

POST-TRAUMATIC GROWTH FOLLOWING A BURN INJURY

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Introduction: Thesis Overview

Post-traumatic growth (PTG) is the experience of positive changes as a result of a traumatic event, where well-being and personal functioning exceed that of pre-trauma levels (Tedeschi, Park, & Calhoun, 1998). The occurrence of PTG following a variety of traumas has been examined, and a number of meta-analyses and reviews have attempted to summarise such literature and determine what facilitates PTG (e.g. Linley & Joseph, 2004). Some of these seek to establish whether there are differences in the experience of PTG dependent on the cause of the trauma (e.g. Bostock, Sheikh, & Barton, 2009). It has been suggested that the character of PTG following a serious accident may be different to that following physical illness, for example, with physical illness being experienced as an internal trauma and an accident as an external trauma (Hefferon, Grealy, & Mutrie, 2009). There are no reviews which explore the literature around PTG following a serious accident. Paper one of this thesis is a systematic review of the quantitative literature which aims to investigate the experience of PTG following serious accidents.

A burn injury can be a traumatic event and can be challenging to recover from, both physically and psychologically (Blakeney, Rosenberg, Rosenberg, & Faber, 2008). Although the psychological impact of burn injuries is undisputed (Wisely, Hoyle, Tarrier, & Edwards, 2007), little attention has been paid to the benefits of such traumas (Fauerbach, Pruzinsky, & Saxe, 2007). Several qualitative studies exploring individuals' experiences of a burn injury refer to positive changes which can accompany distress and trauma; however, only one quantitative study has directly explored the concept of PTG post-burn (Rosenbach & Renneberg, 2008). Paper two of this thesis is an empirical paper which aims to build on this, using quantitative methods to explore the concept of PTG following a burn injury.

The discussion chapter contains three parts. First, an extended discussion which aims to address the clinical relevance of PTG. Secondly, a lay person's summary which is intended as feedback for staff on the burns unit that helped with the implementation of the research. Finally, a research proposal which aims to account for the gaps in research highlighted in both the systematic review and the empirical paper.

Post-traumatic growth after serious accidents: A systematic review¹

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Abstract

The experience of a serious accident can lead to significant negative psychological and physical consequences, but it can also lead to the development of ‘post-traumatic growth’ (PTG): personal development above and beyond that of pre-trauma levels (Tedeschi, Park, & Calhoun, 1998). A growing body of research has explored this phenomenon. A systematic review of the quantitative literature aimed to investigate the experience of PTG following serious accidents. A search of five databases (PsycINFO, Scopus, Web of Knowledge (WoK), Networked Digital Library of Theses and Dissertations (NDLTD) and The Cochrane Library) and was conducted. Eight studies met inclusion criteria. Consistent with other traumas, social support, positive affect and active coping were related to PTG. Overall PTG was found to be lower following a serious accident than following other traumas. Several possible reasons for this are discussed. Potential support for a curvilinear relationship between growth and distress was found. The small number of studies available for inclusion makes drawing strong conclusions difficult. Recommendations for future research are suggested and a number of methodological issues were identified. Clinicians working with accident survivors need to be aware of the potential for growth.

Keywords: post-traumatic growth, benefit finding, serious accidents, perceived benefits

Post-traumatic growth after serious accidents: A systematic review

After the initial impact of a serious accident, survivors are faced with both the physical and psychological consequences. Accidents can lead to serious and permanent injury, to which the individual must try and adapt. The accident may be perceived as traumatic, potentially resulting in symptoms such as anxiety, flashbacks and avoidance. The negative psychological impact of serious accidents has been the focus of the bulk of research in this field (e.g. Hepp et al., 2008), overlooking the potential positive impact of recovering after involvement in a serious accident (Elliott, Kurylo, & Rivera, 2002).

In recent years, research on perceived growth after stressful life events has flourished (Park & Helgeson, 2006). The term ‘post-traumatic growth’ (PTG) is often used to describe this phenomenon, where the development of personal functioning and well-being exceeds that of pre-trauma levels (Tedeschi, Park, & Calhoun, 1998). Three dimensions of PTG are typically referred to: relationship enhancement (valuing friends and family more; increased compassion towards others); a change in self-perception (greater sense of resilience or strength); a change in life philosophy (spiritual beliefs; a renewed appreciation of life) (Joseph & Linley, 2006).

To clinicians working with those who have experienced trauma, tales of individuals who have turned their life around and taken on new challenges and responsibilities are not uncommon; yet until the emergence of positive psychology at the turn of the century, there appeared to be a focus on symptom reduction alone after traumatic events (Joseph, Murphy, & Regel, 2012) rather than enhancing positive outcomes. Clinically, the concept of PTG is relevant. The more clinicians are aware of the potential for growth, the more clients may consider such possibilities (Zoellner & Maercker, 2006). Clients could be encouraged to reflect upon their beliefs generally, rather than focus solely on symptom reduction. It could be

used to promote hope that trauma can be overcome and in aiming to facilitate PTG during therapy, research suggests that distress levels could be lowered (Linley & Joseph, 2004). It could also be used by clients to cope with the difficult question of “why me?” (Zoellner & Maercker, 2006).

Post-traumatic growth has been examined following various types of traumatic events, including: terrorist attacks (Woike & Matic, 2004); diagnosis of multiple sclerosis (Pakenham & Cox, 2008) or cancer (Bellizzi, 2004); bereavement (Polatinsky & Esprey, 2000); childhood sexual abuse (McMillen, Zuravin, & Rideout, 1995); and war (Britt, Adler, & Bartone, 2001). Meta-analysis has revealed that not only is PTG associated with better outcomes in terms of mental health, but that it should be considered as an outcome in itself rather than a mere reflection of a lack of trauma (Helgeson, Reynolds, & Tomich, 2006). Growth was related to intrusive and avoidant thoughts about the event, suggesting that for growth to occur it is necessary for individuals to cognitively process their trauma. Furthermore, time since trauma was a significant moderator, with greater PTG recorded as more time passed. Again, this may signify that time to process the event is crucial. Reviews have found that problem focused, acceptance and positive reinterpretation coping; optimism; religion; cognitive appraisal variables (threat, harm and controllability); cognitive processing; and positive affect were associated consistently with PTG (Linley & Joseph, 2004); as were positive reinterpretation coping, religious coping, seeking and acquiring social support, and optimism (Prati & Pietrantonio, 2006).

The relationship between PTG and post-traumatic stress (PTS) is more complicated. Some studies indicate a negative relationship, where those with higher PTS report less PTG, suggesting that they are two opposing ends of the same continuum (Johnson et al., 2007). However, PTG and PTS can both occur together and be considered distinct and independent constructs (Zoellner & Maercker, 2006). Individuals have been found to experience high PTS

and PTG, indicating that growth and distress co-exist, and distress may be needed to activate and maintain growth (Tedeschi & Calhoun, 2004). Thus, trauma might be necessary to instigate a re-evaluation of beliefs and assumptions about the predictability and controllability of the world and one's identity. By nature this is distressing, yet because of this growth can emerge. In addition to this is the notion of a curvilinear relationship between PTG and PTS (Joseph et al., 2012). Low levels of PTS suggest the individual has been minimally affected by the trauma so experiences minimal PTG. Moderate levels of PTS suggest a challenge to the person's assumptive world and the occurrence of intrusive and avoidant experiences, but it is possible to retain the ability to cope and engage appropriate cognitive processing to work through and achieve PTG. High levels of PTS may mean that individual's ability to cope is challenged to the extent that they are unable to engage in the cognitive processing necessary to work through the event and achieve PTG. Determining the most accurate of these three ways of explaining the relationship between PTG and PTS is difficult because of the variety of participant samples studied (Dekel, Ein-Dor, & Solomon, 2012).

Drawing conclusions from general PTG literature may be problematic: the nature of trauma varies widely and it is probable that the adaptation process to sudden events such as road-traffic accidents (RTAs) would differ to that of long-term stressors such as illness or bereavement (Zoellner & Maercker, 2006). Attempts have been made to identify predictors, related variables and the impact of PTG in illness-related trauma. The relationship between PTG and optimism following this type of trauma was found to be unclear, possibly due to the variation in time since trauma (Bostock, Sheikh, & Barton, 2009). Following diagnosis of a serious medical condition, coping styles and social support were consistently related to PTG, although several other findings were disease specific and dependent on study design (Barskova & Oesterreich, 2009). In a review of the qualitative literature, Hefferon, Grealy,

and Mutrie (2009) identified what they labelled as unique elements to illness-related PTG, including a theme of 'a new awareness of the body'.

It has been argued that the character of PTG following an accident is different still, with physical illness being experienced as an internal trauma and an accident as an external trauma (Hefferon et al., 2009). However, no reviews examining PTG following serious accidents are available. The aims of this review were: to identify and summarise the quantitative literature on PTG following a serious accident; to identify predictors of PTG and related variables, to understand the impact of PTG following an accident and make recommendations for future research. In doing this, it is hoped that clinicians working with individuals who have experienced a serious accident can become aware of which factors may help someone experience PTG, and how it may be promoted within a service.

Method

Eligibility Criteria

This review focuses on papers and unpublished dissertations that include quantitative data, published after 1980, and which examine PTG after accidents leading to serious injury in adults (aged ≥ 18). Studies of caregivers, victims of war, combat, terrorism and natural disasters were excluded. This was to minimise variance within studies, and with the rationale that they could potentially lead to different outcomes than a single accident involving an individual. Studies involving head injuries were also excluded. It was repeatedly noted within this literature that PTG and head injury is a distinct phenomenon (e.g. McGrath & Linley, 2006) and other papers considering PTG following accidents had excluded those with head injury from their sample for that reason (e.g. Zoellner, Rabe, Karl, & Maercker, 2008).

Search Terms

The search terms used were broad so to allow for the fact that an accident could come in many forms. Only the key term of ‘post-traumatic growth’ (allowing for variants in spelling) was entered in the first instance and the inclusion criteria stated above applied. Titles (and abstracts where necessary) were then scanned to identify studies related to PTG and accidents. This search was subsequently repeated using key terms considered to be alternatives to PTG, including: ‘benefit finding’, ‘stress-related growth’ and ‘perceived growth’.

For the purpose of this review, an accident was considered an external threat to the self, not occurring by aggressive intent from another person, but occurring by chance. The accident will have been serious enough to cause physical injury, permanent or temporary in nature.

Search Strategy

Databases searched included: PsycINFO, Scopus, Web of Knowledge (WoK), The Cochrane Library and Networked Digital Library of Theses and Dissertations (NDLTD). Alerts were set up on all five databases so any new research released after the initial search could be included. Furthermore, citation, author and index searches were applied to ensure saturation. Finally, eight researchers who were considered influential in the field of PTG research were contacted via email. This search strategy, following removal of duplicates, resulted in a potential 109 papers. The flow of information is reported using the Preferred Reporting Items for Systematic Reviews (PRISMA) diagram (Figure 1) (Moher, Liberati, Tetzlaff, & Altman, 2009).

Screening

Initially, the remaining 109 studies were retrieved and abstracts screened to assess whether they met the eligibility criteria. Eighty-eight studies were excluded at this stage for: being qualitative in design; focusing on physical illness; being reviews or meta-analysis; focusing on caregivers; or having participants under the age of eighteen. Following this initial screening, sixteen papers were then thoroughly assessed for suitability.

Of these sixteen papers, five were rejected following a decision to exclude all studies concerning PTG and head injury. One paper was rejected due to a focus on the emotional aspect of being a driver in a car accident, where only 16.6% of participants were injured in the accident (Merecz, Waszkowska, & Wezyk, 2012). One paper was rejected due to the inclusion of non-traumatic spinal cord injury (SCI) patients, where nearly half of their sample had acquired their injury through illness rather than an accident (Kortte, Gilbert, Gorman, & Wegener, 2010). One paper was rejected due to recruitment through a war veteran hospital (Phelps, Williams, Raichle, Turner, & Ehde, 2008). The eight omitted papers can be seen in Table 1. Eight papers were left to form the basis of this review. Of the final eight papers, the authors of two were contacted to provide further results.

Figure 1. Flow of Information through the Different Phases of the Systematic Review

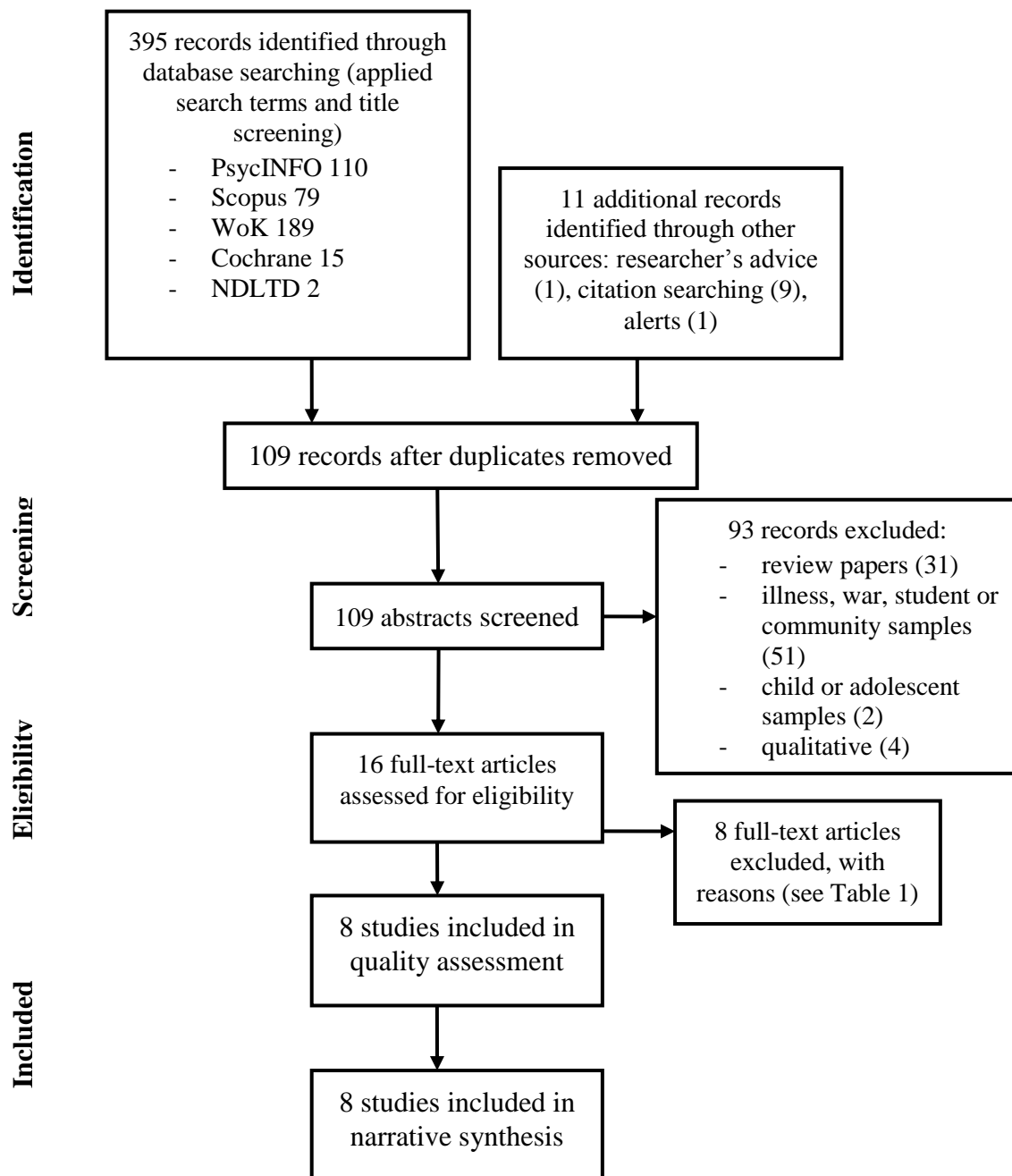


Table 1*Final Excluded Papers*

Author and Year	Country	Reason for Exclusion
Hawley & Joseph (2008)	United Kingdom	Head injury
Kortte et al. (2010)	America	Non-traumatic SCI included
McGrath & Linley (2006)	United Kingdom	Head injury
Merecz et al. (2012)	Poland	Focus on emotional impact
Phelps et al. (2008)	America	Inclusion of war veterans
Powell et al. (2007)	United Kingdom	Head injury
Powell et al. (2012)	United Kingdom	Head injury
Silva et al. (2011)	Australia	Head injury

Quality Assessment

The final eight papers were quality assessed using an adapted scale from a review considering PTG and optimism in health-related trauma (Bostock et al., 2009), which had been devised from various sources (Ellis, Ladany, Krenzel, & Schult, 1996; Papworth & Milne, 2001; Wampold, Davis, & Good, 1990). After reviewing numerous scales, this was considered superior due to its focus on PTG factors specifically. The evaluation criteria assess hypothesis validity, internal validity, construct validity, measurement, statistical conclusion validity and external validity (Table 3). Each criterion was rated on a scale of zero to three: zero suggesting no consideration given, one a partial threat, two a potential threat and three little or no threat. To ensure validity, two of the researchers applied the evaluation criteria independently of each other and then met to discuss and resolve discrepancies.

Results

Description of Included Studies

Details of the final eight papers can be found in Table 2. The studies were carried out in five different countries, all within the past ten years. Five studies concerned road traffic accidents (RTAs), one burn injury and two spinal cord injury (SCI). Time since accident notably varies between studies, with Study 1 measuring PTG from only fourteen days (Calder, Badcoe, & Harms, 2011) and Study 7 measuring PTG up to thirty-nine years post-accident (Rosenbach & Renneberg, 2008). Furthermore, the aims of the studies vary considerably from one another; ranging from simply determining the presence of PTG post-accident and establishing correlates (Study 3 and Study 7), exploring the relationship between PTS and PTG (Study 2 and Study 4), to examining the neural correlates of PTG using electroencephalography (EEG) (Study 6).

Table 2*Summary of Quantitative Papers on PTG and Serious Accidents*

No	Author	Date	Country	N	Accident type	Time since accident	Method	Aim
1	Calder, Badcoe, & Harms	2011	Australia	16	RTA	44 days average (14-145 days)	Mixed, cross-sectional	Examine role of spirituality and pastoral care post-accident
2	Harms & Talbot	2007	Australia	79	RTA	3-4 years	Mixed, cross-sectional	Determine prevalence of PTG and examine relationship with PTS
3	McMillen & Cook	2003	America	42	SCI	18-36 months	Mixed, cross-sectional	Assess PTG and explore correlates. Compare to proxy reports of PTG.

4	Nishi, Matsuoka, & Kim	2010	Japan	118	RTA	18 months (442- 700 days)	Quantitative, cross- sectional	Examine occurrence of PTG, and relationship to PTSD and resilience
5	Pollard & Kennedy	2007	United Kingdom	37	SCI	9.9 years average (range 8-11 years)	Quantitative, longitudinal (PTG only measured at second wave)	Comparison of coping, PTG and emotional impact 12 weeks vs. 10 years post- accident
6	Rabe, Zoellner, Maercker, & Karl	2006	Germany	82	RTA	57 months (6-474 months)	Mixed, cross-sectional	To explore neural correlates of PTG via EEG
7	Rosenbach & Renneberg	2008	Germany	149	Burn	3-29 years (average 4 years)	Quantitative, cross- sectional	Prevalence of PTG after burn injury, and determine predictors of PTG
8	Zoellner, Rabe, Karl, & Maercker	2008	Germany	102	RTA	5.5-7.5 years	Quantitative, cross- sectional	Examine constructive vs. illusionary PTG, openness and optimism

Quality Assessment

Overall scores were computed, however, these should be interpreted with caution due to the heterogeneity of the studies making it difficult to draw conclusions regarding the overall quality of the eight studies (Table 3). Some studies included did not report PTG as a primary outcome but could be informative: for example, Study 6 examines neural correlates of PTG post-accident so was rated as least relevant to this review; however, their measurement of PTG makes it useful for comparison. Assessing the quality of studies depending on time since trauma was also problematic, because the literature on PTG is unclear as to what is an appropriate time since trauma (Bostock et al., 2009). A score of 2, indicating a potential limitation, was therefore given if time since the accident appeared very short, as it is hard to imagine true growth occurring within days of an accident (Helgeson et al., 2006), or if there was a large range in time since trauma.

Notably, only one study overtly controlled for prior traumatic exposure (Harms & Talbot, 2007) and only two studies assessed whether the accident was perceived as traumatic (Zoellner et al., 2008; Harms & Talbot, 2007). All studies in some way assessed the severity of the accident. All studies included only severe accidents or accidents resulting in significant injury.

Table 3*Quality Assessment*

	1. Calder, et al., 2011	2. Harms & Talbot, 2007	3. McMillen & Cook, 2003	4. Nishi et al., 2010	5. Pollard & Kennedy, 2007	6. Rabe et al., 2006	7. Rosenbach & Renneberg, 2008	8. Zoellner et al., 2008
<i>Hypothesis validity</i>								
Relevance to this review	2	3	3	3	2	1	3	2
Ambiguous hypotheses / aim	2	2	3	3	3	3	3	3
<i>Internal validity</i>								
History: appropriate time since trauma	2	3	3	3	3	2	2	3
Controlled for prior traumatic exposure	0	2	0	0	0	0	0	0
Controlled for accident severity / type	3	3	3	3	2	2	2	3
<i>Construct validity</i>								
Adequate definition of PTG / benefit finding	3	3	3	3	3	3	3	3
Assessed whether accident perceived as 'traumatic'	0	3	0	0	0	0	0	3

Assessed growth with appropriate measure / method	3	3	2	3	3	3	3	3
<i>Measurement</i>								
Sensitivity of growth measure	3	3	2	3	3	3	3	3
Specificity of growth measure	3	3	2	3	3	3	3	3
Reliability of growth measure	3	3	2	3	3	3	3	3
Validity of growth measure	3	3	2	3	3	3	3	3
<i>Statistical conclusion validity</i>								
Appropriate number of participants	1	2	2	3	2	3	3	3
Power reported	0	0	2	0	0	0	0	3
Inadequate statistical power	1	2	2	3	2	2	3	3
Type 1 error	0	2	2	3	2	3	3	3
<i>External validity</i>								
Conclusions consistent with result	2	3	3	3	3	3	3	3
Limitations acknowledged	1	1	2	3	3	3	3	3
Findings generalizable	1	2	3	3	2	2	3	2
<i>Total</i>	33	46	41	48	42	42	46	52

Overall Outcomes

The outcomes of the eight studies are displayed in Table 4. Seven of the eight studies used the Post Traumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996) to measure PTG, and one study (Study 3: McMillen & Cook, 2003) used the Perceived Benefit Scale (PBS) devised by the same research group (McMillen & Fisher, 1998). The PTGI captures five subdomains of PTG: appreciation of life, personal strength, new possibilities, relating to others and spiritual change. The PBS captures eight subdomains: increased self-efficacy, increased faith in people, increased compassion, increased spirituality, increased community closeness, increased family closeness, lifestyle changes, and material gain.

Of the two studies which reported on PTG and gender, women were found to experience higher levels of PTG than men in both. Only one study of the two that reported on age found a significant difference, with PTG higher in older participants. Exploration of the relationship between PTG and severity of the accident or injury gave mixed results, with one study reporting no relationship and another reporting a significant correlation. Predictors or correlates of PTG included social support and active coping. All but one study reported that growth and distress can co-exist; however, these results must be interpreted with caution as the way distress was measured appears to vary. Whereas some studies measured distress through measures of post-traumatic stress, such as the Impact of Event Scale (IES) (Weiss & Marmar, 1996), other studies measured distress by use of measures of depression, anxiety or quality of life. Although all studies found that PTG can occur following an accident, three out of the eight studies commented that PTG scores appeared lower than scores in other samples.

Table 4

Outcomes of Studies

No	PTG scale	PTG and gender	PTG and age	PTG and severity	Predictors / correlates of PTG	PTG and PTS	Conclusions
1	PTGI	x	x	x	X	x	Pastoral care important in recovery from RTAs
2	PTGI	Women scored higher	x	x	X	Significant positive relationship	PTG was more common than PTS. Low PTG compared to other studies.
3	PBS	x	x	x	X	PTG unrelated to measures of 'psycho-pathology'	PTG occurs. Minimal agreement with proxy sources re. type of growth.
4	PTGI	x	x	x	X	Significant correlation	Certain factors of PTG relate to resilience, and certain factors to PTS

5	PTGI	x	x	x	Active coping, depression and mental disengagement at 12 weeks post-accident predicted higher PTG at 10 years post-accident (48% variance)	Positive relationship between growth and 'distress'	Coping style important. PTG occurs irrespective of distress. Lower PTG than other studies.
6	PTGI	x	Not related	x	Relationship between dispositional positive affect and PTG	x	Left prefrontal activation corresponds with PTG
7	PTGI	Women scored higher	Older scored higher	Injury severity not associated	Active coping, social support and gender accounted for 57% variance of PTG	Overall sample reported 'high emotional distress', as well as high PTG	Prevalence of PTG after burn injury
8	PTGI	x	x	Objective / subjective severity correlated with overall PTG	No significant correlations between PTG and openness or optimism	Overall PTG present irrelevant of level of PTS. Subdomains of PTG differ depending on PTSD severity.	PTGI not unitary construct. Low overall PTG scores than other samples.

x = not reported

Table 5*Reported PTGI Mean Scores and Subdomain Scores: English and Japanese Version*

No	Subdomain PTGI					
	Overall PTGI	Appreciation of Life	Personal Strength	New Possibilities	Relating to Others	Spiritual Change
1	60.53 (SD 26.1)	9.38 (SD 4.47)	11.50 (SD 5.74)	11.81 (SD 7.6)	23.81 (SD 8.23)	4.03 (SD 3.01)
2	44.86 (SD 25.05)	8.30 (SD 4.76)	9.49 (SD 5.81)	7.59 (SD 7.28)	16.91 (SD 9.52)	2.59 (SD 3.59)
4	41.2 (SD 22.6)	8.2 (SD 3.7)	7.0 (SD 4.7)	8.4 (SD 6.2)	15.1 (SD 8.0)	2.5 (SD 2.6)
5	45.72 (SD 21.50)	7.00 (SD 4.14)	9.78 (SD 5.31)	11.00 (SD 5.63)	14.97 (SD 8.78)	2.54 (SD 2.77)

Post-traumatic Growth Scores

Although seven studies used the PTGI, it was necessary to subdivide the studies further according to the Likert-scale used. The original English version and the Japanese version of the PTGI used a six point Likert-scale (range = 0-5) to capture respondents' ratings of the twenty-one items, therefore overall scores were out of 126 (Table 5). The German studies used a five point Likert-scale and differed from each other in its use (Table 6): Study 6 and 8 used a range of 0-4 (potential overall score of 84), whereas Study 7 used a range of 1-5 (potential overall score of 105). Furthermore, Study 7 reported mean item scores rather than total scores, allowing for comparison of subdomain scores but not allowing for between study comparisons. The results from Study 3, which used the PBS to capture growth, are displayed in Table 7.

Table 6*Reported PTGI Mean Scores and Subdomain Scores: German Version (0-4 Likert-scale)*

No	Overall PTGI	Subdomain PTGI				
		Appreciation of Life	Personal Strength	New Possibilities	Relating to Others	Spiritual Change
6	37.88	7.57	6.52	7.32	14.23	2.24
	(SD 16.88)	(SD 2.61)	(SD 3.91)	(SD 4.80)	(SD 7.15)	(SD 2.58)
7	*3.19	*3.60	*3.41	*2.77	*3.51	*2.09
	(SD .73)	(SD .95)	(SD .93)	(SD .89)	(SD .83)	(SD 1.20)
8	Non PTSD	Non PTSD	Non PTSD	Non PTSD	Non PTSD	Non PTSD
	38.5 (SD 17.1)	7.1 (SD 2.7)	7.6 (SD 4.0)	8.2 (SD 5.0)	13.7 (SD 6.8)	2.0 (SD 2.5)
	Sub PTSD	Sub PTSD	Sub PTSD	Sub PTSD	Sub PTSD	Sub PTSD
	38.4 (SD 15.8)	8.2 (SD 2.5)	6.3 (SD 3.4)	7.4 (SD 4.5)	14.7 (SD 6.9)	1.8 (SD 2.3)
	Full PTSD	Full PTSD	Full PTSD	Full PTSD	Full PTSD	Full PTSD
	40.2 (SD 18.4)	8.7 (SD 3.6)	5.6 (SD 3.7)	7.5 (SD 5.6)	15.1 (SD 7.6)	3.4 (SD 3.1)

* = mean item score

Aside from Study 1, which appears to have substantially higher scores, the overall PTGI scores appear similar: ranging from M= 41.2 to M= 45.72 for the English and Japanese version, and M= 37.88 to M= 40.2 for those German studies which used a comparable Likert-scale (Studies 6 and 8). Because seven out of the eight studies reported mean participant scores, it was not possible to compare subdomains on the PTGI. The highest sub-domain on the PTGI in Study 7, which provided mean item scores to allow for comparison, was

‘appreciation of life’ and the lowest was ‘spiritual change’. Subdomain scores in Study 3, which used the PBS, showed ‘increased family closeness’ and ‘increased compassion’ as the highest subdomain scores. ‘Increased spirituality’ was reported by 43% of respondents. The lowest scoring subdomain reported on the PBS was ‘material gain’, which is not captured by the PTGI.

Table 7*Scores for Study 3: Perceived Benefit Scale*

Scale	Mean Item Score	% Self-reporting Benefit *
Increased Self-efficacy	2.25 (SD 0.83)	26
Increased Community Closeness	1.23 (SD 1.04)	5
Increased Spirituality	2.11 (SD 1.43)	43
Increased Compassion	2.76 (SD 0.96)	50
Increased Faith in People	2.38 (SD 0.98)	38
Increased Family Closeness	2.92 (SD 1.09)	62
Material Gain	0.70 (SD 0.94)	5
Any Positive by-product		79

*Mean item score of above 3

Discussion

The aim of this review was to identify and summarise the quantitative literature examining PTG following accidents: to explore the prevalence and impact of PTG, to identify predictors and variables, and to make recommendations for future research. A systematic search using five databases revealed eight empirical studies of PTG after accidents, the aims of which varied considerably. Post-traumatic growth occurred consistently, although two studies commented that this was lower than that found in other trauma samples. Growth and

distress were positively correlated in five of the studies. Active coping and social support were highlighted as contributing to PTG.

The PTGI was the most used measure but the present review identified a problem with its use internationally. The original English version of the PTGI uses a six point (0-5) Likert-scale. The Japanese PTGI mirrored this Likert-scale, allowing for straightforward comparison across cultures. The German version (Maercker & Langner, 2001) asks respondents to rate their experience of each item using a three point Likert-scale. Furthermore, the three German studies reviewed increased this three point scale to a five point scale Likert-scale. Moreover, the ranges used differed; with two studies using a range of 0-4 and one study using a range of 1-5. Study 8 states the five point scale was used “to retain the uneven rank number of the German scale and at the same time to allow for more differentiation within the range” (Zoellner et al., 2008, pp.149–150). Equivalent statements were not found in Study 6 or Study 7. These discrepancies result in a lack of comparable data and if not recognised, could lead to confusion and incorrect comparisons being drawn. It is important that future reviews are aware of, and make allowances for, this discrepancy.

Three of the eight studies commented that PTG scores were lower than PTG following other traumas. Study 5 (Pollard & Kennedy, 2007) made the comparison to a sample of breast cancer survivors, and Study 8 (Zoellner et al., 2008) to war refugees; alluding to the small number of studies examining PTG following accident and the lack of comparative data. When contrasting overall PTGI scores in Table 5 to the overall PTGI scores in the review by Linley and Joseph (2004), they appeared comparably lower, with the lowest reported PTGI score in the Linley and Joseph (2004) review at $M = 52.15$. This discrepancy suggests that accident survivors may differ from other samples in their experience of PTG (Zoellner et al., 2008), for which a number of reasons are suggested.

Cultural differences in experiences of PTG have been proposed (Zoellner et al., 2008); however, this fails to explain lower scores across all accident samples, conducted in a number of countries. It is possible that PTG is less achievable if the trauma is ongoing as opposed to a single past event (Pollard & Kennedy, 2007), and consistent with this theory, Harms and Talbot (2007) comment that 86% of their sample reported to be still suffering physical consequences of the accident. Furthermore, they state that ongoing physical consequences of trauma can result in financial and employment difficulties, which may restrict one's ability to experience PTG; meaning complex and ongoing trauma results in less PTG. Conversely, an accident could be viewed as a single trauma from which one can recover or adjust to, and there is no ongoing threat to survival as with cancer, for example. If, as some report, more trauma results in increased potential for PTG (Joseph et al., 2012), this may explain lower PTG following an accident. More research into PTG following significant and complex trauma would be beneficial, particularly as much research to date has been conducted on university students whose exam stress is unlikely to be comparable to the trauma experienced from a RTA (Harms & Talbot, 2007).

Regarding comparison of subdomains of the PTGI, only one study (Study 7), by reporting mean item scores, enabled accurate comparisons to be made. The other studies all reported mean participant scores. The PTGI consists of twenty-one items and the five subdomains are compiled from varying numbers of these items (for example, 'spiritual change' has two items, whereas 'relating to others' consists of seven). Research needs to be cautious of drawing conclusions about subdomain scores based on mean participant scores and report mean item scores if wanting to do so. The present review was not able to make meaningful comparisons between subdomains due to this.

Only two of the eight studies reported on age differences; one finding no age differences and one finding that older participants tended to experience higher levels of

growth. While there must be caution in drawing conclusions from this, the finding does differ from other studies which tend to find younger individuals experience greater PTG (Helgeson et al., 2006). It has been suggested that this is due to a longer perceived duration of living with injuries resulting from the accident (Evers et al., 2001), which could be unique to accident survivors. In this review, only two studies commented on gender differences, with women experiencing more PTG in both. Despite suggestions in the literature that women tend to experience more PTG, this is not conclusive (Linley & Joseph, 2004). Studies should be encouraged to report on these findings to increase knowledge of possible trends.

Consistent with previous reviews of PTG in other clinical contexts (Linley & Joseph, 2004; Prati & Pietrantonio, 2006) social support, positive affect and active coping were related to PTG. Social support and coping styles were found to be particularly relevant to PTG following diagnosis of a serious medical condition (Barskova & Oesterreich, 2009), which appears similar to the results of this review. There were insufficient results to explore the relationship between PTG and optimism, which have been inconsistently linked in health-related trauma (Bostock et al., 2009). Four studies drew conclusions in line with Tedeschi and Calhoun (2004) that growth and distress can co-exist, potentially supporting the theory that distress may be needed to activate and maintain growth. The lower levels of overall PTG may provide evidence for a curvilinear relationship between growth and distress (Joseph et al., 2012): low PTS resulted in low levels of PTG, moderate PTS resulted in high levels of PTS, yet high PTS through complex and ongoing trauma resulting from physical health difficulties results in low PTG, because the individual's ability to cope is too severely challenged. Results from Study 8 (Zoellner et al., 2008) challenge this, however, because overall PTG scores appeared unaffected by PTS scores, suggesting PTG can occur irrespective of PTS levels. It is worth noting the range in ways distress appears to be measured. Some studies used measures such as the IES, which accounts for intrusive

thoughts and cognitive processes, and specifically measures PTS, whereas some studies referred to distress using measures of quality of life or depression. Both may be important, and greater consistency would allow for more meaningful comparisons to be made.

The findings appear to reflect Linley and Joseph's (2004) recommendation that the PTG literature is in need of greater methodological rigour. Only one study reviewed controlled for prior traumatic events, which is similar to the findings of Bostock et al.'s (2009) review of health related trauma. This threatens the validity of the results, as some PTG may be attributable to experience of prior traumas. Few studies assessed whether the accident was perceived as traumatic, again, compromising validity. Furthermore, the studies varied hugely on time since accident. This may reflect a general debate within the literature as to the best time to capture PTG (Linley & Joseph, 2004). This is further complicated when the trauma is an accident leading to serious injury, as with health trauma, because the point at which the trauma occurs may be the accident/diagnosis, yet there are ongoing physical threats to self that the individual must deal with. These ongoing threats, depending on their perceived severity, will lead to intrusive and avoidant thoughts, and so there is potential for growth (Helgeson et al., 2006). Study 1 reported the highest total PTGI scores and measured PTG within days of the trauma, yet the small number of participants makes it impossible to draw conclusions. Only one longitudinal study was included in this review (Pollard & Kennedy, 2007) and PTG was only measured at the second wave so little was uncovered regarding the process of PTG. There has been an increase in longitudinal studies examining PTG following health-related trauma (Bostock et al., 2009), and further longitudinal research in accident survivors should be encouraged.

There are a number of limitations of this review. First, was that only a small number of studies were available for inclusion. It was still considered important to perform such a review to draw attention to the lack of such studies and to highlight preliminary findings

worthy of further exploration. Also, while every effort was made to avoid publication bias by including searches of unpublished dissertation databases and contacting researchers who may have known of unpublished work, it is possible that important studies were unintentionally excluded. Furthermore, the definition of accidents used may prove debatable. It is possible that in considering all burn injuries, for example, people who have been burnt intentionally have been included. It was necessary to consider the majority in this case and assume that most people with a burn injury acquired this through an accident. This point is also relevant for SCI studies.

Conclusions

This review suggests that separate types of trauma should be accounted for when considering PTG. There are factors that are potentially unique to trauma following a serious accident. It is difficult to establish whether PTG following an accident may differ to PTG following physical illness, as suggested by Bostock et al. (2009), due to the small number of studies available for review. It is possible that both physical illness and injury resulting from accident follow a curvilinear relationship to PTS: a certain amount of distress is needed to produce PTG, yet too much distress and too many complications arising from the injury or illness lead to a reduced capacity for growth. More research is needed to explore these further, particularly longitudinal studies, with reference to the degree of disability. Methodological weaknesses should also be addressed in future research (Table 8).

Table 8*Recommendations for Future Research*

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- Report subdomain mean item scores in addition to mean participant scores to allow for comparison between subdomains of the PTGI
 - Standardization of Likert-scales to allow for comparison between studies and across cultures
 - Age differences to be reported as standard
 - Gender differences to be reported as standard
 - Consistency when measuring and reporting on 'distress'
 - Assessment of prior traumatic events
 - Assessment of whether event was perceived as traumatic
-

Clinically, this review highlights a need to consider the complexity of trauma following an accident. Potentially, PTG may be more difficult to achieve after this type of trauma. If this is because of the social implications, such as financial difficulties or difficulty returning to work, a focus on improving support for this may be beneficial. Active coping and acceptance of help from others should be encouraged by clinicians, as these variables appear to contribute to growth. The idea of using a PTG scale as an outcome measure may be attractive to clinicians, to counteract the negative bias of typical outcome measures (McMillen & Cook, 2003). Authors have urged clinicians to address PTG cautiously with clients, for example, with appropriate timing and word choice (Zoellner & Maercker, 2006); however, growth can be, and is, achieved following an accident and clinicians working with accident survivors should be aware of this and promote it where possible.

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Post-traumatic growth following a burn injury²

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² To be submitted to: *Burns* (no word limit, but no study seems to be over 5000 words).

Abstract

It is well established that a burn injury can result in negative psychological consequences. Throughout the literature there is also reference to individuals reporting positive changes post-burn. The concept of 'post-traumatic growth' (PTG) refers to such individuals, whose recovery exceeds pre-trauma levels of well-being. To date there has only been one quantitative analysis directly examining PTG post-burn. The present study builds on this, examining the prevalence of PTG and related constructs, including: social support, coping styles, dispositional optimism, functioning, post-traumatic stress symptoms, severity and time since burn. Seventy-four participants recruited through a regional burns unit completed a battery of self-report questionnaires. Burn survivors were found to experience PTG, although to a lesser degree than previous research suggests ($GM=1.26$, range= 0-4.67). Severity of burn, post-burn functioning and trauma symptoms significantly correlated with PTG. Regression analysis proposed a model explaining 51.7% of the variance, with active coping, perceived social support and avoidance coping as significant predictors of PTG. Results support the theory that distress and trauma symptoms act as a catalyst for PTG. Coping styles and social support appear to facilitate this process. Clinical implications are discussed.

Introduction

A burn injury brings numerous traumatic assaults to both body and mind [1]. The psychological impact of burn injury is widely recognised and an increasing number of studies have examined not only the prevalence of psychological difficulties post-burn, but also the impact these difficulties have on recovery [2]. Psychological difficulties arise from the traumatic nature of the injury itself, potential hospital stay and multiple consequences of the burn [3]; with distress manifesting as body image dissatisfaction, low mood, anxiety, or sleep disturbances [4]. Furthermore, chronic and significant post-traumatic stress symptoms are found to occur in approximately one third of burn patients [5].

Certain factors have been considered important to aid the process of recovery from a burn, namely coping styles, social support and optimism. Avoidant coping has been linked to a greater risk of developing psychological difficulties [6] and an increase in depressive symptoms, when compared to those using approach coping strategies [7]. Acceptance has also been found to be a useful coping strategy post-burn, relating to positive adjustment three months post-injury [8]. The quality of social support has a critical role in adaptation to burns, with family conflict and poor family cohesion being associated with poor adjustment [1]. Furthermore, optimistic attitudes were found to correlate with perceived social support following a burn, and it has been suggested optimism may also be important to psychological recovery by influencing adherence to medical procedures [9].

The objective severity of a burn injury is generally found not to be associated to distress [7], although a link was found between elevated anxiety and depression in those with burns to their hands, suggesting that limitations in post-burn functioning may be an important consideration [9]. The lack of correlation between the extent of a burn, as measured by the percentage of total body surface area burnt (TBSA), and distress has led researchers to warn

of the clinical importance of psychological care for patients with even minor burns, and assessing patients based on individual need rather than medical factors [8].

Post-traumatic growth

The emergence of positive psychology at the turn of the century brought about an interest in the concept of perceived growth following a traumatic event [10]. Commonly termed 'post-traumatic growth' (PTG), this concept aims to describe those individuals who have exceeded pre-trauma levels of personal functioning and well-being [11]. There are thought to be three domains of PTG: a change of life philosophy (spiritual beliefs; a renewed appreciation of life); a change of self-perception (greater sense of resilience or strength); relationship enhancement (valuing friends and/or family more; increased compassion towards others). Not only is PTG associated with better outcomes in terms of mental health, but it has been established as an outcome in itself rather than a mere reflection of lack of trauma [12]. Researchers have examined PTG following a wide range of traumas, for example terrorist attacks [13] and bereavement [14]. Research in the field of health psychology has taken particular interest in the concept of PTG [15] [16] [17].

Perceived social support [18], certain coping styles (problem focused, acceptance and positive reinterpretation coping) and dispositional optimism are consistently positively associated with PTG [19]. The relationship between PTG and time since trauma has yet to be established, but PTG has been found to relate to intrusive and avoidant thoughts about the event, suggesting some time for cognitive processing is necessary [12]. The relationship between PTG and post-traumatic stress (PTS) symptoms is complex. Individuals have often been found to experience PTG and PTS together, leading to the hypothesis that not only can they co-exist, but that PTS acts as a catalyst for PTG and is necessary to activate and maintain growth [20]. Furthermore, some theorise a curvilinear relationship between PTS and

PTG [21], where low levels of PTS indicate minimal impact of the trauma, so minimal PTG is experienced; moderate PTS suggests a challenge to the individual's world and the occurrence of intrusive and avoidant experiences which can be worked through to achieve PTG, and high PTS results in an inability to work through the trauma or to engage with the processes necessary for PTG to occur. Conversely, both PTS and PTG are viewed as occurring together but as distinct and independent constructs [22]. As yet, the most accurate of these theories has not been established [23].

Importantly, if clinicians were aware of the potential for growth after a trauma, they could begin to open up this possibility to clients [22] and rather than focus on negative symptoms, clients could be encouraged to reflect on their beliefs and relationships positively. Facilitating PTG during therapy has been linked to the reduction of distress and restored hope [19]. Furthermore, PTG could be used as an outcome measure to counteract the negative bias of traditional outcome measures [24].

Post-traumatic growth in burn survivors

Evaluation of the psychological outcomes in burn survivors tends to focus on the negative aspects rather than any growth that might occur from such a trauma [4]; however, a number of studies, mostly qualitative, have referred to positive change. The achievement of a positive and meaningful life that is better than life prior to the burn has been noted to occur alongside experiences of suffering [25]. In one study focused on adapting to life after burn injury, the theme of gaining a new understanding of life emerged [8], which maps onto the PTG domain of a change of life philosophy. Through examining the concept of resilience post-burn, one narrative exploratory paper of adolescents' experiences found five of the six themes contained tales of positive transformation and growth, including reference to rediscovery of self and meaningful connections with others [26]. Furthermore, it was noted

that this positive change coexisted alongside struggles and fragility, indicating again that growth and distress co-occur. One study referred to the process of reframing; commenting that women in particular coped with the trauma of their burn by acknowledging gains such as 'personal growth' [27]. This related to redefining life in a more meaningful way, improved relationships with others, development of coping skills and an enhanced sense of self-esteem. Again themes of growth coexisted with distress following the accident, including strong emotions of anger, depression, hatred and loss. One quantitative paper indirectly examined PTG post-burn when including a measure of benefit-finding in response to patients commenting on positive changes [28]. Up to 26% of participants reported significant positive outcomes and 44% reported moderate benefits.

Two studies have looked specifically at the concept of PTG in burn survivors. A Chinese qualitative study explored the dimensions of PTG post-burn, determining that cognitive processing of the trauma was a central element to achieving PTG and depended on individuals' coping styles and social systems [29]. Four dimensions of PTG emerged: personal strength, a new life philosophy, sharing self with significant others and altruism born of suffering. To date, only one quantitative study has specifically examined PTG following a burn, with social support and active coping strategies as the strongest predictors of PTG [30]. Older participants and women reported higher PTG. The severity of burn, as measured by TBSA, was not related to growth. Although distress and growth were found to co-exist, with some participants reporting low quality of life as well as a high level of PTG, the measure of quality of life was not burn-specific and distress was measured by poor quality of life rather than trauma symptoms or affective symptoms. Furthermore, although TBSA aimed to measure severity of burn, the location, visibility or how the burn happened were not accounted for. Finally, the study included participants with a huge range of time

since burn, from three years to twenty-nine years. Such a diverse timeframe creates the potential for considerable variance.

Aims of the present study

Understanding PTG following a burn is important in understanding recovery and to the development of effective interventions for psychological distress [4]. Focusing only on the negative consequences of trauma leads to a biased view of human reactions and can deny patients hope of making a meaningful recovery [19]. The present study aimed to examine the occurrence of PTG within a burns population, using quantitative measures of growth, social support, coping styles and dispositional optimism to determine the potential predictors of PTG. Furthermore, a burn-specific measure of functioning was used to assess quality of everyday life post-burn. The impact of burn severity, how the burn happened and location of burn was also considered. Finally, a measure of PTS symptoms allowed for distress to be captured so clarifying the relationship between growth and distress.

The hypotheses were:

1. PTG will be evident in burn survivors.
2. The use of active coping styles, a high level of perceived social support and dispositional optimism would be significant predictors of PTG; whereas factors related to the burn (e.g. visibility, functioning and severity) would not.
3. PTG and PTS will show a curvilinear relationship; with low levels of PTS resulting in low PTG, moderate PTS resulting in high PTG, and high PTS resulting in low PTG.

Method

Procedure

Patients receiving, or who had received, treatment for burn injuries at a National Health Service regional burns service based in the North West of England were recruited in one of three ways. First, all patients attending an outpatient scar clinic between June 2012 and January 2013 were approached to participate following their appointment and offered a questionnaire pack to complete there or to take away and return in a pre-paid envelope. Secondly, patients attending other clinics, such as psychology outpatients or physiotherapy, were recruited through the clinicians they were seeing. Thirdly, questionnaire packs were sent via mail to patients on a burns support group list who had previously received treatment from the unit and had consented to be contacted by the service for research participation. This approach aimed to capture those with burn injuries significant enough to warrant follow-up treatment. Furthermore, it ensured that at least four weeks had passed since the burn injury. Aside from age (≥ 16) and ability to read English, no other exclusion criterion was applied. Consent was gained through a signed consent form. Ethical approval was sought and granted through the National Research Ethics Service.

Measures

Post-traumatic growth:

The Post-Traumatic Growth Inventory (PTGI) [31] is used to measure PTG. It is a twenty-one item scale assessing the positive outcome of trauma, across five subdomains: new possibilities, relating to others, personal strength, appreciation of life and spiritual change. Each item is rated on a six point Likert-scale (0-5). The PTGI has a substantial internal consistency of $\alpha = .90$, with subscales ranging from .67 to .85.

Coping:

The Coping with Burns Questionnaire (CBQ) [6] is a thirty-three item questionnaire intended to measure to what extent the participant has used various strategies to cope with a burn injury after discharge from hospital. The six dimensions of coping measured are: re-evaluation/adjustment, avoidance, emotional support, optimism/problem-solving, self-control and instrumental action. The CBQ has internal consistency ranging from $\alpha = .60$ to $.83$.

Perceived social support:

The Multidimensional Scale of Perceived Social Support (MSPSS) [32] is a twelve item scale, with items divided into three domains relating to the source of social support, namely: family, friends or significant other. Items are rated on a seven point Likert-scale (1-7). The MSPSS has an internal consistency of $\alpha = .88$, with subscales ranging from $\alpha = .85$ to $.91$.

Post-traumatic stress:

The Impact of Event Scale – Revised (IES-R) [33] is a twenty-two item scale, with three subscales that cover the main symptom groups of Post-Traumatic Stress Disorder (PTSD): intrusions, avoidance and arousal. Items are rated on a five point Likert-scale (0-4). The scale is used widely in psychological research as a measure of trauma symptoms. Previous reports on validity are satisfactory, with a high internal consistency of $\alpha = .96$ [34].

Post-burn functioning:

The Burn Specific Health Scale – Brief (BSHS-B) [35] is used as a measure of an individual's functioning post-burn. The scale consists of forty items with nine subdomains, including: heat sensitivity, affect, hand function, treatment regimens, work, sexuality,

interpersonal relationships, simple abilities and body image. Internal consistency ranges from $\alpha = .75$ to $.93$.

Optimism:

The Life Orientation Test – Revised (LOT-R) [36] is used as a measure of dispositional optimism. The scale consists of six items and an additional four filler items. A five point Likert-scale is used (0-4). The LOT-R has an internal consistency of $\alpha = .78$.

Demographic variables and burn information:

Information was gathered regarding age, gender, total percentage of body surface area burnt (TBSA), time since burn and location of the burn on the body.

Participants

The response rate was 33%, with 223 questionnaire packs given out and 74 completed packs returned. The final sample consisted of 58% female and 42% male. Participants' age ranged from 18 to 82 years ($M= 45.67$, $SD= 17.11$). The TBSA ranged from less than 1% to 90%, with an average TBSA of 9.41%. Time since burn injury ranged from 4 weeks to 624 weeks, with an average of 69 weeks since injury, and 83% of participants having suffered their burn less than 3 years prior to the study. Fifty-four percent of participants had burns to their body, 15% had burns involving their hands, 12% involving their face and 19% reported burns involving both their hands and face. Fifty-seven percent of burn injuries occurred through accidents, 19% were specifically accidents that happened at work, 4% were intentional.

Data analysis

Data analysis was conducted using SPSS (15.0) statistical software. Descriptive statistics reported PTGI results and independent T-Tests allowed for comparison between male and female participants. One-way ANOVAs were performed to determine the difference in PTGI scores for how the burn happened and location of the burn. Correlation analysis explored the relationship between PTG and variables such as TBSA, age, time since burn, social support, optimism, coping, functioning and PTS. A regression analysis determined which of the variables significantly associated with growth had the greatest explanatory power to predict PTG. Finally, the potential for a curvilinear relationship between PTG and PTS was explored using a scatterplot.

For the purpose of analysis, to correct for outliers and skewed distribution, logarithmic transformation was applied to all variables before analyses were performed. This was to allow for the use of tests based on the assumption of a normal distribution and was considered preferable to using non-parametric tests because it allowed for sensitivity to be retained. The data analysed are therefore summarised with the geometric mean (GM) and range (minimum/maximum) or 95% confidence intervals (CI) where appropriate.

Power

Assuming 80% power to detect correlations of 0.25 as being statistically significant, a sample size of 150 was required. The study was therefore potentially underpowered because the final sample size was N=74.

Results

Post-traumatic growth

Subjective experiences of growth were demonstrated in the scores of the PTGI (Table 1). Participants reported a low overall score of PTG (GM=1.26, range= 0-4.67), where *2 = I experienced change to a small degree as a result of my burn*. The two highest scores were on the subscales Relating to Others (GM=1.46, range= 0-4.86) and Personal Strength (GM= 1.41, range= 0-5). The lowest scoring subscales were New Possibilities (GM= 0.74, range= 0-5) and Spiritual Change (GM= 0.47, range= 0-5).

There were no significant effects of either age or gender on participants' experiences of growth and there were no significant differences in growth scores dependent on how the accident happened. There was a significant effect of the location of the burn on levels of reported growth, $F(3, 61) = 6.02, p = 0.001$, and post-hoc analysis using Tukey HSD showed that participants who suffered burns involving both hands and face (GM= 2.86, 95% CI 2.13, 3.79) reported significantly higher levels of growth than participants who suffered burns to their body (GM= 1.01, 95% CI 0.70, 1.39) or involving their face (GM= 1.15, 95% CI 0.45, 2.20).

The more time that passed since the burn the more growth was reported ($r=0.34, p<0.01$). Furthermore, there was a significant positive correlation between TBSA and PTG ($r=0.47, p<0.01$), indicating that the greater the extent of the burn, the higher the levels of PTG.

Table 1: PTGI scores

	Geometric mean (range)	Total sumscore (range)
PTGI total	1.26 (0-4.67)	32.82 (0-98)
PTGI new possibilities	0.74 (0-5)	5.07 (0-25)
PTGI relating to others	1.46 (0-4.86)	13.15 (0-34)
PTGI personal strength	1.41 (0-5)	7.35 (0-20)
PTGI spiritual change	0.47 (0-5)	1.59 (0-10)
PTGI appreciation of life	1.40 (0-5)	5.65 (0-15)

Variables associated with PTG

Avoidance coping had the strongest association with PTG ($r=0.43$, $p<0.01$) (Table 2). This was followed by overall functioning ($r=0.40$, $p<0.01$), indicating that individuals whose everyday functioning was affected by their burn were more likely to report experiences of growth. Re-evaluation/adjustment coping ($r=0.40$, $p<0.01$) also had a moderate correlation with PTG. Instrumental/action coping ($r=0.37$, $p<0.01$), post-traumatic stress symptoms ($r=0.32$, $p<0.01$) and emotional support seeking coping ($r=0.30$, $p<0.05$) all had low correlations, indicating a small yet definite relationship. Perceived social support ($r=0.22$, $p<0.05$) showed a slight yet significant relationship with PTG. Dispositional optimism ($r=0.04$, ns) and optimistic/problem-solving coping ($r=0.03$, ns) were not significantly associated with PTG.

With regards to functioning, heat sensitivity was the variable which was most strongly correlated with PTG ($r=0.39$, $p<0.01$) followed by hand functioning ($r=0.34$, $p<0.01$) and ability to work ($r=0.33$, $p<0.01$). This suggests that those with burns significant enough to

result in difficulties with work, use of hands or that were sensitive to heat, reported experiencing higher levels of growth. Treatment regime ($r=0.29$, $p<0.05$), body image ($r=0.26$, $p<0.05$) and ability to perform simple tasks ($r=0.24$, $p<0.05$) were also significantly correlated with PTG, although the extent of the relationship appeared to be smaller.

Predictors of PTG

To determine which of the variables significantly associated with growth had the greatest explanatory power to predict PTG, a hierarchical linear (stepwise) regression analysis was performed (Table 3). The assumptions of multiple regression were checked prior to the analysis. Time since burn and TBSA were entered in the first block to assess the variance once these had been accounted for. The second block contained social support and active coping, previously found to predict PTG [30], followed by a third block containing the variables of trauma symptoms, overall functioning and avoidance coping to assess how much variance these then contributed.

The final model included severity of burn (TBSA), instrumental/action coping, avoidance coping and social support; explaining 51.7% of the total variance ($R^2= 0.52$, $F(4,57)=15.24$, $p<0.001$). Each of these variables remained significant after adjusting for other selected predictors. After selection of the aforementioned predictors, time since burn, trauma symptoms and overall functioning were not included in the regression model.

Post-traumatic growth scores were higher with increasing severity of burns (TBSA) ($\beta= 0.132$, $p=0.002$), increasing instrumental/action coping ($\beta= 0.495$, $p=0.005$), increasing social support ($\beta= 0.407$, $p=0.005$), and increasing avoidance coping ($\beta= 0.581$, $p=0.001$), after adjusting for the other selected predictors.

Table 2: Correlation coefficients (r) for variables associated with PTG

	PTGI total		
	Geometric mean (range)	Pearson correlation	Significance
Perceived social support	5.13 (1-7)	0.22*	0.01
Dispositional optimism	11.55 (0-24)	0.04	0.75
Post-traumatic stress	1.90 (0-12)	0.32**	0.01
Overall functioning	5.10 (0-35.80)	0.40**	0.00
Functioning: Body image	0.87 (0-4)	0.26*	0.03
Functioning: Simple abilities	0.44 (0-4)	0.24*	0.05
Functioning: Relationships	0.26 (0-4)	0.05	0.70
Functioning: Sexuality	0.33 (0-4)	0.19	0.11
Functioning: Work	0.61 (0-4)	0.33**	0.00
Functioning: Treatment regime	0.69 (0-3.80)	0.29*	0.02
Functioning: Hand function	0.36 (0-4)	0.34**	0.00
Functioning: Affect	0.54 (0-4)	0.22	0.07
Functioning: Heat sensitivity	1.24 (0-4)	0.39**	0.00
Coping: Instrumental/action	1.75 (1-3.25)	0.37**	0.00
Coping: Self-control	2.10 (1-3.67)	0.09	0.47
Coping: Re-evaluation/adjustment	2.06 (1-3.75)	0.40**	0.00
Coping: Avoidance	1.93 (1-3.57)	0.43**	0.00
Coping: Optimism/problem-solving	2.64 (1-6.63)	0.03	0.80
Coping: Emotional support seeking	2.24 (1-4)	0.30*	0.01

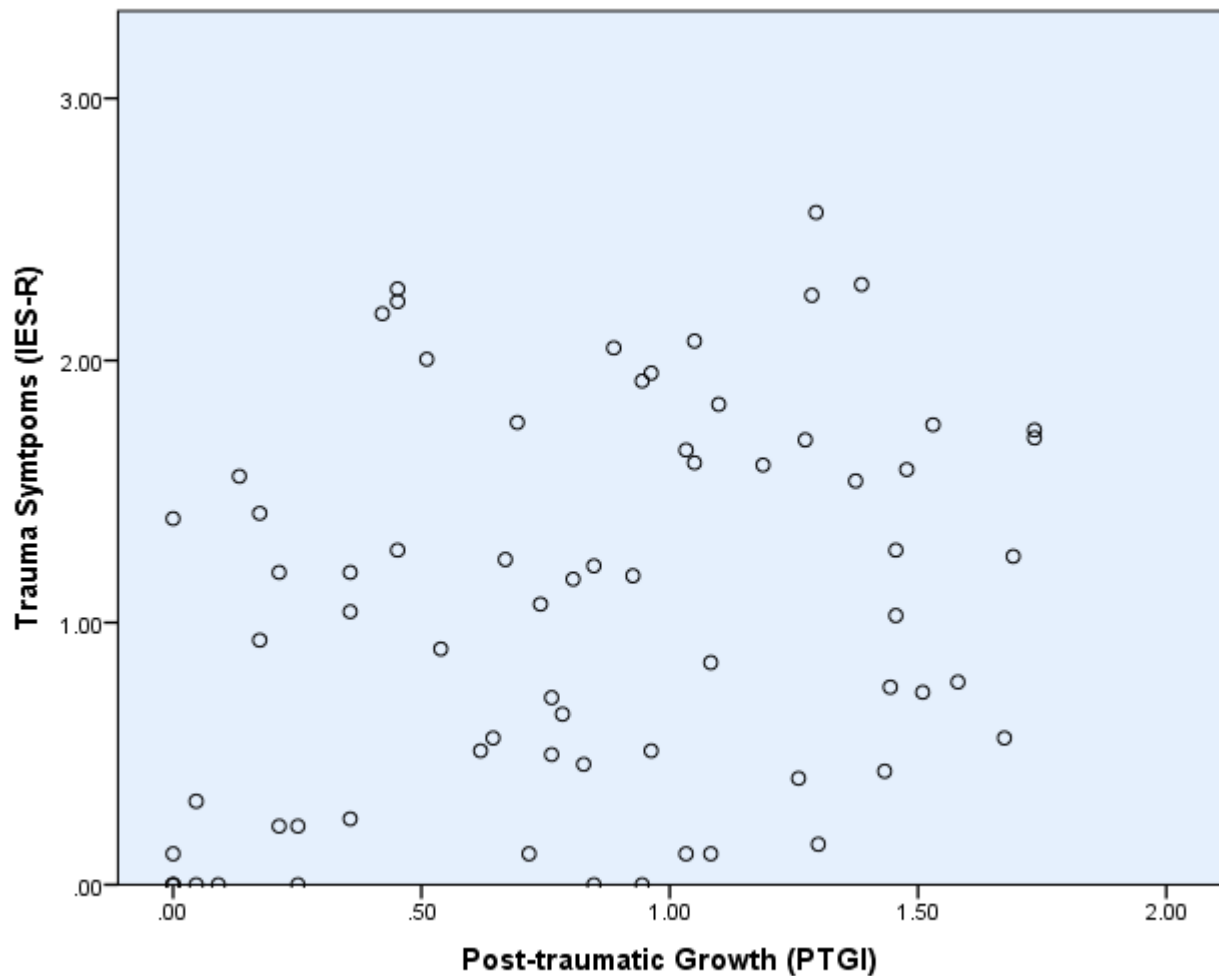
* = sig at 0.05 level, ** = sig at 0.01 level

Table 3: Regression model for PTG containing selected multiple predictors

Significant Predictors	Regression coefficient	95% Confidence interval	p-value
Constant	-0.679	-1.213, -0.145	-
Severity (TBSA)	0.132	0.049, 0.215	0.002
Coping: Instrumental action	0.495	0.157, 0.832	0.005
Perceived social support	0.407	0.129, 0.684	0.005
Coping: Avoidance	0.581	0.260, 0.902	0.001

Relationship between growth and trauma symptoms

There was a significant correlation between PTG and PTS ($r=.32$, $p<.01$). This small positive relationship indicates participants who reported trauma symptoms were also likely to report higher levels of growth. This relationship was further explored using a scatterplot to determine whether analysis of a possible curvilinear relationship was necessary (Figure 1). As there appeared to be no observable curvilinear relationship, no further analysis was performed.

Figure 1: Scatterplot of IES-R and PTGI scores

Discussion

The aim of this study was to determine the prevalence of post-traumatic growth in burn survivors and to explore which constructs relate to growth. Burn survivors did experience growth to some extent but this was less than in a previous, similar study [30]. Participants scored highest on the PTGI subscales of Relating to Others and Personal Strength. Age, gender and how the burn happened had no relationship to levels of PTG. Conversely to the hypothesis, however, some factors relating to the burn were related to growth. The location of the burn on the body appeared to affect PTG, with participants who

suffered burns involving their hands and face reporting higher levels of growth than those who suffered burns to their body or face. Severity of the burn had a positive relationship with PTG, indicating that the more severe the burn the more growth experienced. Time since burn and overall functioning also showed positive relationships, signifying that the more time passed and the more someone's everyday life was affected by their burn, the more the growth experienced. As hypothesised, active coping and perceived social support were significant predictors of PTG. Dispositional optimism had no relationship to PTG. Finally, although PTG and PTS had a significant positive relationship, indicating the more trauma experienced the more growth was reported, there was no clear indication of whether these two constructs exhibited a linear, curvilinear or other type of relationship.

The comparatively low levels of PTG are hypothesised to be due to the difference in samples between the two studies. The previous study, with a mean sumscore of 57.12, stated that they captured severe burns [30], whereas the present study, with a mean sumscore of 32.82, aimed to capture a wide range of severity. It may be that because the majority of participants in the present sample suffered relatively minor burns caused by everyday accidents, the threat to life and related cognitive processing necessary for PTG to occur was not present in the majority of this sample. This is supported by the relationship between severity, functioning, PTS and PTG, which indicates that for growth to occur, the burn has to be severe enough to cause a disturbance to everyday life and/or be perceived as traumatic. The low levels of PTG may also be due to the fact that burns are unique because of the ongoing pain involved and the potential visibility of scarring [8] which means there may be less scope for finding positives. In addition, consideration must be given to cultural differences which may contribute to the low PTG scores. It has been suggested that PTG may be a particularly American concept and may occur to a lesser extent in other cultures [29] such as in the present sample.

Exploration of the relationships between burn-related variables and growth revealed two issues. First, the location of burn appeared to be significant in determining growth. Participants who suffered burns involving the face and hands reported more growth than those who had burns to their body or face, indicating that functioning may be more important than visibility. This is consistent with evidence that burns to the hand and the resulting lack of ability to perform everyday tasks can be particularly distressing [9]. The significant relationship between hand functioning and PTG further supports this and suggests individuals who suffer burns that affect everyday functioning, suffer more distress and are therefore subsequently more able to experience growth. Secondly, the more time that passed since the burn, the more growth participants reported, supporting the theory that for PTG to occur there has to be time to cognitively process the event [12]. This finding may also relate to the recruitment of participants in scar clinic, however, and represent the severity of burn. Participants with minor burns may have attended the clinic once shortly after their burn, yet those with more severe burns would have had several appointments for months or years afterwards; therefore the participants for whom time had passed were more likely to have severe burns and were seemingly more likely to report growth.

Dispositional optimism was not related to growth as hypothesised, which is contrary to work which found it to predict PTG [19] and psychological recovery from burns [9]. This suggests that it is possible to experience growth even if one does not have a natural tendency to think positively. Consistent with previous research [30], perceived social support and active coping were significant predictors of growth, which highlights the potential importance of these two constructs. Re-evaluation/adjustment coping was also associated with PTG, although it is likely that this variable measured a very similar construct to PTG, which may explain the high correlation. Unexpectedly and counter-intuitively, avoidance coping was found to be a significant predictor of PTG. The subscale is described as cognitive or

behavioural efforts to divert attention away from difficulties or reminders of the accident [6] and because the questionnaire was burn-specific, it may have tapped into a coping style that may be useful or appropriate to manage the associated pain or scarring of a burn. Furthermore, such avoidance is typical of post-traumatic stress, so its correlation with PTG may relate to the relationship between PTS and PTG. Nonetheless, this finding differs to past research on burns and PTG [30].

The positive relationship between PTS and PTG indicates that after a burn individuals can experience both growth and distress [30]. It seems that participants with a small burn and minimal distress or disturbance to life as a result, did not experience growth; whereas participants who experienced a large burn and trauma from the accident, and had resulting difficulties with functioning and everyday life, had the capacity to experience growth. This result sits well with the theory that not only can they co-exist, but distress acts as a catalyst for growth to occur [11]. Unfortunately, due to the small sample size and substantial variability, the potential for a curvilinear relationship could not be explored. The possibility of this relationship still remains, where low levels of PTS indicate minimal impact of the trauma, so minimal PTG occurs; moderate PTS suggests a challenge to the individual's world and the occurrence of intrusive and avoidant experiences which can be worked through to achieve PTG; and high PTS may result in an inability to work through the trauma and for PTG to occur [21].

There are a number of weaknesses with the present study. As mentioned previously, the sample size was smaller than expected which restricted analyses and reduced power. In reporting PTG and PTS, previous traumatic events were not controlled for which may have reduced the potential for variability. Furthermore, the first year post-burn is a particularly difficult time [3]; coping strategies differ from those employed one year post-burn [8] and

body dissatisfaction increases over time and has been found to be higher one year post-burn [37]. In capturing the initial years post-burn, the results may have been affected by these variables and may differ if all participants were over one year post-burn. Future research would benefit from longitudinal designs to allow for the relationship between PTG, time since burn and associated variables to be explored at separate time points, thus allowing for analysis and clarification of these issues. Future research may also include proxy reports of PTG from significant others, which can conflict with self-reported PTG [24].

Clinical implications

Stories of individuals who make positive changes to their life after a burn injury are not uncommon. There is the possibility of experiencing growth after a burn and this may be more so for those who have experienced a burn significant enough to cause distress and disruption to everyday life. It seems that through their turmoil, people may go through an appraisal of life and be encouraged to appreciate the world and the people around them, and realise that they are capable of enduring such a trauma. To do this, it may not be necessary to have a pre-disposition to be optimistic. Particular coping strategies and social networks seem to help, and clinicians should be aware of this. Growth may be facilitated through the use of narrative to disclose details of the trauma and begin to rebuild and restructure their world view [38]. Patients could also be assisted to establish or renew meaningful social support networks [39]. Encouraging patients to attend support groups could serve to not only increase social support and active coping, but also facilitate PTG if those who have already experienced growth are present in the group [40]. Burn camps can also provide a similar experience and can assist growth in a similar way [27]. Furthermore, the more clinicians hold PTG in mind in their everyday work, the more patients can be exposed to the idea of a meaningful recovery. As well as an awareness of growth, clinicians may also want to

consider using PTG as an outcome measure. This would open up the possibility of growth to clinicians and patients, focusing on something beyond a mere lack of negative symptoms, and would counteract the negative bias of traditional outcome measures [24].

Conclusions

Recovery following a burn is complex, involving physical and psychological challenges. Despite the trauma of the accident and impact of the burn injury, burn survivors can go on to experience growth and exceed pre-trauma levels of personal functioning and well-being. It seems that the process of growth emerges from distress, and individuals to have their world assumptions challenged to be able to make the life appraisals necessary to experience growth. Coping styles and social support appear to facilitate this process. Future research on the process of PTG in the burn population would allow clinicians to be aware of the best time to explore the concept and also which factors may be more important at which time point post-burn.

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Concluding Discussion

The discussion consists of the following components:

- A. An extended discussion of the thesis, addressing the clinical relevance of the concept of post-traumatic growth, particularly for psychologists.
- B. A summary of the empirical paper for the staff on the burns unit where the project took place. This aims to be coherent and succinct, with a particular focus on the clinical implications of post-traumatic growth and what clinicians could do to facilitate it.
- C. A research proposal which will address the gaps in research highlighted in both the systematic review and the empirical paper. The proposal aims to detail a project which would extend this particular field of research and would be feasible to undertake.

A. Extended Discussion: Clinical Application of Post-traumatic Growth

Following a growing body of evidence which claims that post-traumatic growth (PTG) can occur after a variety of traumas, the practical application of growth in clinical practice, particularly for psychologists, seems to be capturing researchers' attention (Joseph & Linley, 2006). The concept of PTG is part of the wider movement of positive psychology, which considers the role of psychology as going beyond symptom reduction. Three principles are thought important for clinicians to consider regarding the application of PTG: first, expectations of clinicians need to adjust to recognise that not all trauma and adversity leads to a condemned life; secondly, clinicians need to understand that trauma does not lead to positive change for everyone and not achieving PTG does not equate to failure; thirdly, when discussing the concept of PTG clinicians should not imply that the trauma is inherently positive, but advise that growth can emerge from the struggle with trauma and from within themselves (Joseph & Linley, 2006).

By increasing clinicians' knowledge of PTG, they will perhaps naturally bring this awareness to their clients; however, appropriate expectations, timing and word choice are vital (Zoellner & Maercker, 2006). There is the risk that those clients who have recently experienced a trauma and are still grieving for loss or experiencing high levels of distress would react badly to the concept of PTG; leaving them feeling invalidated, misunderstood and potentially angry. If a client is attempting to tell a clinician about their recent experience of losing a limb, for example, and the clinician is simply re-directing the conversation to the benefits this loss could bring, this could lead to a breakdown of the therapeutic relationship. Furthermore, by focusing on positive changes clinicians could neglect genuine distress and trauma. If the client is experiencing flashbacks and hyper-arousal symptoms, to hear that they

should have an enhanced appreciation of life and value their loved ones may not be appropriate.

To promote PTG, it has been suggested that certain priorities must be accounted for (Wiechman Askay & Magyar-Russell, 2009). Ensuring the client is safe and their basic needs are met, such as food and shelter, is the first step. Secondly, they must be allowed time to process the trauma and return to key roles in their life, such as their position within the family or employment. Depending on the extent of their injuries they may need help with this stage. Trauma symptoms, such as hyper-arousal and flashbacks, could be addressed by psycho-education regarding the impact of a trauma and normalisation of their reaction. Once the client is in a safe place, social connections can be renewed or re-established and appropriate coping strategies employed, which again clinicians could help with and encourage. It is when in this safe place that the client can begin to rebuild their assumptions about themselves, the world and other people; working to achieve PTG.

The link between PTG and specific psychological therapies is still being examined and research is in its infancy (Joseph & Linley, 2006). Positive changes have the potential to lay foundations for therapeutic work and encourage hope that trauma can be overcome (Linley & Joseph, 2004). Lessening of distress alone does not bring about growth, yet PTG does appear to predict better long-term adjustment and well-being (Joseph & Linley, 2006). This is not to suggest that interventions for distress are not needed, but rather that these should perhaps look beyond distress reduction as a successful outcome and consider more long-term outcomes. Traditional therapies such as cognitive behaviour therapy (CBT) that are designed to address trauma symptoms typically focus on symptom reduction and ignore the potential for growth; it has been hypothesised that while such treatments are important and necessary for some clients, these interventions are difficult to combine with PTG because they do not aim to integrate the person with their experience but instead aim to distance the

two (Joseph & Linley, 2006). Nonetheless, interventions such as CBT that encourage positive coping strategies may naturally increase the client's ability to experience growth, and interventions involving family members that enhance social support may also be effective (Elliot, Kurylo, & Rivera, 2002). Support groups of any kind could encourage good coping strategies and increase social support, as well as expose the clients to individuals who have already experienced some degree of growth (Badger & Royse, 2010). More specifically, the concept of PTG could work alongside therapies such as acceptance and commitment therapy (ACT), which in part aims to clarify personal values and to take action on them, bringing more meaning and direction into their life (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). It is important to emphasise, however, that during any type of therapy, allowing the client to lead any exploration of the topic of PTG and offering gentle reflections is recommended (Wiechman Askay & Magyar-Russell, 2009).

B. Feedback: Summary of Research for Staff on the Burns Unit

After a burn injury, as with other serious injuries and accidents, it is no surprise that people can be affected by traumatic memories, nightmares, extreme fear and panic. This is often termed post-traumatic stress. What is often not recognised is that having experienced a serious accident, people sometimes find that they become a better person as a result of their experience. Their lives become more meaningful, they have closer, more enriched relationships with family and loved ones, and a better outlook on life. This has been called post-traumatic growth (PTG).

The phenomenon of PTG is currently being researched worldwide, with a growing interest in this aspect of recovery. In clinical work, however, this is not an uncommon observation; tales of people who have experienced horrific events and who have subsequently dedicated their lives to a good cause, or have a renewed appreciation of life, are often seen in the media and inspire others. Similarly with burn survivors, some patients come onto the ward having suffered a traumatic burn which leads them to re-evaluate life and what is important to them, perhaps making changes such as stopping drinking or re-establishing contact with loved ones. In understanding what helps these people experience PTG, we should be able to work out how to help this process. Furthermore, if clinicians are mindful of the potential for growth after a trauma, we can bring it into the awareness of our patients; providing hope during a difficult time in their lives.

Although there have been numerous studies looking at PTG after traumas such as war, bereavement and cancer, there is relatively little research looking at PTG in burn survivors. A Chinese study interviewed burn survivors and found that the way that people approach problems and the people they have around them are important. Only one study has examined

PTG in burn survivors through the use of questionnaires and statistical analysis. This German study by Drs Rosenbach and Renneberg found that social support and coping styles were important in achieving PTG and that PTG and distress can both occur together. The severity of the burn had no effect on how much growth people experienced, which suggests that no matter how big or small the burn is, people can go on to make positive changes to their lives.

The present study

We aimed to build on the German study and look at what helps people to achieve PTG and whether certain burn characteristics, such as how the burn happened or where it is on the body, affects people's chances of experiencing PTG. Using questionnaires, we aimed to measure: PTG, social support, coping styles, dispositional optimism (a general tendency to look on the bright side), post-traumatic stress symptoms (PTS), burn-specific functioning/quality of life, severity of burn, location of burn, how the burn happened, age and gender.

With the help of the staff at outpatient clinics at a regional burns unit, questionnaire packs were given out to over 200 participants. In total 74 participants of all ages in adulthood completed the questionnaires, with a fairly even split of males and females. The severity of burn ranged from less than 1% total body surface area burnt (TBSA) all the way to 90%, although most participants suffered burns of less than 10%. Most participants had suffered their burn injury within the three years prior to participating in the study. Half of participants had burns to their body and half had more visible burns to their hands or face. Most of the burn injuries occurred through household accidents or through leisure activities and a third happened because of an accident at work.

Overall the participants in this study reported low PTG compared to the German study, although experiences of PTG were found to happen. Their age, sex and how the

accident happened had no effect on whether someone could experience PTG. Those with burns to their hands or face experienced more PTG than participants who had burns to their body. It also seems that some amount of time needs to pass for PTG to occur. The severity of the burn did seem to matter, with patients who had bigger burns tending to report more PTG, a result different to the German study in which extent of burn was irrelevant to PTG. When looking at what helped people to achieve PTG, as expected having good social support and a pro-active coping style seemed to help. Interestingly, avoidance coping (for example, trying not to think about the problem) also seemed to help PTG to occur, which was an unexpected finding and the opposite to that seen by the German study. We thought this might be because we used a burn-specific questionnaire and avoidance coping can be helpful to manage the pain associated with a burn. Finally, we found that people who experienced some degree of distress, whether it be a disruption to everyday activities or post-traumatic symptoms, were more likely to report PTG. If there was no trauma or disruption to functioning, very low levels of PTG were reported.

To experience PTG, therefore, the trauma needs to have been significant enough to cause distress and/or a disruption to everyday life. Those participants who reported poor functioning, had more severe burns, had burns to hands and face, or had higher trauma symptoms, reported more growth. This may explain the relatively low levels of PTG compared to that in previous studies; because most of the participants who took part had quite small burns as a result of common accidents (such as hot water spills) and were not traumatised or particularly distressed by their injury, so there was no basis from which to experience PTG. This fits in with what we know about PTG; that for PTG to occur the person's world must be threatened to an extent where they re-evaluate their life and their belief system.

Our results support the idea that burn survivors experience growth after their trauma. Through their turmoil, it seems people can experience a re-appraisal of their life choices and priorities and make positive changes. This is important for clinicians. By focusing only on the negative consequences of a burn injury, a biased view of human reactions is formed and patients can be denied the hope of making a meaningful recovery. It seems that by encouraging appropriate coping styles and assisting the patient to accept support from loved ones and services, PTG could be achieved. For psychologists and counsellors working with burn victims, reducing distress may not be the only concern. Facilitating PTG could be an important consideration. In addition, support groups and burn camps may naturally assist PTG, because there are likely to be people there who have experienced growth and provide examples of how things can change.

It is important that clinicians do not put too much emphasis on achieving PTG, however, and appropriate expectations, timing and word choice should be carefully considered. There is the risk that patients would react badly if the topic is brought up before they are ready or while they are still experiencing significant distress. This can be avoided by ensuring that the issue of PTG is led by the patient and encouraged through gentle reflection, while acknowledging any distress or pain they may have. Rather than focus on negative symptoms only, patients could be encouraged to reflect on their beliefs and relationships. Through talking, it is hoped that the trauma can be worked through and the patient can be helped to rebuild their world for the better.

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C. Research Proposal

Post-traumatic growth in burn survivors: Time to grow?

Aims

Despite a growing body of evidence examining post-traumatic growth (PTG) after an accident, there appears to be a lack of research examining the process of growth over time and its interactions with distress, coping and functioning. In burn survivors specifically, the initial year post-burn is a particularly difficult time and requires numerous coping strategies (Smith, Smith, & Rainey, 2006). The various stages of recovery in this first year may impact on growth and exploring these would increase understanding for clinicians working in the field of burns. The aims of the research are therefore:

1. To investigate the occurrence of PTG in burn survivors over the first two years post-burn and assess whether PTG remains stable or is changeable over this time period.
2. To examine the relationship between some of the potential factors relating to PTG in burn survivors at various time points, namely: post-traumatic stress (PTS), coping styles, functioning, severity and visibility of burn.

Background and relevant literature

Post-traumatic growth has been found to occur in a number of settings (Linley & Joseph, 2004) and has been linked to coping styles and social support particularly (Prati & Pietrantonio, 2006). Consistent with the overall literature, PTG was found to occur following accidents and there is a growing body of literature that suggests burn survivors are no exception. In this literature, however, there has been little attention paid to the process of PTG and how it may develop over time. A meta-analysis of PTG following numerous

traumas reported that higher levels of PTG are recorded with more time that passes, suggesting that time to process the trauma is necessary (Helgeson, Reynolds, & Tomich, 2006). The same result was found when examining PTG post-burn. Despite measuring time since burn, however, this study was cross-sectional, capturing participants at only one point in time. Due to the time since burn differing for each participant, this design ignored the potential variance in stages of recovery.

Research regarding burn survivors highlights one year post-burn as a particularly difficult time in the process of recovery, which can be broken down further into the critical stage (immediately after the accident), acute stage (0-3 months post-burn), chronic (3-6 months post-burn) and delayed (greater than six months) (Smith et al., 2006). The acute stage is likely to be dominated by painful medical procedures, sleep disturbances and anxiety, whereas the chronic stage involves issues related to scarring and appearance, self-consciousness, re-integration back into society and potential low mood. Unsurprisingly, coping styles in the early stages differ from those utilised later on; with avoidance, self-distraction and wishful thinking being commonly used to cope with pain, and acceptance coping as the most helpful strategy over three months post-burn to deal with scarring and adjustment to everyday functioning (Dahl, Wickman, & Wengström, 2012). Furthermore, longitudinal research has shown that variables such as body dissatisfaction increase over the twelve months post-burn (Thombs, Notes, Lawrence, Magyar-Russell, Bresnick, & Fauerbach, 2008). Regarding the relationship between distress and growth, if a curvilinear relationship is hypothesised where distress is necessary to activate growth but too much distress could hinder growth (Joseph, Murphy, & Regal, 2012), it would be helpful to explore what would happen to growth should levels of distress change over time.

A longitudinal study of PTG in burn survivors would allow for related constructs to be explored at various time-points. There is a general lack of longitudinal data in PTG following any accident with just one study using longitudinal measures but only capturing PTG at the second wave (Pollard & Kennedy, 2007). Clinically, a longitudinal study would allow greater understanding of the relationship between PTG and PTS, how coping particularly facilitates growth, and would also allow clinicians to know when to approach to the idea of PTG with patients. Furthermore, if considering the use of growth-measures as outcomes, it would allow for identification of the appropriate time to do so.

Design

The research will be longitudinal and quantitative in design. Participants will be asked to complete a battery of standardised self-report questionnaires at four time points post-burn: three months, six months, one year and two years. Participants will be patients who have been admitted to the inpatient unit at one of two regional burns units in the North West of England, thus aiming to capture patients who have suffered a severe burn. Participants will be aged sixteen plus, and there will be no restriction on gender or ethnicity. As the self-report measures are written in English only, individuals who are unable to understand English will be excluded from the study. In taking part in the study, participants will be asked to consent to allow the researcher access to their medical records to gather basic demographic and burn related information, such as severity of burn. Ethics approval will be sought from NHS ethics.

The two regional burn units in the North West of England have, on average, between 250 and 350 inpatients each per year, with an average stay in hospital of between 7 and 10 days. This results in a minimum potential of 500 participants. Participants would recruited over a one year period and the study would have an estimated time-scale of three years.

Procedure

Participants will be informed of the study while they are an inpatient on the burn ward. If they are interested in taking part, they will be offered an information sheet and consent form which will ask them to consent to being contacted three months post-burn. They will also be asked to consent to telephone reminders. At three months post-burn, if the participants have been discharged from hospital, a pack containing the questionnaires and a further consent form and information sheet will be posted to them, as well as a pre-paid envelope to return the completed questionnaires. If the participant is still in hospital, the pack will be provided to them on the ward. This process will be repeated at each time point. All participant data will be anonymised and matched with their other time point questionnaires through patient identification numbers.

Materials

- *Post-Traumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996)*

A 21 item scale assessing the positive outcome of trauma, overall and across five subscales: new possibilities, relating to others, personal strength, appreciation of life and spiritual change. The PTGI has a substantial internal consistency of $\alpha = .90$, with the subscales ranging from .67 to .85.

- *Coping with Burns Questionnaire (CBQ) (Willebrand, Kildal, Ekselius, Gerdin, & Andersson, 2001)*

A 33 item questionnaire intended to measure coping with burn injury after discharge from hospital. The six dimensions of coping measured are: re-evaluation/adjustment, avoidance, emotional support, optimism/problem-solving, self-control and instrumental action. The CBQ has internal consistency ranging from $\alpha = .60$ to .83.

- Impact of Event Scale – Revised (IES-R) (Weiss & Marmar, 1996)

A 22 item scale, with three subscales that cover the main symptom groups of Post-Traumatic Stress Disorder (PTSD): intrusions, avoidance and arousal. The scale is widely used in psychological research and previous reports on validity are satisfactory, with a high internal consistency of $\alpha = .96$ (Creamer, Bell, & Failla, 2003).

- Burn Specific Health Scale – Brief (BSHS-B) (Kildal, Andersson, Fugl-Meyer, Lannerstam, & Gerdin, 2001)

Used as a measure of an individual's functioning post-burn, the scale consists of 40 items with nine domains, including: heat sensitivity, affect, hand function, treatment regimens, work, sexuality, interpersonal relationships, simple abilities and body image. Internal consistency ranges from $\alpha = .75$ to $.93$.

- Demographic Variables and Burn Information

Age; gender; total percentage of body surface area burnt (TBSA); location of burn.

Data analysis

Data analysis will be conducted using SPSS statistical software. To assess changes in outcomes measured over the two-year period; longitudinal regression via generalized estimation equation (GEE) modelling would be used. Although difficult to derive a sample size estimate specific for longitudinal regression, working on the conventional 10:1 rule with five independent variables (PTS, coping, functioning, severity and location of burn) at four time points, 200 participants would allow for reasonably robust analysis.

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Appendices

Appendix One

Participant information sheet and consent form



PARTICIPANT INFORMATION SHEET

POST-TRAUMATIC GROWTH IN BURN SURVIVORS

INVITATION

When you were last in Scar Clinic, you will have received information on a study that is taking part on 'post-traumatic growth' (positive change) following a burn injury. The researcher is Sarah Kellett, a student at the University of Liverpool studying for a Doctorate in Clinical Psychology. The research is for her dissertation and is being conducted as part of educational requirements. Dr Julie Wisely (Clinical Psychologist who works in the Burns Unit) is supervising this research, as well as Dr Bill Sellwood from the University of Liverpool.

Research in the area of burns tends to focus on the negative psychological impact of burn injury, whereas there is a lack of research that considers positive change following a burn injury. By studying the positive changes people experience, or in other words those who adjust well following a burn injury, we can learn more about what we can do to help those who struggle. The aims of the research are therefore:

- To investigate the occurrence of post-traumatic growth (PTG) in burn survivors.
- To examine the relationship between some of the potential factors relating to PTG in burn survivors, namely: social support, coping styles, post-trauma symptoms, how the injury was obtained, functioning, severity and visibility of burn, and optimism.

The study is to be approved by an NHS ethics committee.

WHAT WILL HAPPEN

In this study, you will be asked to complete a total of six questionnaires. These will ask you a range of questions about how you have been since your burn, how you were before your burn, and what support you have around you. Some questions may feel personal, and if you feel uncomfortable answering them, you do not have to. The questionnaire pack will be given to you and you may complete it in the waiting room if you would like to. The researcher (Sarah Kellett) will be available to answer any questions. Take your time to complete them. If you don't finish all the questions while you are there, you can take them home and post them back (a pre-paid envelope will be provided to you). You will also be asked to sign and hand back a consent form to say you have understood the study and your rights. You can say no to taking part, or withdraw from the study at any time, and this will not affect your treatment with the Burns Service.

TIME COMMITMENT

It typically takes 30 minutes to complete the questionnaires. You will only be asked to do it once.

PARTICIPANTS' RIGHTS

If you agree to take part, you may decide while completing the questionnaires that you want to stop being a part of the research study. You do not need to give an explanation. This will not affect your treatment as a patient at the Burns Unit. You have the right to ask that any data you have completed be destroyed. Once you have completed and submitted the questionnaires, however, they will be anonymous and it will not be possible to identify them to withdraw and / or destroy them.

You have the right to omit or refuse to answer or respond to any question that is asked of you. This also will not affect your treatment as a patient at the Burns Unit.

You have the right to have any questions you have about the study answered. If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

BENEFITS AND RISKS

There are no known benefits or risks for you in this study.

COST, REIMBURSEMENT AND COMPENSATION

Your participation in this study is voluntary. You will not receive payment in return for your participation.

CONFIDENTIALITY/ANONYMITY

The data we collect will not contain any personal information about you. Your name will only be on the consent form, which will be kept separate from your answer sheets. Some information will be collected from your medical records, however, such as: time since burn, location of burn, and total percentage of body surface area burnt. Your name or date of birth will not be gathered or recorded. The information will be gathered by Sarah Kellett (student) who is not a member of the clinical team. By signing the consent form you agree to this; however, if you do not wish for this to happen but would still like to participate in the study, please inform the researcher.

All data gathered from this study will be used for the researcher's dissertation, as well as for publication and presentation at conferences. No individual participants will be identifiable.

FOR FURTHER INFORMATION OR QUERIES ABOUT THE STUDY

If you have any further questions about the study, or would like a copy of the results of the study, you can contact Julie or Sarah on:

julie.wisely@mhsc.nhs.uk or 0161 291 6971 / sarah.kellett@liv.ac.uk



CONSENT FORM

Post-traumatic Growth in Burn Survivors

Investigators:

Sarah Kellett (Trainee Clinical Psychologist, University of Liverpool)
 Dr Julie Wisely (Clinical Psychologist, Wythenshawe Hospital Burns Unit)
 Dr Bill Sellwood (Senior Lecturer, University of Liverpool)

The participant should complete the whole of this sheet himself/herself. Please initial the boxes if you agree with the following statements:

- I have read and understood the participant information sheet
- I have had the opportunity to ask questions and discuss the study
- All the questions been answered satisfactorily
- I have received enough information about the study
- 'I understand that relevant data collected during the study, may be looked at by individuals from the University of Liverpool, 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 this data.'
- I agree to the researcher accessing information from my medical records
- I understand that I am free to withdraw from the study:
 at any time
 without having to give a reason
- I agree to take part in the study

“This study has been explained to me to my satisfaction, and I agree to take part. I understand that I am free to withdraw at any time.”

Signature of the participant:

Date:

Name in block capitals:

“I have explained the study to the above participant and he/she has agreed to take part.”

Signature of researcher:

Date:

Contact: Julie Wisely: julie.wisely@mhsc.nhs.uk 0161 291 6971

Sarah Kellett: sarah.kellett@liv.ac.uk