

The Relationship of Core Belief Challenge, Rumination, Disclosure, and Sociocultural Elements to Posttraumatic Growth

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The relationship of challenge to core beliefs, rumination, disclosure, and some sociocultural elements to posttraumatic growth (PTG) were explored. Participants were college students enrolled in psychology classes who reported having experienced a stressful event within the past 2 years and who completed measures in groups. Findings suggested that challenge to core beliefs was the main predictor of PTG, and that a very large proportion of the sample had encountered themes of PTG in their sociocultural contexts.

Keywords: posttraumatic growth, rumination, core beliefs, trauma

Traumatic events are rather common (Norris & Slone, 2007), and most research on their impact has focused on the development of posttraumatic problems (Joseph, Linley, & Harris, 2005). However, over the past 30 years, there has been growing interest in the experience of positive change in the aftermath of trauma. The idea that positive change can be found after a traumatic event is age-old, but the systematic study of these changes is more recent (Joseph, Yule, & Williams, 1993; Park, Cohen, & Murch, 1996; Tedeschi & Calhoun, 1995).

Posttraumatic growth (PTG), the experience of positive change as a result of the struggle with a major life crisis (Calhoun & Tedeschi, 1999), has been reported by people who have experienced a wide range of events, including cancer (e.g., Cordova, Cunningham, Carlson, & Andrykowski, 2001; Weiss, 2004; Cordova et al., 2007), sexual assault (e.g., Grubaugh & Resick, 2007), combat (e.g., Maguen, King, King, & Litz, 2006), natural disasters (e.g., Cryder, Kilmer, Tedeschi, & Calhoun, 2006), and HIV/AIDS (e.g., Milam, 2004). PTG has been reported on at least five dimensions: Relating to Others, New Possibilities, Personal Strength, Spiritual Change, and Appreciation of Life (Morris, Shakespeare-Finch, Rieck, & Newbery, 2005; Tedeschi & Calhoun, 1995, 1996). Relating to Others includes the realization of how good and supportive people are as well as a sense of increased closeness in relationships. New Possibilities is the experience of new options that had previously not been considered, and it can include the discovery of a new life path. Personal Strength is the realization of oneself as being stronger than was previously thought. Spiritual Change is illustrated by a greater understanding of spirituality and increased faith in a higher power. Appreciation of Life can entail a revision of life priorities and a new appreciation for how precious life is. Earlier research focused on the occurrence

and prevalence of PTG. More recently, the focus has shifted to seeking to assess what contributes to the process of growth and why the experience of growth varies across individuals.

One of the factors hypothesized to be important for setting the stage for subsequent PTG is the occurrence of events that present a challenge, that shake, or that shatter the core beliefs that comprise the person's assumptive world (Janoff-Bulman, 1992; Linley & Joseph, 2004; Parkes, 1971; Tedeschi & Calhoun, 1995, 2004). The assumptive world is a "general set of beliefs and assumptions about the world, that guide actions [and] help understand the causes and reasons for what happens" (Tedeschi & Calhoun, 2004). Previous research has indicated that the amount of PTG reported is correlated with the degree of challenge to one's core beliefs about the world and one's place in it (Cann et al., 2010). The challenge to the assumptive world is assumed to lead to cognitive processing of the event in the form of repeated thought about what happened.

The term rumination has been used, by some but not all scholars, to denote exclusively negative and intrusive thinking (e.g., Lyubomirsky & Nolen-Hoeksema, 1995; Nolen-Hoeksema & Morrow, 1993). However, rumination, as the word is used here, follows the original meaning of the term, to mean repetitive thinking (Watkins, 2008). Rumination can be intrusive, when unwanted thoughts invade the person's cognitive world. Rumination can also be a thoughtfully reflective (Nolen-Hoeksema & Davis, 2004), deliberate, and purposeful reexamining of the event and related issues (Calhoun, Cann, Tedeschi, & McMillan, 2000). As Martin and Tesser (1996) have suggested, rumination can include reflecting on events, trying to understand them, reminiscing, and trying to find solutions to life problems. Although intrusive rumination tends to occur for most, if not all, trauma survivors, deliberate rumination, where the person decides, consciously and explicitly, to think about something, can also occur. This deliberate kind of rumination may be more conducive to PTG than is the kind of intrusive thinking that is typical after a highly stressful event, because the presence of more deliberate and of less-intrusive rumination tends to be related to PTG (Affleck & Tennen, 1996; Calhoun et al., 2000). Deliberate rumination, in this context, can involve thinking about possible positive repercussions of the event, for example, "I think this event helped me realize I am much stronger than I had thought" and it may also involve

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deliberate and conscious attempts to remind oneself of benefits experienced as a result of being forced to face a very difficult situation (Affleck & Tennen, 1996; Folkman, 2008).

In contrast, intrusive rumination is unwanted thinking that happens without the person wanting it and it is likely to be distressing. The thought may be experienced as an annoyance or worse. Although intrusive rumination is likely for most trauma survivors soon after the event, PTG is theorized to occur for individuals who move away from intrusive rumination and enter into more deliberate ruminative processing as time since the event increases (Tedeschi & Calhoun, 1995, 2004).

Another factor that may affect the process of PTG is self-disclosure about one's reactions to the highly stressful event. The general psychological benefits of disclosure are well-documented (Lepore & Smyth, 2002; Niederhoffer & Pennebaker, 2009; Pennebaker, 2003). There is also some indication that disclosure may be related to the amount of growth reported. For example, a study with cancer patients found that disclosure about their illness was positively associated with stress-related growth (Henderson, Davison, Pennebaker, Gatchel, & Baum, 2001). A study with Japanese university students found that those who had told others about their experience with a highly stressful event and who experienced mutual disclosure reported more PTG than those who did not (Taku, Tedeschi, Cann, & Calhoun, 2009). These previous findings suggest that disclosure may be related to growth, but previous studies have not examined the specific content of disclosure and its relationship to growth. It seems likely that disclosure of growth themes will be more likely to be related to PTG than disclosure of negative posttraumatic experiences. However, little is known about this aspect of the process of development of growth.

Sociocultural influences have also been proposed as an important component to the development of PTG (Weiss & Berger, 2010). One of the influences proposed as an important covariate of PTG is the degree to which themes of growth are culturally available to the individual who has experienced a traumatic event. The degree to which people are exposed to cultural themes that growth can come from the struggle with a traumatic event has been hypothesized to impact the degree to which they will report PTG (Calhoun & Tedeschi, 2006; Calhoun, Cann, & Tedeschi, 2010). Exposure to growth themes, both through the broader culture (e.g., TV, Internet, and newspapers) and through one's more proximate social network (e.g., friends or family reporting positive changes resulting from difficult experiences), may contribute to the experience of PTG. If themes of PTG are available to persons who are coping with a major stressor, they may be more likely to report growth.

The current study was designed to examine the relationship of threat to core beliefs, rumination, disclosure experiences, and exposure to cultural themes of growth to posttraumatic growth.

Method

Participants

Participants were recruited via an online system at a large public university in the Southeastern United States. They were undergraduate college students enrolled in introductory psychology courses who participated for course credit. Originally, 213 students participated in this study, which was identified as requiring per-

sonal reactions to a highly stressful event experienced in the past 2 years. However, 84 participants were excluded from the analyses. Exclusion criteria were as follows: if event occurred more than 2 years before, if event did not meet criteria for a traumatic event as defined by the *DSM-IV-TR* (American Psychiatric Association, 2000), and if the event was rated as less than 4 on a 7-point scale of stressfulness. The final sample of 129 participants included 87 (67.4%) women and 42 (32.6%) men. Participants ranged in age from 18 to 47 years ($M = 20.29$, $SD = 3.73$) and included 87 (67.4%) Caucasians, 23 (17.8%) African Americans, 9 (7%) Asians, 5 (3.9%) Native Americans, 4 (3.1%) Latinos, and 1 person did not list their ethnic identification. Almost all participants ($N = 127$) were single. The most commonly reported traumatic events were death of a family member (43 participants, 33.3%), death of a close friend (26 participants, 20.2%), serious accident (16 participants, 12.4%), sexual assault (8 participants, 6.2%), and other (16 participants, 12.4%), which included, for example, life-threatening illness of a family member, suicide of a loved one, and unplanned pregnancy.

Procedure

Measures were administered to participants in groups of up to 10; they were asked to read the informed consent form and were given an opportunity to ask questions. Participants were asked to focus on a highly stressful event they had experienced in the past 2 years. Completion of measures took approximately 10–15 min. Order of presentation of measures was counterbalanced to control for order effects.

Measures

Stressfulness of the event. Stressfulness of the event was assessed with two separate items. One asked for a rating of stressfulness at the time of the event (How stressful was the event for you at the time it happened?) and the other for a rating of current stressfulness (How stressful is the event for you now?). Responses were made on 7-point Likert scales ranging from 1 (*not at all stressful*) to 7 (*extremely stressful*).

Core Beliefs Inventory (CBI). The CBI (Cann et al., 2010) is a nine-item measure that assesses the degree to which a traumatic/stressful event causes people to reevaluate their assumptive worlds, including beliefs about themselves, other people, the future, and the world. Items were rated on a 6-point scale ranging from 0 (*not at all*) to 5 (*to a very great degree*). Scores can range from 0 to 45 ($M = 28.06$, $SD = 9.19$). The CBI has been shown to have good internal reliability ($\alpha = .82$) (Cann et al., 2010) and acceptable test-retest reliability (.69). In the current study, the reliability for the CBI was $\alpha = .84$.

Rumination scale. The Rumination Scale is a 24-item measure assessing intrusive and deliberate rumination both "two weeks after" the event and in the past 2 weeks ($\alpha = .93$ for intrusive items, $\alpha = .80$ for deliberate items); the present scale is based on items used in a previous study (Calhoun et al., 2000). There are 12 distinct items, with six assessing intrusive rumination (e.g., Thoughts about the event came to mind and I could not get rid of them, I could not keep images or thoughts about the event from entering my thoughts) and six assessing deliberate rumination (e.g., I thought about the event and tried to figure out how I could

make sense out of what happened, I deliberately thought about how the event had affected me). Participants respond to the same six deliberate and intrusive rumination items separately for each of the two time points.

Self-disclosure about the event. Two items were used to assess disclosure of consequences of the event: "Sometimes, did you actually discuss *negative* consequences of this event with your friends or family?" and "Sometimes, did you actually discuss with your friends or family, *positive things* that came from your struggle with this event?" (Yes = 1, No = 2).

Sociocultural context. The sociocultural context was assessed using a 7-item measure developed for this study. The items assessed the availability of PTG themes in both the proximate (e.g., I have known several people who experienced really tough situations and saw benefits in their experience) and distal culture (e.g., I have seen TV shows or movies where people who faced really tough losses changed for the better because of that). Items are rated from 0 (*strongly disagree*) to 5 (*strongly agree*). Responses to the items were summed to obtain a total score to indicate overall exposure to growth themes (possible range of scores is 7–35; $M = 27.56$, $SD = 3.40$). Internal consistency was only marginally acceptable ($\alpha = .65$).

Posttraumatic Growth Inventory (PTGI). The PTGI (Tedeschi & Calhoun, 1996) is a 21-item inventory that assesses five domains of growth. Items are rated on a 0 (*I did not experience this change*) to 5 (*I experienced this change to a great degree*) scale, and scores can range from 0 to 105 ($M = 60.07$, $SD = 19.27$). The scale has acceptable test-retest reliability, scores are not correlated with social desirability, and responses on the scale tend to be corroborated by others (Shakespeare-Finch & Enders, 2008; Tedeschi & Calhoun, 1996; Weinrib, Rothrock, Johnsen, & Lutgen-dorf, 2006; Wild & Paivio, 2003).

Results

Correlations between the major variables were conducted, and there were significant correlations between challenge to core beliefs ($M = 28.06$, $SD = 9.19$) and stressfulness of event at the time it happened ($M = 6.43$, $SD = .72$) ($r = .22$, $p < .05$); soon after event intrusive rumination ($M = 13.56$, $SD = 4.04$) ($r = .24$, $p < .01$); deliberate rumination soon after event ($M = 10.46$, $SD = 3.35$) ($r = .37$, $p < .01$); recent intrusive rumination ($M = 6.70$, $SD = 5.39$) ($r = .38$, $p < .01$); recent deliberate rumination ($M =$

6.86 , $SD = 4.29$) ($r = .44$, $p < .01$); and PTG ($M = 60.07$, $SD = 19.27$) ($r = .58$, $p < .01$). See Table 1.

The mean sociocultural context scores were quite high, with very limited variability ($M = 27.56$, $SD = 3.40$; minimum = 15, maximum = 35). Sociocultural context scores were not significantly correlated with any of the other variables of interest. Items assessing exposure to growth themes were generally rated highly, suggesting that growth is a common theme in the sociocultural contexts of the present participants. Total scores ranged from 15 to 35, and means on individual items (rated on 1–5 scales) were generally high, ranging from 3.69 to 4.29, indicating that respondents generally saw themes of growth as quite common in their sociocultural contexts.

To examine the effect of disclosure about the event, participants were divided into two groups, based on whether they had, or had not, discussed with others consequences of their struggle with the trauma; disclosure of positive consequences from the struggle were considered separately from negative consequences of the event. Participants who had discussed positive consequences of their traumatic experience reported more deliberate rumination soon after the event ($M = 11.10$, $SD = 3.05$) than those that had not discussed positive consequences of the trauma ($M = 9.40$, $SD = 3.58$, $t(126) = 2.86$, $p < .01$), and less current stress associated with the event ($M = 3.51$, $SD = 1.61$), than those who did not discuss positive consequences of the event ($M = 4.23$, $SD = 1.49$, $t(127) = 2.53$, $p < .05$). There were no differences between the two groups on total scores on the PTGI.

Those who discussed negative consequences of the trauma differed from those who did not only on deliberate rumination soon after the event; those who reported having discussed negative consequences scored higher on deliberate rumination soon after the event ($M = 10.97$, $SD = 3.11$) than those that did not ($M = 8.64$, $SD = 3.61$, $t(126) = 3.38$, $p < .01$). There were no differences between the two groups on total scores on the PTGI.

A stepwise regression analysis was conducted to assess the impact of several variables of interest on total PTG. Based on theoretical models of growth (Calhoun et al., 2010; Janoff-Bulman, 1992) and on previous findings (Cann et al., 2010), degree of challenge to core beliefs was entered first and predicted 34% of the variance in PTGI score ($R^2 = .34$, $F(1, 125) = 63.31$, $p < .001$). In the next step, intrusive and deliberate rumination

Table 1
Descriptive Statistics and Zero-Order Correlations Among Focal Variables

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Stress at time of event	6.43	.72								
2. Core beliefs challenge	28.06	9.19	.22**							
3. SA intrusive rumination	13.56	4.04	.44*	.24*						
4. SA deliberate rumination	10.46	3.35	.03	.37*	.18*					
5. Recent intrusive rumination	6.70	5.39	.37*	.38*	.54*	.26*				
6. Recent deliberate rumination	6.86	4.29	.25*	.44*	.48*	.52*	.70*			
7. Stress now	3.78	1.60	.45*	.16	.39*	-.01	.63*	.37*		
8. Socio-cultural context	27.56	3.40	-.01	.11	-.10	.05	-.04	.02	-.04	
9. Total PTGI score	60.07	19.27	.12	.58*	.25*	.44*	.27*	.46*	.06	.07

Note. $N = 129$.

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

soon after the event were entered separately and, together, predicted an additional 6% of variance ($R^2 = .40$, $F(3, 123) = 27.53$, $p < .01$), a significant change (change in $R^2 = .07$, F change = 6.73, $p < .01$). In the third step, discussing negative and positive consequences of the trauma were entered separately and, while not significant, predicted an additional 2% of variance ($R^2 = .42\%$, $F(5, 121) = 17.48$, $p < .001$). Finally, recent intrusive and deliberate rumination were entered separately and, together, predicted an additional 2% of variance (nonsignificant change), resulting in an overall 44% of variance being predicted by the model [$R^2 = .44$, $F(7, 119) = 13.23$, $p < .001$]. See Table 2.

Discussion

The current study was perhaps the first to directly assess the relationship of specific proximate and distal sociocultural factors to self-reported PTG. Although no relationship was found between self-reported exposure to cultural themes and growth, the very limited range of scores, with the possibility of ceiling effects, may have influenced this finding. What was surprising was the very large proportion of participants who reported at least some cultural exposure to themes of growth. Ninety-eight percent, for example, reported having heard or read stories of people who had experienced positive changes as a result of their struggle with very difficult events, and the mean score on the sum of items assessing exposure to growth themes was approximately 28 of a total possible score of 35. These findings may be the most interesting of this cross-sectional study, because they indicate that themes of PTG are readily available to almost all people in the present

sample. A needed next step is an assessment of the degree to which these findings are representative of other places in North America in particular, and the world more generally.

The current study provides additional support for the important relationship between challenges to core beliefs and PTG. Present findings are congruent with both theoretical predictions (Calhoun & Tedeschi, 2006; Janoff-Bulman, 1989, 1992, 2006) and with recent empirical findings (Cann et al., 2010). Significant challenge to the assumptive world appears to be an important correlate of, and perhaps causal antecedent to, PTG. If a traumatic event does not present a challenge to previously held beliefs, the processes necessary to produce growth (e.g., rumination, self-disclosure, etc.) are unlikely to occur. The discomfort caused by the discrepancy between previously held core beliefs and new, contradictory information is purported to prompt the need to engage in these processes. However, longitudinal studies are needed to confirm that core beliefs challenge precedes growth.

The present study also provides some additional information on the possible impact of disclosure about a traumatic event. Disclosure about negative consequences was associated only with deliberate rumination recalled as having occurred soon after the event. However, participants who reported having disclosed about the positive impact of the struggle with the traumatic event reported more deliberate rumination soon after the event, and less current stress related to the event, than those who reported no such disclosure. One possible reason for these relationships is that higher levels of deliberate rumination may not only increase the likelihood of disclosure, but disclosure, especially disclosure that is socially accepted or reinforced, may, in turn, increase the likelihood of deliberate positive rumination about the stressful event. The finding that disclosure about positive consequences of the trauma is associated with less current stress is congruent with other findings on the effects of disclosure about traumatic experiences (Taku et al., 2009). Present findings suggest that it may be useful to further investigate the relationships between disclosure, especially disclosure about positive consequences of having to deal with a very difficult situation, the social and cultural responses to such disclosure, and PTG.

Unlike a previous study done on disclosure in Japan, there was no clear relationship between PTG and disclosure in the present findings; there are at least two possible reasons for this. One possible explanation is that disclosure may somehow be a more salient, impactful social action in Japan than it is in the United States. In addition, the present study assessed disclosure dichotomously and did not include any measure of the perceived responses to the disclosure, factors which may have moderated the effect of self-disclosure. Future studies should assess not only whether disclosure occurred, but also what the responses to disclosure were.

The findings from the regression predicting PTG indicate that the process by which growth occurs is complex and involves the interplay of many factors. Challenge to core beliefs, deliberate and intrusive rumination, both soon after the event and recently, and disclosure about positive and negative consequences of the trauma together predicted 44% of the variance in growth. A considerable amount of the variance of PTG is accounted for by the challenge to core beliefs, additional evidence that such threat to the assumptive world is an important element for understanding the process of PTG (Cann et al., 2010). The threat to the assumptive world likely

Table 2
Hierarchical Multiple Regression Predicting
Posttraumatic Growth

Model	<i>b</i>	<i>SE</i>	β	R^2	ΔR^2
Step 1				.34**	.34**
(Intercept)	25.62	4.55			
CBI	1.23	.15	.58		
Step 2				.40**	.07*
(Intercept)	11.20	6.23			
CBI	.98**	.16	.46		
Soon after intrusive	.47	.35	.10		
Soon after deliberate	1.44*	.44	.25		
Step 3				.42**	.02
(Intercept)	21.92	8.37			
CBI	1.03**	.16	.46		
Soon after intrusive	.55	.35	.11		
Soon after deliberate	1.09***	.47	.19		
Negative disclosure	-3.82	3.58	-.08		
Positive disclosure	-3.71	3.12	-.09		
Step 4				.44**	.02
(Intercept)	23.58	8.86			
CBI	.99**	.17	.47		
Soon after intrusive	.43	.40	.09		
Soon after deliberate	.72	.51	.12		
Negative disclosure	-2.93	3.60	-.06		
Positive disclosure	-3.61	3.10	-.09		
Recent intrusive	-.43	.38	-.12		
Recent deliberate	1.00	.51	.22		

Note. $N = 129$. b = unstandardized beta weight; β = standardized beta weight.

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

sets in motion other processes, such as intrusive rumination and deliberate rumination, which may, in turn, have an impact on the degree of growth experienced and reported, as proposed models of PTG suggest (Calhoun & Tedeschi, 2006; Janoff-Bulman, 1992; Linley & Joseph, 2004).

This study has several limitations. One major limitation is its cross-sectional design, so the findings do not offer indication either of causality or of temporal sequence. A second limitation is that it was conducted with a sample of undergraduates from one region of the United States, and generalizations to other people, in other places, must be done with caution. A third limitation is that the assessment of self-disclosure and sociocultural context, although having face validity and at least minimally acceptable internal consistency, are not established measures and have not been used in other contexts.

In spite of its limitations, the present findings suggest that threat to the assumptive world and repetitive thought about the event are variables that need to be continued to be included in studies of the antecedents and causes of PTG. Perhaps, more importantly, however, these findings suggest it may be important to include an assessment of sociocultural variables in future studies of PTG. At least in this group of participants, themes of PTG were common components of their sociocultural contexts, a finding that suggests the importance of assessing such cultural elements in the study of both PTG and posttraumatic distress.

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