based on a ratio of five cases to each independent variable for the regression calculation (Tabachnick and Fidell, 1989). Based on 17 variables, including degrees of freedom for categorical variables, a minimum of 85 participants were needed for the study to have sufficient power.

Between November 2007 and May 2008, from a possible 380 post-MI patients, 212 were considered for eligibility. Of these, 12 were excluded due to poor health. In total, 200 patients were eligible for inclusion in the study. Of the 200 questionnaires posted, 73 (36.5%) were returned, two patients declined participation. From 115 reminder letters and questionnaires posted, 34 patients responded; eight patients declined and 26 consented to participate. In total, a 53.5% (n=107) response rate was achieved. 97 participants (48.5%) consented to participate. [Appendix C displays details of participant recruitment].

The final clinical sample consisted of 97 post-MI patients ranging in age from 30 to 90 years (mean = 63.3 years; SD = 11.91). The majority of responders (76.3%) were male and 23.7% female. Social deprivation scores derived from 2001 census data from postcode ranged from 1 (most deprived) to 5 (least deprived), with a mean score of 2.43 (SD = 1.35). Eligible patients that did not participate ranged in age from 26 to 96 years (mean 64 years, SD = 11.99); 71.2% were male and 28.8% female. Social deprivation scores for non-responders ranged from 1 to 5, with a mean score of 2.02 (SD = 2.02). Independent t-tests comparing demographic information between responders and non-responders showed no differences for age, $t(198) = -.396$, $p = .692$, but significant differences for socio-economic status where the non-responders were more socially deprived, $t(177) = 2.081$, $p = .039$. Chi-

square analyses showed no significant differences between the groups on gender (X^2[1, N=201] = .682, p = .409).

A convenience sample of healthy controls was recruited for comparison of PTG between MI patients and healthy individuals. Three hundred questionnaires were distributed and 86 (28.67%) were completed and returned. The control sample ranged in age from 19 to 83 years (mean =41.67 years; SD = 14.78); 37.2% of the sample were male and 62.8% female.

Procedure

Ethical approval was obtained from the local Research Ethics Committee and subsequent trust approval was granted [please see Appendix D and E]. Participants were recruited from cardiac rehabilitation services using data and information collected on a routine questionnaire given to patients by the cardiac rehabilitation nurses at 12-weeks and 12-months post-MI as part of the heart manual programme. Eligibility for participation was determined by the Service and Professional Manager using this information.

Using a cross-sectional survey design, potential participants were posted a study pack including letter of invitation, information sheet [Appendix F and G], consent form [Appendix H], questionnaire, and stamped addressed envelope for responses. Participants were requested to return the questionnaire within two weeks of receipt. Questionnaire completion took approximately 20 minutes. A reminder letter was sent with another questionnaire if a response was not received after four weeks.

To increase participation rates, the researcher attended the physiotherapy clinics of the same cardiac rehabilitation service. The lead Physiotherapist identified suitable participants and introduced participants to the study via a letter of invitation and

questionnaire pack if they had not already received one in the post. Potential participants took the questionnaires and returned them using the enclosed stamped addressed envelope.

Measures

Clinical sample

Demographic variables. Participants completed a self-report demographic questionnaire for age, gender, postcode, and time since last significant cardiac event. Patients were asked to rate the severity of their cardiac event using a 4-point scale whereby 1= very severe, 2 = quite severe, 3 = slightly severe, and 4 = not severe. A measure of socio-economic status was obtained from a social deprivation score generated from participants' postcodes, where 1 = most deprived and 5 = least deprived. Objective medical severity of MI was recorded from service records by using a measure of Troponin T[1].

Previous trauma. Participants were asked if they had experienced previous trauma using Section F39 of the Structured Clinical Interview for DSM (SCID; First, Spitzer, Gibbon & Williams, 1997). This required a yes/no response but adequate space was provided for additional information. Previous trauma was used as a control variable in regression statistics.

Personality. The short form of the Eysenck Personality Questionnaire, Revised (Eysenck, Eysenck & Barrett, 1985) was used. This is a 48-item self report questionnaire with four scales, each comprising 12 items; Psychoticism, Extraversion, Neuroticism, and the Lie Scale. This measure was used as a control variable for individual differences in regression statistics.

Posttraumatic growth. The Posttraumatic Growth Inventory (PTGI; Tedeschi and Calhoun, 1996), a measurement tool that lists 21 positive statements about possible changes

[1] Troponin T is a cardiac enzyme used to identify the presence of a myocardial infarction.

as a result of a crisis, was used. Response options were modified to refer to the ‘cardiac event’ rather than ‘the crisis’. Participants were requested to rate each statement according to a six point scale where 1= ‘I did not experience this change as a result of my cardiac event’ and 6 = ‘I experienced this change to a very great degree as a result of my cardiac event’. A score was given for five factors; ‘New Possibilities’, ‘Relating to Others’, ‘Personal Strength’, ‘Appreciation of Life’, and ‘Spiritual Change’. A total PTGI score was obtained where scores range from 0-105.

Tedeschi and Calhoun (1996), using a student population, reported internal consistency co-efficient alpha of the PTGI to be .90. Test-retest reliability over a 2–month period was r=.71. Normative data suggested that females report more benefits (M=75.18, SD=21.24) than males (M=67.77, SD=22.07).

Social support. The Perceived Social Support from Family and Friends Scale (Procidano & Heller, 1983) measures the extent to which an individual perceives their family and friends to fulfil their needs for support, information and feedback (Procidano & Heller). It comprises two 20-item self-report measures; one for perceptions of family support (Perceived Social Support from Family; PSS-FA) and one for perception of support from friends (Perceived Social Support from Friends; PSS-FR). Responses require a ‘yes’, ’no’ or ‘don’t know’ response, where only ‘yes’ answers are scored. Each scale has a range of 0-20, where higher scores indicate more perceived support. Procidano and Heller reported that the scale correlated with measures of psycho-pathology and distress demonstrating predictive and construct validity. Tests with 222 students produced correlation co-efficients of 0.88 and 0.90 for items for friends and family, respectively (Procidano & Heller).

Distress. The Hospital Anxiety and Depression Scale (HADS; Zigmond and Snaith, 1983) consists of 14 items divided into two sub-scales for anxiety and depression comprising seven items each. Each item is rated on a 4-point scale representing degree of distress where 0=none and 3=unbearable. Higher scores indicate the presence of problems. Ratings of 7 or less are considered to be 'normal/asymptomatic', 8-10 are considered 'possible clinical disorder' and 11+ are considered 'probable clinical disorder'. This scale was selected due to its routine use within the heart manual programme. This allowed for less scales to be sent to the potential participants. Additionally, the HADS is relevant for use in a health setting because it excludes items relating to both emotional and physical disorder (Bowling, 1997).

Zigmond and Snaith (1983) used data from 50 psychiatric outpatients to report a high correlation between severity ratings and psychiatric assessments (r=0.70 for depression and r=0.74 for anxiety). Internal consistency of the scale showed correlations ranging from 0.41 to 0.76 for anxiety and from 0.30 to 0.60 for depression. [please see Appendix I for a copy of the study questionnaire].

Control sample

Participants in the control sample completed a shortened form of the clinical sample questionnaire. Demographic variables included were age, gender and previous trauma. If the participant indicated a trauma, they were asked to rate its severity using the 4-point severity scale described above. Finally, control participants completed the PTGI for a measure of PTG. Responses were modified from 'crisis' to 'in the past two years' to match the experience of the clinical sample. This method was a replication of the original control study used by Tedeschi and Calhoun (1996). [please see Appendix J for a copy of the control questionnaire].

Statistical Analyses

The Statistical Package for the Social Sciences version 14.0 (SPSS, Inc. 2005) was used for analyses. Statistical significance was set at 0.05. Differences between clinical and control group on the PTGI were initially calculated using a multivariate general linear model (GLM) to allow for correlations between the subscales of the PTGI. Subsequent t-tests were used to determine significant differences. Bivariate correlations were conducted using Pearson's r. For categorical factors (i.e. perceived severity), a multivariate GLM was used to determine any significant effects and subsequent ANOVAs were performed. A univariate GLM was used for the regression calculations due to the range of categorical and continuous variables used.

Cases were excluded when number of missing items on the PTGI exceeded one third of the growth domain. Otherwise, mean scores of the domain were used to impute the missing value. Missing items on the EPQ-R were imputed to reflect the majority of yes or no responses on individual subscales.

Results

Descriptive Statistics

Clinical sample

Mean time since MI was 38.78 weeks (SD = 23.29); 24.2% of participants perceived their cardiac event as 'very severe', 49.5% rated it as 'quite severe', 17.9% said 'slightly severe' and 8.4% rated their cardiac event as 'not severe'. More than half of participants (55.1%) reported experiencing a trauma previous to the most recent cardiac event. Reported levels of anxiety ranged from 0 to 15, with a mean of 4.22 (SD = 3.79). Using the HADS (Zigmond & Snaith, 1983) classifications, 6.7% of cases were classified as probable clinical cases, 13.5% were classified as possible clinical cases and 79.8% of cases were

categorized as ‘normal/asymptomatic’. The reported levels of depression ranged from 0 to14, with a mean depression score of 2.87 (SD = 2.68); 1.1% were probable clinical cases, 4.5% were ‘borderline cases’ and 94.4% were ‘normal/asymptomatic’. Participants reported a range of 0-19 on the PSS-Fa (mean = 10.87; SD = 3.59). There was a reported range of 0-20 for the PSS-Fr (mean = 8.65; SD = 4.34). For overall support ratings, the range was 0-39 (mean = 19.52; SD = 6.52). On the EPQ-R, participants reported a mean of 2.08 (SD = 1.53; range 0-6) for pyschoticism; for extraversion, the mean rating was 6.10 (SD = 3.53; range 0-12); for neuroticism, the mean rating was 4.73 (SD = 3.56; range 0-11), and finally the Lie scale had a mean score of 6.78 (SD = 2.81; range 1-12).

Control sample

34.9% of participants reported experiencing a previous trauma. Of those, 32.3% rated the trauma as ‘very severe’, 48.4% rated it as ‘quite severe’ and 19.4% rated it as ‘slightly severe’.

Comparison between Clinical and Healthy Control Group

Independent t tests showed a statistical difference between the control group and clinical group on age, t (157.052) = 10.704, p = .000, where the control group were younger. Analysis using chi-square also displayed a significant difference between the two groups on gender (X^2[1, n=183] = 28.564, p = .000) where there were more females in the control group. Means and standard deviation scores of the PTGI for clinical and control groups are shown in Table 2.

Table 2

Group Means and Standard Deviations for the PTGI.

	Post-MI Sample		Healthy control sample		P value
	M	SD	M	SD	
Total PTG	**48.77**	22.47	**42.47**	24.78	.072
PTGI factor 1- 'New possibilities'	**8.65**	5.90	**9.26**	6.74	.477
PTGI factor 2- 'Relating to others'	**18.56**	8.53	**14.64**	9.75	.005
PTGI factor 3- 'Personal strength'	**9.33**	4.88	**8.21**	5.51	.157
PTGI factor 4- 'Appreciation for life'	**9.59**	4.16	**7.49**	4.18	.002
PTGI factor 5- 'Spiritual change'	**2.34**	2.87	**2.21**	2.78	.743

Note: Ranges of PTGI: 'overall growth'(0-105); 'new possibilities'(0-25); 'relating to others'(0-35); 'personal strength'(0-20); 'appreciation for life'(0-15); 'spiritual change' (0-10).

A multivariate general linear model was used to test for differences between the groups. There were significant differences between groups on reported growth ($F[5,168] = 5.328$, $p = .000$). ANOVA tests revealed significant differences between groups on 'Relating to Others,' ($F[1,172] = 8.12$, $p = .005$), where the clinical group reported more growth ($M=18.56$) than controls ($M = 14.64$). A significant difference between groups on 'Appreciation for Life,' ($F[1,172] = 9.99$, $p = .002$) was seen, whereby the clinical group reported higher appreciation for life ($M = 9.59$) than the control group ($M = 7.49$). The remaining three domains (new possibilities, personal strength and spiritual change) did not show statistically significant differences.

Correlations

Bivariate correlations between PTGI, social support, distress, age, social deprivation, time since MI and objective severity are shown in Table 3. Perceived severity was not included in the correlations due to it being a non-parametric, categorical variable.

Analysis using Pearson's r indicated that perceived social support from family was significantly positively correlated with PTGI factor 'Relating to others', $r(92) = .257$, $p = .013$. Additionally, perceived social support from family was also significantly positively correlated with PTGI factor 'Personal strength', $r(92) = .264$, $p = .011$. Social support did not correlate with other growth domains.

Distress was not associated with overall PTG or its domains. Objective severity of MI was not related to overall growth or the domains of relating to others, new possibilities, personal strength or appreciation of life. It was however, negatively correlated with spiritual change, $r(75) = -.228$, $p = .049$. Age, socio-economic status, and time since MI were not associated with overall PTG or its domains.

Table 3

Correlation Matrix for PTGI and Social Support, Distress, Personality, Demographic and MI- Related Factors

	PTGI					
	Overall Growth	New possibilities	Relating to others	Personal strength	Appreciation for life	Spiritual change
Social support-						
Overall	.137	.109	.180	.193	.036	.099
Family	.195	.153	.257*	.264*	.052	.080
Friends	.040	.037	.057	.070	.011	.081
Distress						
Anxiety	.124	.203	.127	.086	.075	.030
Depression	.072	.095	.086	-.011	.040	.018
Demographics-						
Age	.003	-.150	.097	-.030	-.018	.072
Social Deprivation	-.097	-.039	-.009	-.176	-.171	-.138
MI factors-						
Time since MI	-.124	-.099	-.097	-.108	-.041	-.070
Objective Severity	-.174	-.146	-.128	-.148	-.251	-.228*

Note.*indicates statistical significance ($p \leq 0.05$).

To assess the effect of perceived severity of MI on growth, a multivariate GLM was used. Wilks' Lambda revealed a significant effect of severity rating on growth ($F[15,224]=1.837$, $p = .031$). ANOVA tests showed a significant effect of perceived severity on 'appreciation for life' ($F[3,85] = 3.930$, $p = .011$), where most growth was reported for 'slightly severe ($M = 11.294$), followed by 'very severe', 'not severe' and 'quite severe' ($M = 11.023$, 9.375, 8.095 respectively). A significant effect was also found for 'personal strength' ($F[3,85] = 4.802$, $p = .004$) where the most growth was reported for 'very severe' ($M = 11.682$); and finally an effect was found for 'overall growth' ($F[3,85] = 3.046$, $p = .033$), where most growth was reported for 'slightly severe' ($M = 57.588$), followed by 'very severe', 'not severe' and 'quite severe' ($M = 55.401$, 43.209 and 42.254 respectively). Using a GLM, no effect of gender was found for overall or sub-domains of growth ($F[5,84] = 1.859$, $p = .110$).

For control variables, extraversion was positively correlated with 'personal strength' ($r[92] = .213$, $p = .041$) and 'spiritual change' ($r[91] = .214$, $p = .042$). No other relationships were found between growth and personality. There was no effect of reported previous trauma on overall or domain-specific growth ($F[5,84] = 1.054$, $p = .392$).

Predictors

Univariate GLM's showed that severity remained a predictor variable for personal strength ($F [3,68] = 3.855$, $p = .013$), and appreciation for life ($F[3,67] = 3.478$, $p = .021$), when age, gender, previous trauma, time since MI, personality, social support and distress were controlled for. Additionally, extraversion was a predictor variable for 'new possibilities' ($F[1,68] = 4.225$, $p = .044$), 'personal strength' ($F[1,68] = 5.662$, $p = .020$), and 'spiritual change' ($F[1,68] = 5.589$, $p = .021$) when age, gender, previous trauma, time since MI, severity, other personality variables, social support and distress were controlled for. Finally,

neuroticism was a predictor for both ‘new possibilities’ ($F[1,68] = 4.948$, $p = .029$), and ‘spiritual change’ ($F[1,68] = 6.132$, $p = .016$) when all other variables were controlled for. Social deprivation score and objective severity were removed from the regression calculations because due to missing items, they excluded too many cases for the calculation to have sufficient power (i.e. <85).

Discussion

This study had several aims and objectives. Firstly, to describe level of growth reported by a post-MI patient sample by use of a validated measure of PTG, and compare it with that of a healthy control sample. Secondly, to examine correlations between growth in the post-MI sample with perceived social support and a range of other demographic, disease-related and psychological factors. Finally, to determine possible predictors of PTG and its sub-domains.

As expected, the post-MI sample reported more growth in the domains of ‘relating to others’ and ‘appreciation for life’. This pattern of growth is consistent with that reported by Cordova et al. (2001) in a sample of breast cancer survivors. Of the five domains of growth, ‘relating to others’ was of particular interest in the post-MI sample because the domain refers to increased intimacy and closeness in relationships, aspects derived from social support, which has been found to play an important role in recovery from MI (e.g. Berkman, 1995). However, due to the difficulty of stating direction of findings owing to use of cross-sectional design, elevated scores on ‘relating to others’ may reflect closer relationships, and possibly more socializing pre-MI and greater cardiac risk behaviours such as drinking alcohol and smoking.

Raised levels of ‘appreciation for life’ suggests that the post-MI sample were more likely than healthy individuals to appreciate the value of everyday things and re-focus their

life priorities, which is said to develop from confronting the reality of death (Calhoun and Tedeschi, 1999). The manifestation of this in post-MI patients may be through reducing cardiac risk behaviours to lessen the risk of re-infarction or death. Alternatively, it may remind them to enjoy life while it lasts by continuing to engage in such behaviours. This suggests an area that warrants research into the effect of PTG on behaviour change.

Interestingly, overall growth was low compared to that reported for other medical illnesses. A review to support this empirical work showed only one study that described lower overall growth (Thornton & Perez, 2006). As all reviewed papers examined growth following cancer, it may be that cancer leads to more growth than MI. Indeed, previous research suggested overestimated mortality knowledge of breast cancer but underestimated for coronary heart disease (Wilcox & Stefanick, 1999), implying a diagnosis of cancer may be perceived as more threatening. As greater perceived threat is associated with PTG (Linley & Joseph, 2002), cancer may lead to more growth.

Previous research has shown female gender to be associated with more reported PTG (Park et al., 1996). Therefore, it could be expected that a sample of post-MI participants would report less PTG as MI's are more prevalent in males (British Heart Foundation, 2008). Indeed, the recruited clinical sample was 76.3% male and 23.7% female. Therefore, it is difficult to compare the level of PTG in post-MI samples to cancer samples due to the differences in gender distribution. Interestingly, the identified study in the literature review that reported less overall growth was a prostate cancer sample (Thornton and Perez, 2006). However, overall growth reported (M= 48.77) falls short of that described by Sheikh (2004) who examined PTG following coronary heart disease (M = 55.85). However, that sample had a mean of 60.5 months since diagnosis, compared to 38.78 weeks since MI in this study, an important factor as time since trauma has been cited

as predictive of PTG (e.g. Sears et al. 2003). Furthermore, the sample used by Sheikh (2004) may have considered their experiences more traumatic as the majority had cardiac arrest, the major mechanism for sudden cardiac death (Gersh, 2000). As increased traumatic threat has been associated with increased PTG (Linley & Joseph, 2002) comparison across the two studies is biased.

Contrary to expectations, differences were not found between the clinical and control sample for 'overall growth', 'new possibilities', 'personal strength' or 'spiritual change'. This supports the implication by Greenwald (1980) that all individuals would report positive change over time due to biases in revising personal histories. However, there are limitations in comparing the clinical group with the control sample used. Firstly, the control sample was statistically younger than the clinical group. Youth has been widely reported across the literature as being associated with more reported PTG (e.g. Bellizzi & Blank, 2006), therefore the control sample may have been more likely to report PTG. Furthermore, there was a statistical effect of gender between the groups where the control group had more female representation. Again, this has been reported as a factor that may influence an increased likelihood of reporting PTG (e.g. Park et al., 1996). These differences make drawing conclusive differences in reported PTG difficult. Finally, the comparison is further complicated by 34.9% of the control sample responding positively to a trauma question. It would have been difficult to recruit a control sample who did not consider any experience in their lives as traumatic, but as the nature and extent of these traumatic experiences were unknown, it is difficult to compare the group with the clinical group in that the control's traumas may have been severe enough to induce PTG in some individuals. More matching across control and clinical groups would have improved the reliability of drawing differences between them.

In partial support for the hypothesis, perceived family support was significantly positively associated with ‘relating to others’ and ‘personal strength’. The social support-relating to others relationship could be expected given the items comprising the domain refer to strengthening existing relationships. The family support- personal strength association indicates a relationship between an individual perceiving their family as fulfilling their support, information and feedback needs, and perceiving a sense of self-reliance and ability to cope with life (Calhoun & Tedeschi, 1998). It implies that individuals gain strength from family support. However, it may be that the sample are better at relating to others so may have good social support networks and therefore support. The overarching finding of a relationship between social support and PTG is consistent with other research (e.g. Kinsinger et al, 2006). It also has implications for the findings from the wider trauma literature that social support is predictive of better outcomes (e.g. Pruitt & Zoellner, 2008).

As expected, distress was unrelated to PTG. This supports previous research (e.g. Linley and Joseph, 2002). However, contrary to expectations younger age was unrelated to PTG. Similarly, PTG was not associated with amount of time since MI. This challenges the model proposed by Tedeschi and Calhoun (2004) that purports that the longer the time since traumatic event, the more chance of PTG. An explanation may be that PTG was measured too soon after the trauma when compared with other studies (e.g. Sheikh, 2004), suggesting that insufficient time had elapsed for the growth process to occur. However, research in other medical areas has reported no relationship between time and trauma (e.g. Bellizzi & Blank, 2006). More research is needed to clarify this relationship.

This study showed a significant effect of patient perceived severity of MI on the growth domains of appreciation for life and personal strength. It remained a predictor for

growth when all other factors were controlled for. However, examination of severity did not show a linear relationship with PTG (e.g. increased PTG with increased severity). Interestingly, objective severity of MI was largely not associated with overall growth, supporting the findings of others (e.g. Cordova et al., 2001). Previous research suggests that perceived severity effects growth (e.g. Sears et al., 2003), which is theoretically supported by the functional-descriptive theory of PTG, which states the event needs to be personally significant enough for people to alter their schema (Tedeschi & Calhoun, 2004). This study shows partial support for this but the lack of a linear relationship complicates interpretation. The most important conclusions that can be derived from these findings are that the individual meaning of the event (perceived severity) may be more important for growth than biological severity. It is possible that the measurement of perceived severity was too simplistic in the current study. It may have been more appropriate to extend the question of severity to gather more information about any possible trauma reactions with use of the extended version of Section F39 of the Structured Clinical Interview for DSM (SCID; First, Spitzer, Gibbon & Williams, 1997) which specifically asks about possible distressing reactions to trauma. This would give a clearer idea of the level of trauma experienced. In order to gain a fuller understanding of the participants' perceptions of their MI, the illness representation model could have been used. This is based on Leventhal's self-regulation model (Leventhal, Meyer & Nerenz, 1980) and follows that individuals make sense of their illness by forming a cognitive representation which determines their coping procedures. The representation consists of five components: identity, cause, timeline, consequences and controllability. The individual illness representations are likely to have associative roles with PTG. For example, for the timeline component, if a patient perceives their condition to have long-lasting consequences, it could be assumed that they perceived their MI to be

more severe than a person who perceived it to be an acute event. The former individual may be more likely to report PTG therefore. An improvement on the current study would be to additionally administer the Illness Perceptions Questionnaire (Moss-Morris, Weinman, Petrie, Horne, Cameron & Buick, 2002), a quantitative measure of the five components of illness perceptions.

Objective severity was negatively correlated with spiritual change. This suggests that increased medical severity of MI is associated with less spiritual change. It is likely that this is an anomalous finding given the other findings of no relationships between objective severity and growth.

Clinical Implications

Although the sample did not report a large amount of growth as a whole in comparison to other studies, it is unrealistic to consider post-MI patients a homogenous group. Individual case analysis reveals a large range of growth. Indeed, previous research has stated that not everyone will experience growth (Tedeschi and Calhoun, 2004), and it would not be viable to expect so. However these results suggest that data should be collected on positive as well as negative outcomes as natural growth has been reported. Previous work has suggested that the clinician can have a role in facilitating and fostering growth by highlighting paradoxes made in patients' narratives (Tedeschi and Calhoun, 2004) so therefore should be aware for the possibility of growth in post-MI patients.

The finding that social support was related to growth implies that perceived support should be measured and included in cardiac rehabilitation programmes to increase opportunities for growth. Indeed, the importance of family inclusion in cardiac rehabilitation has been recognized (e.g. Hilscher, Bartley & Zarski, 2005). Previous findings of both the importance of social support and PTG on physical and psychological

recovery from MI (Berkman, 1995; Affleck et al., 1987) makes this especially pertinent. Additionally, the finding that distress and growth are not related shows the potential for a range of post-MI patients to experience growth, regardless of medical presentation. However, the National Service Framework for Coronary Heart Disease (Department of Health, 2000) suggests that psychology interventions are utilized when patients have been identified as 'psychologically disordered'. Because distress was found to be unrelated to PTG in this study, all post-MI patients should have opportunity to discuss their experience and its personal meaning, not just those experiencing psychological distress.

Finally, effects of perceived severity on growth have important clinical implications. Interventions to reduce anxiety surrounding the severity of MI experience may actually be counter-productive. For example, with best intentions, patients' perceptions of MI severity may be challenged by health professionals by use of minimization. Tedeschi and Calhoun's (2004) functional-descriptive model suggests that distress needs to be experienced to encourage growth. It also fits with wider models of adaptation such as Adams, Hayes, and Hopson's (1976) model that demonstrates all individuals go through a period of depression when adjusting to a major life event. Therefore, attempts to minimize distress may be detrimental for long-term adjustment.

Limitations

Research findings and conclusions should be considered in the context of study limitations, which focus around three areas; design, sample and measurement techniques. Firstly, cross-sectional designs have natural limitations of recall and sampling bias (Press, Klein, Kaczorowski, Liston, & von Dadelszen, 2007). Cross-sectional methodology disallows firm conclusions regarding direction of results. Re-assessment in a number of months to

examine changes in PTG over time by use of a longitudinal design would improve upon this drawback.

The post-MI sample may challenge external validity of the findings. Firstly, although responders and non-responders did not differ on age or gender, responders had a higher mean social deprivation score indicating they were more socially privileged than non-responders. There has been some suggestion of an association between increased income and more PTG (e.g. Cordova et al. 2001). Therefore, if the sample is over-represented by individuals from higher socio-economic statuses, the full patterns of growth in the population as a whole may still be misunderstood. Also, mean levels of anxiety and depression were very low in the clinical sample, yet previous research has suggested distress is a particular problem in this population (Sheikh & Marotta, 2008). Additionally, approximately 43% of potential participants were excluded from recruitment because they did not receive a cardiac assessment. This may indicate they had withdrawn from the cardiac rehabilitation programme. Previous research has suggested an association between social support and attendance at cardiac rehabilitation (Molloy, Perkins-Porras, Strike, & Steptoe, 2008), indicating that responders may have had more support. Owing to these aforementioned factors, ineligible patients and non-responders may have differed considerably from the final sample in terms of psychological adjustment. Additionally, the post-MI sample was drawn from one NHS service in one geographical area, thereby making it difficult to generalize to the whole post-MI sample in the UK. Finally, ethnicity was not recorded for the clinical or control samples. Ethnicity has been shown to effect reports of PTG (e.g. Kinsinger et al, 2006). Therefore, the lack of this information could lead the results and conclusions to be not fully understood.

Although the healthy control sample was more comparable in age than the norms available (Tedeschi & Calhoun, 1996), they still differed from the clinical sample in terms of age and gender and therefore, comparisons are difficult. Matching on age and gender would enable more reliable comparisons.

The final area of limitation concerns measurement methods. Firstly, as cited in previous research, self-report of growth may be biased due to social desirability (Tedeschi and Calhoun, 1996) and because humans are prone to revising their histories (Greenwald, 1980). However, a study by Weiss (2002) demonstrated that perceived PTG was corroborated by others, increasing the reliability of the reports.

Future Research

As the first systematic study to examine patterns of PTG reported by post-MI patients, this study has provided a baseline for further research to raise knowledge and understanding of this area equivalent to that of cancer (e.g. Weiss, 2002, Bellizzi, 2004). Specific advances for this research would be to include follow-up of those patients studied after a time-lapse to assess longitudinal patterns of growth, especially considering time since trauma was relatively short in this study, compared to others' (mean = 38.78 weeks post-MI). Health outcomes of the sample could also be recorded in a longitudinal study, to partially replicate the work of Affleck et al. (1987), with the use of a formal measurement tool. Replication of this study in another NHS trust or with multiple sites to explore service effects on growth could be undertaken. Finally, as behaviour change is an important aim of cardiac rehabilitation (Hofkamp & Burns, 2008), a longitudinal study of the effect of growth on behaviour change would be clinically useful.

Conclusions

This study indicated that post-MI patients showed significantly more PTG than healthy controls in the areas of ‘Relating to Others’ and ‘Appreciation for Life’. Perceived support from family and perceived severity of MI was related to perceived PTG. Perceived severity remained a unique predictor of PTG when other demographic, social, psychological and MI-related factors were controlled for. Interestingly, objective severity was largely unrelated to growth. Implications include the importance of meaning of MI over and above biological markers for long-term psychological adjustment. More comparable research is needed to clarify these relationships and findings.

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Part 3

Appendixes

Appendix A: Macfarlane Quality Checklist

Appendix B: Review Data Collection Form

Appendix C: Participant Recruitment Details

Appendix D: Ethics Committee Approval

Appendix E: Trust Research Governance Approval

Appendix F: Postal Patient Information Sheet

Appendix G: Clinic Patient Information Sheet

Appendix H: Patient Consent Form

Appendix I: Study Questionnaire

Appendix J: Control Group Questionnaire

Appendix K: Reflective Statement

Appendix L: British Journal of Health Psychology Author Instructions

Appendix M: Health Psychology Author Instructions

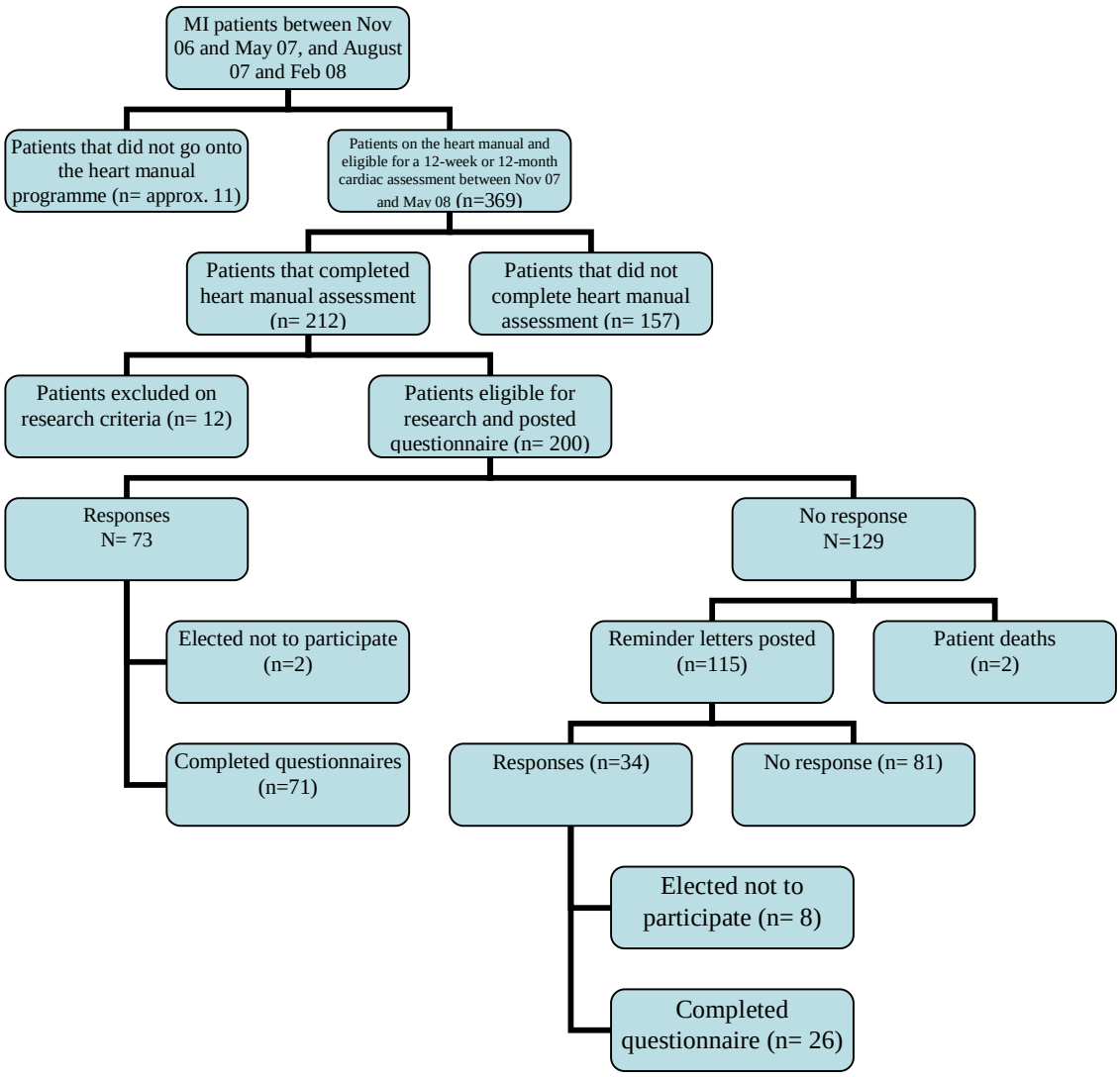
Appendix A: Macfarlane Quality Checklist

Appendix B: Review Data Collection Form

Data Collection Form

Author	
Title of study	
Research aims	
Target population	
Measurement tool	
Mean growth?	
Prevalence	
Participants- gender	
Participants- age	
Outcome variables	
Variables studies	
Time since event	
Positive definition	
Design	
Sample size	
Statistical analysis	
Main findings	
Conclusions	
Intervention details	

Appendix C: Participant Recruitment Details



Appendix D: Ethics Committee Approval

This has been removed as part of the process of anonymising the thesis

Appendix E: Trust Research Governance Approval

This has been removed as part of the process of anonymising the thesis

Appendix F: Postal Patient Information Sheet

'Positive Psychological Changes Following a Cardiac Event'

We would like to invite you to take part in a research study. Before you decide, you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. Talk to others about the study if you wish. Please contact us if there is anything that is not clear or if you would like more information (contact details at end). Take time to decide whether or not you wish to take part.

What is the purpose of the study?
Experiencing a major cardiac event, such as a heart attack, can have a serious impact on a person both physically and psychologically. Age old traditions and folk lore suggest that the paradox has long been known that 'something good can come from bad' and that 'loss can produce gain' i.e. 'every cloud has a silver lining'. Posttraumatic Growth (PTG) is where a change occurs from a traumatic event towards a positive reaction. The aim of this study is to measure the amount of perceived PTG present in a group of people who have experienced a cardiac event and to explore possible factors that might relate to this.

Why have I been invited?
You have been selected because you have experienced a significant cardiac event within the past two years. This study is hoping to obtain the views of approximately 100 people who have experienced a significant cardiac event.

Do I have to take part?
It is up to you to decide. If you decide to take part you will be asked to sign and return a consent form to show that you have agreed to take part. You are free to withdraw at any time, without giving a reason. This would not affect the standard of care you receive. Participation in the study is entirely voluntary.

What will happen to me if I take part?
You will be required to complete a questionnaire. This will be investigating:

- Any changes in yourself following your cardiac event
- Any current difficulties with anxiety or depression
- Current extent of support available to you

What will I have to do?
If you decide to take part, you will be required to complete the questionnaire and return it in the stamped-addressed envelope provided.

What are the possible disadvantages and risks of taking part?
The disadvantages and risks are minimal. It may be possible that some participants may become distressed by reflecting on their experience if there have not been any positive

effects. If this happens, the researcher will be able to be contacted via telephone to discuss any difficulties.

What are the possible benefits of taking part?
The study will give you the opportunity to reflect on any positive effects you may have noticed since your cardiac event.

We cannot promise the study will help you but the information we get from this study will help researchers to learn more about PTG. This may, in turn, help in the designing of ways to facilitate 'growth' following a cardiac event in the future.

What happens when the research study ends?
You will be given an opportunity to opt for a summary of the findings when the research study is complete.

Will my taking part in the study be kept confidential?
All information which is collected about you during the course of the research will be kept strictly confidential, and any information about you which leaves the cardiac rehabilitation premises will have your name and address removed so that you cannot be recognised.

What if there is a problem?
If you have a concern about any aspect of this study, you should ask to speak to the researchers who will do their best to answer your questions. If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure. Details can be obtained from the hospital.

Involvement of the General Practitioner/Family doctor
If you choose to participate in the study, your GP will be routinely informed of your participation.

What will happen to the results of the research study?
The results will be submitted as part of a doctoral research project in July 2008. It is hoped that the findings will be published in a peer-reviewed scientific journal. The results will also be presented in at a cardiac rehabilitation team meeting. All participants will remain anonymous.

Who is organising and funding the research?
The University of Hull is funding the research, as part fulfilment of the ClinPsyD course in Clinical Psychology.

Who has reviewed the study?
All research in the NHS is looked at by an independent group of people, called a Research Ethics Committee to protect your safety, rights, wellbeing and dignity. This study has been reviewed and given favourable opinion by the Hull and East Riding Local Research Ethics Committee.

Further information and contact details:

If you require any further information or advice, please contact:

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Tel: 01482 464087 (office hours)
Email: E.Toland@2005.hull.ac.uk

Appendix G: Clinic Patient Information Sheet

'Positive Psychological Changes Following a Cardiac Event'

We would like to invite you to take part in a research study. Before you decide, you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. Talk to others about the study if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

What is the purpose of the study?
Experiencing a major cardiac event, such as a heart attack, can have a major impact on one both physically and psychologically. Age old traditions and folk lore suggest that the paradox has long been known that 'something good can come from bad' and that 'loss can produce gain' i.e. 'every cloud has a silver lining'. Posttraumatic Growth (PTG) is a positive reaction to trauma where the traumatic event acts as a springboard for psychological growth. It has been described as 'a shift toward more optimal functioning as a result of the adverse experience'.The aim of this study is to measure the amount of perceived PTG present in a cardiac population and to explore possible factors that might relate to this.

Why have I been invited?
You have been selected because you have experienced a significant cardiac event within the past three years. This study is hoping to obtain the views of approximately 120 people who have experienced a significant cardiac event.

Do I have to take part?
It is up to you to decide. If you decide to take part you will be asked to sign a consent form to show that you have agreed to take part. You are free to withdraw at any time, without giving a reason. This would not affect the standard of care you receive. Participation in the study is entirely voluntary.

What will happen to me if I take part?
You will be required to complete a questionnaire. This will be investigating:

- Any changes in yourself following your cardiac event
- Any current difficulties with anxiety or depression
- Current extent of support available to you

What will I have to do?
If you decide to take part, you will be required to complete the questionnaire and either hand it back to the researcher or return it in a stamped-addressed envelope that will be provided.

What are the possible disadvantages and risks of taking part?
The disadvantages and risks are minimal. It may be possible that some participants may become distressed by reflecting on their experience if there have not been any positive effects. If this happens, the researcher will be available to discuss any difficulties either in person or via telephone.

PTO

What are the possible benefits of taking part?
The study will give you the opportunity to reflect on any positive effects you may have noticed since your cardiac event.

We cannot promise the study will help you but the information we get from this study will help researchers to learn more about PTG. This may, in turn, help in the designing of ways to facilitate 'growth' following a cardiac event in the future.

Will my taking part in the study be kept confidential?
All information which is collected about you during the course of the research will be kept strictly confidential, and any information about you which leaves the hospital will have your name and address removed so that you cannot be recognised.

What if there is a problem?
If you have a concern about any aspect of this study, you should ask to speak to the researchers who will do their best to answer your questions. If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure. Details can be obtained from the hospital.

Involvement of the General Practitioner/Family doctor
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Who has reviewed the study?
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Further information and contact details:
If you require any further information or advice, please contact:

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Appendix H: Patient Consent Form

CONSENT FORM

Title of project: **Positive Psychological Changes following a Cardiac Event**
Name of Researcher: Emma Toland

	Please initial box
1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected.	☐
3. I understand that relevant sections of my medical notes and data collected during the study may be looked at by individuals from the University of Hull, from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.	☐
4. I agree to my GP being informed of my participation in the study.	☐
5. I agree to take part in the above study.	☐
6. I consent to a referral for psychological support, if the investigator considers it necessary.	☐
7. I would like to receive a summary of the findings when the study is complete.	☐

Name of Patient	Date	Signature
Name of Person taking consent	Date	Signature

Appendix I: Study Questionnaire

Positive Psychological Changes Following a Cardiac Event: Questionnaire

Section 1: About You

1. Age:

2. Gender:

3. Postcode:

4. How many significant cardiac events have you had?

5. How long (approximately) has it been since your last significant cardiac event?

6. Using the following scale, please rate the severity of your last significant cardiac event in your opinion:

   very severe quite severe slightly severe not severe

   (please circle)

The remainder of the questionnaire consisted of copywrite measures which have been Removed.

Appendix J: Control Group Questionnaire

The questionnaire has been removed due to copywrite reasons.

Appendix K: Reflective Statement

The creation of the portfolio thesis could be likened to a strategic game of snakes and ladders. The quest for the finishing square has always been the priority, but the lessons learnt in pursuit of the final goal have progressively helped to land the squares with ladders and dodge the squares with snakes. The process of reflecting throughout the research process has not only helped me to review and change my approach to taking on research in the future, but also helped me throughout the process to review my approaches to tasks and enabled more efficient progression. Looking back, the achievement not only lies in the completed portfolio, but also in the lessons and experiences that were gained along the way.

Posttraumatic Growth

My initial attraction to the chosen area of research reflects my personal clinical interests; I am most interested in adjustment and rehabilitation in health psychology. I was first introduced to the concept of posttraumatic growth during a lecture on adjustment in the first year of the clinical course. I was drawn to the phenomenon because of its relevancy to everyone in everyday life, something that I could possibly relate to. Indeed my initial attraction to psychology concerned the power of human resiliency and adjustment. An opportunity to study this concept clinically was something I really looked forward to.

As my understanding of PTG has evolved over the research period, I have often noticed hints of growth in individuals around me in my personal and professional life. However, I have faced times when I questioned my original enthusiasm for the phenomenon in a clinical sample and wondered if was too naïve to assume that individuals that have endured a life-threatening event could derive positive outcomes. However, as my understanding of PTG theory developed, I realised that it is a possibility but not a certainty; the most important realisation.

Empirical Study

With the benefit of hindsight, I now know that the most important part of the research process was the research proposal stage. The difference between reading about a subject and creating a concrete plan that will pave the way for the prospective two years was a bigger step than I first anticipated. Indeed, the lack of a well formulated plan cost me time in the research process. My first application to ethics was rejected largely owing to a lack of consideration of potential problems in recruitment procedures. The subsequent application was approved with no problems. Although this was very problematic, I managed to use those problems as opportunities and learn from them. The challenges taught me the importance of trouble shooting and planning, which were put into good use further into the research process.

As an overall reflection and learning experience, if I was to do more research in the future, I would spend more time at the planning stage to envisage the finished product in so much as which journal it would be written for, what type of data and analysis it will need. I would have spent more time creating a draft questionnaire and administering it to volunteers who would comment on its user-friendliness. This would save time and pressure further into research.

Although the planning stage caused problems, I am very pleased with the plan that I finally devised in terms of identifying a research gap and choosing a suitable methodology. Ideally, I would have preferred to do a longitudinal study of the same category but the resources in way of time made me decide against this. With reflection this was a wise choice. The cross-sectional design chosen matches that of other research in the field, but with a new population.

I took a systematic approach to recruitment, which I feel has paid dividends. I attended the cardiac rehabilitation office weekly to recruit and charted numbers recruited against protracted figures to ensure the estimated sample size was achievable. Contingency plans were considered half way through recruitment but were not needed. I developed good working relationships within the cardiac rehabilitation base which was very useful for ease of recruitment procedures.

The write-up of the paper was the final hurdle. It was a difficult step to approach as I wanted the paper to represent the two years of work that went into getting to this stage. Choice of a journal was difficult. Although I wanted it to be disseminated to the relevant professionals in cardiac rehabilitation, my overriding feelings were to choose a journal that allowed sufficient explanation of the psychological principles. Therefore, I chose Health Psychology because it is a wide ranging psychology journal for health that has published similar articles in the past.

Systematic Literature Review

The systematic literature review was challenging, but a really worthwhile experience. It has really altered my way of approaching and reading the literature and it is definitely a skill I am pleased to have gained. The main obstacles were finding the correct approach to take given the dominant research designs in PTG research, i.e. observational studies. Recommended guidelines usually referred to reviews of experimental research, especially randomised controlled designs. Therefore, much time was spent putting a plan together of how to assess the quality of studies and report the findings. If I was to conduct another systematic review, I would devise a really detailed plan of how to approach it. However, I wouldn't consider this a criticism, but more of a learning curve. The allocated time I planned for myself to conduct the review helped with this. Additionally, in ideal

circumstances I would have conducted and written up the review prior to planning the empirical study as I now consider this the best approach to familiarising oneself with the literature. I found that critically appraising and reporting on the quality of other papers taught me a lot about the approach to writing my own empirical paper. Choosing the British Journal of Health Psychology seemed appropriate because it welcomes systematic reviews of literature and disseminates the general area of health which is what this paper tackles.

Conclusions

Studying a positive aspect of adjusting and dealing with difficulties has helped my approach to dealing with the stressful parts of the research process. My enthusiasm for the topic has curbed this stress somewhat, but the meaning of the research in terms of professional qualification has added pressure. The overall process hasn't been a means to an end, but a really valuable learning curve: not only in how to do clinical research but also personally on how to approach and cope with challenges. I've often reflected on the difficulty in doing this research on a part-time basis and would have preferred to do it full-time. However, the roles of the clinical psychologist are multiple and I think managing these tasks simultaneously has been good practice for my professional career.

Appendix L: British Journal of Health Psychology Author Instructions

Notes for Contributors

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

The types of paper invited are:

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

1. Circulation

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

2. Length

Papers should normally be no more than 5000 words, although the Editor retains discretion to publish papers beyond this length in cases where the clear and concise expression of the scientific content requires greater length.

3. Editorial policy and reviewing

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

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

The journal operates a policy of anonymous peer review. Papers will normally be scrutinised and commented on by at least two independent expert referees (in addition to the Editor) although the Editor may process a paper at his or her discretion. The referees will not be aware of the identity of the author. All information about authorship including personal acknowledgements and institutional affiliations should be confined to the title page (and the text should be free of such clues as identifiable self-citations e.g. 'In our earlier work...').

4. Online submission process

1) All manuscripts must be submitted online at http://bjhp.edmgr.com.

First-time users: Click the REGISTER button from the menu and enter in your details as instructed. On successful registration, an email will be sent informing you of your user name and password. Please keep this email for future reference and proceed to LOGIN. (You do not need to re-register if your status changes e.g. author, reviewer or editor).

Registered users: Click the LOGIN button from the menu and enter your user name and password for immediate access. Click 'Author Login'.

2) Follow the step-by-step instructions to submit your manuscript.

3) The submission must include the following as separate files:

- Title page consisting of manuscript title, authors' full names and affiliations, name and address for corresponding author - Manuscript title page template
- Abstract
- Full manuscript omitting authors' names and affiliations. Figures and tables can be attached separately if necessary.

4) If you require further help in submitting your manuscript, please consult the Tutorial for Authors - Editorial Manager - Tutorial for Authors
Authors can log on at any time to check the status of the manuscript.

5. Manuscript requirements

- Contributions must be typed in double spacing with wide margins. All sheets must be numbered.
- Tables should be typed in double spacing, each on a separate page with a self-explanatory title. Tables should be comprehensible without reference to the text. They should be placed at the end of the manuscript with their approximate locations indicated in the text.
- Figures can be included at the end of the document or attached as separate files, carefully labelled in initial capital/lower case lettering with symbols in a form consistent with text use. Unnecessary background patterns, lines and shading should be avoided. Captions should be listed on a separate page. The resolution of digital images must be at least 300 dpi.
- For articles containing original scientific research, a structured abstract of up to 250 words should be included with the headings: Objectives, Design, Methods, Results, Conclusions. Review articles should use these headings: Purpose, Methods, Results, Conclusions -
British Journal of Health Psychology - Structured Abstracts Information
- For reference citations, please use APA style. Particular care should be taken to ensure that references are accurate and complete. Give all journal titles in full.

- SI units must be used for all measurements, rounded off to practical values if appropriate, with the Imperial equivalent in parentheses.
- In normal circumstances, effect size should be incorporated.
- Authors are requested to avoid the use of sexist language.
- Authors are responsible for acquiring written permission to publish lengthy quotations, illustrations etc for which they do not own copyright.

For guidelines on editorial style, please consult the APA Publication Manual published by the American Psychological Association, Washington DC, USA (http://www.apastyle.org).

6. Publication ethics

Code of Conduct - Code of Conduct, Ethical Principles and Guidelines (2004)
Principles of Publishing - Principles of Publishing

7. Supplementary data

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

8. Post acceptance

PDF page proofs are sent to authors via email for correction of print but not for rewriting or the introduction of new material. Authors will be provided with a PDF file of their article prior to publication for easy and cost-effective dissemination to colleagues.

9. Copyright

To protect authors and journals against unauthorised reproduction of articles, The British Psychological Society requires copyright to be assigned to itself as publisher, on the express condition that authors may use their own material at any time without permission. On acceptance of a paper submitted to a journal,

authors will be requested to sign an appropriate assignment of copyright form.

10. Checklist of requirements

- Abstract (100-200 words)
- Title page (include title, authors' names, affiliations, full contact details)
- Full article text (double-spaced with numbered pages and anonymised)
- References (APA style). Authors are responsible for bibliographic accuracy and must check every reference in the manuscript and proofread again in the page proofs.
- Tables, figures, captions placed at the end of the article or attached as separate files.

Appendix M: Health Psychology Author Instructions

Instructions to Authors

Please consult APA's Instructions for All Authors for information regarding

- Manuscript Preparation
- Submitting Supplemental Materials
- Abstract and Keywords
- References
- Figures
- Permissions
- Publication Policies
- Ethical Principles

Submission

Submit manuscripts electronically (.rtf, PDF, or .doc) to

Robert M. Kaplan, Editor
Department of Health Services
UCLA School of Public Health
650 Charles E. Young Drive
Room 31-293C
Los Angeles, CA 90095-1772

Submission Portal Entrance

General correspondence may be directed to the Editor's Office.

Manuscripts should not exceed 30 pages (including references, notes, tables, captions, and figures). Please avoid footnotes when possible. Number the pages consecutively in the upper right-hand comer.

Keep a copy of the manuscript to guard against loss.

Masked Review Policy

All submissions receive masked review unless requested by the author. Include this request in the submission letter.

Do not include author information (addresses, phone numbers, electronic mail addresses, and fax numbers) in the manuscript.

Authors may submit a list of suggested reviewers for the manuscript; suggested reviewers should not have any conflict of interest regarding the review.

Use of CONSORT Reporting Standards

All statistical tests should include an indication of effect size whenever possible (estimates of effect size for some statistical tests have not been fully developed).

All randomized controlled trials must include a diagram indicating participant flow into the study and a completed CONSORT checklist (see "The CONSORT Statement: Revised Recommendations for Improving the Quality of Reports of Parallel-Group Randomized Trials," by M. Moher, K. F. Schulz, and D. Altman, for the CONSORT Group, 2001, *Journal of the American Medical Association, 285,* pp. 1987–1991).

Visit the CONSORT Statement Web site for more details and resources.

Submission Letter

Include the following in your submission letter:

1. a statement of compliance with APA ethical standards in the treatment of their sample, human or animal, or a description of the details of the treatment;
2. a statement that the manuscript or data have not been published previously and that they are not under consideration for publication elsewhere;
3. a statement to reflect that all listed authors have contributed significantly to the manuscript and consent to their names on the manuscript; and
4. a brief statement of how the article content is relevant to the domain of *Health Psychology* as described in the journal inside cover.

Authors should also include names and institutional affiliations, plus the contact details for the corresponding author.

Failure to include any of the requirements above may result in a delay of the review process.

Brief Reports

Health Psychology accepts Brief Reports of soundly designed research studies that are of specialized interest or limited importance—reports that cannot be accepted as regular articles due to lack of space. An author who submits a Brief Report must agree not to submit the full report to another journal.

To ensure that a Brief Report does not exceed the available journal pages (approximately 4 pages), set your computer so that

a. the approximate number of characters per line is 90 (use 12-point Times Roman type with 1-inch [2.54-cm] side margins)
b. the number of double-spaced lines per page is about 25

c. the total number of lines in the report is about 400

Count all lines, including headings and references but excluding title, author name(s), affiliation(s), and abstract; figure 27 lines for each 1/4 journal page required for tables and figures (visual estimation necessary).

Letters to the Editor

Health Psychology considers letters concerning articles previously published in the journal. Letters should be no more than 500 words and have a maximum of five references. Authors will be notified of the decision to publish the letter and will be sent an edited version.

Authors of the original article will be offered an opportunity to reply to the letter. No additional letters on the topic will be accepted.