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Doors opening: A mechanism for growth after adversity

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People commonly experience positive psychological changes after adversity, but little is known about how this growth happens. We propose that engagement with new possibilities – seeing ‘doors opening’ in the wake of loss – is key in this process. We hypothesized that people would report greater growth if they saw new possibilities in the aftermath of adversity. We also predicted that unless people had engaged with new possibilities, they would report greater deterioration when adversity disrupted their core beliefs. A diverse group of adults ($N=276$) from the US and India participated in a cross-sectional online study. Individuals experienced more growth if they had experienced more core belief disruption and more engagement with new possibilities. Engagement partially mediated the relationship between core belief disruption and growth. Engagement may also buffer against deterioration when core beliefs are disrupted. We conclude that pursuing new opportunities may be a crucial step in growth.

Keywords: posttraumatic growth; stress-related growth; benefit-finding; engagement; coping

Adversity may lead to surprising benefits as well as to unsurprising damage. Philosophical and religious texts have discussed the transformative power of suffering for millennia. More recently, psychologists have examined this phenomenon through an empirical lens, measuring, describing, and predicting the positive changes that can follow adverse experiences. These changes are referred to as *post-traumatic growth*, *stress-related growth*, *benefit-finding*, or *adversarial growth* (Linley & Joseph, 2004). Such growth has been documented following sexual assault, life-threatening illness/injury, and combat (Tedeschi & Calhoun, 2004), as well as events that fall short of meeting the official Diagnostic and Statistical Manual IV Text Revision (DSM-IV-TR; American Psychiatric Association, 2000) criteria for *trauma* (Lehman et al., 1993; Park, Cohen, & Murch, 1996). The present study includes individuals who experienced trauma as well as individuals who experienced non-traumatic stress, and so we deem the general term *growth* most apt for the present discussion. Such growth arises in five major domains: improved relationships, deeper spirituality, greater appreciation of life, increased personal strength, and a sense of new possibilities (Tedeschi & Calhoun, 1996). Growth is more likely in people who are optimistic, religious, and who cope by using positive reappraisal, acceptance, or social support (Helgeson, Reynolds, & Tomich, 2006; Swickert & Hittner, 2009).

If people can indeed change for the better after adversity, how might this process unfold? Janoff-Bulman (1992, 2006) proposed an intuitively appealing theory

based on the metaphor of the *seismic event*. First, an earth-shaking traumatic event brings a person’s core beliefs tumbling to the ground. Then, this person struggles to make sense of the world, of other people, and of her own character and abilities. During this reconstruction, new positive beliefs and values may arise, and these constitute growth. The mechanism for growth, according to this theory, is reflection and reconstruction of beliefs (Cann et al., 2011; Tedeschi & Calhoun, 2004).

A review of the literature provides few empirical tests of this theory, but recent cross-sectional studies indicate that more core belief disruption is linked to more growth (Cann et al., 2009, 2011; Cann, Calhoun, Tedeschi, & Solomon, 2010; Lindstrom, Cann, Calhoun, & Tedeschi, 2011; LoSavio et al., 2011; Thombre, Sherman, & Simonton, 2010). Cann et al. (2010) additionally found that core belief disruption did *not* lead to increased deterioration in people’s relationships, spirituality, appreciation of life, personal strength, and sense of possibilities.

Core belief disruption might be double edged: it might lead to growth but it might also lead to negative consequences. Intuitively, it seems that reflecting on shattered beliefs could lead to bitterness, cynicism, and distress just as easily as it could lead to growth and wisdom (Joseph & Linley, 2005), and research also finds this: for example, the more a person’s beliefs about meaning and self-worth are disrupted, the greater the symptoms of traumatic grief (Boelen, Kip, Voorsluijs, & Bout, 2004). These conflicting findings – positive outcomes, negative

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outcomes, or both – suggest an unknown moderator, and we propose one: engagement with new possibilities in life. Individuals experiencing engagement see ‘new doors opening’ even as other doors slam shut in the wake of adversity. While the sense of new possibilities is not a novel concept, the current literature views it as one of the domains of growth rather than as the cause of growth. We hypothesize that people who see new doors opening and walk through them are more likely to grow after adversity, and to have better relationships, more spirituality, more strength, and more appreciation of life – whether or not their core beliefs are shattered. Moreover, people who see new possibilities may be protected from the negative effects that they might otherwise experience when their core beliefs are shattered.

Several theories point to these hypotheses. The first is Klinger’s (1975) *incentive-disengagement cycle* of motivation. Klinger argues that when strivings are repeatedly thwarted, people eventually disengage from a particular goal and turn their efforts toward a new, more attainable goal. This disengagement-to-engagement process is normal and adaptive, he suggests, and clinical levels of depression arise when people inappropriately cling to impossible goals. Similarly, Snyder’s (1994) hope theory suggests that it is adaptive to flexibly pursue goals, to identify multiple pathways to attain valued ends, and to *re-goal* after losses and failures (Snyder, 1996). Thus, we suggest that people who grow after being thwarted are those who are especially adept at perceiving new values and goals in the wake of adversity.

The emerging science of *prospection* (Gilbert & Wilson, 2007; Schacter & Addis, 2007) also lends theoretical support to this work. Seligman, Railton, Baumeister, and Stripada (2013) propose that humans are drawn by the future rather than solely driven by the past; our mental simulations of possible futures powerfully impact how we act and feel. We do not act mechanistically in the face of adversity, constrained by past conditioning; rather we generate an array of ‘if *X*, then *Y*’ scenarios representing different courses of action and consequences. These scenarios can be more or less imaginative, positive, plausible, and adaptive (and individuals may vary widely in their ability to generate inspiring or helpful future scenarios). Thus, the content of people’s *prospection* in the wake of adversity may be crucial for positive adaptation and growth.

People who can perceive or imagine rewarding new paths – and then follow them – should prove most likely to grow. Indeed, empirical work supports this idea. Actively pursuing goals, feeling supported in this, and making meaningful progress on goals is linked to greater well-being (Diener & Fujita, 1995; Klinger & Cox, 2004). Failing to imagine positive possibilities in one’s future, on the other hand, has been linked to depression (MacLeod & Byrne, 1996).

Guided by this theoretical and empirical work, we tested three hypotheses: (a) people who saw new possibilities in the aftermath of adversity will report more growth; (b) people who questioned their core beliefs and also saw new possibilities will report growth, but people who questioned their core beliefs without seeing new possibilities will report deterioration; and (c) engagement with new possibilities accounts for the positive relationship between core belief disruption and growth.

Method

Participants and procedure

Adult participants ($N = 276$) were recruited for a study about ‘major life events’ by posting announcements on two websites: the University of Pennsylvania-affiliated *Authentic Happiness* (www.authentichappiness.sas.upenn.edu, $n = 61$), and Amazon Web Services’ *Mechanical Turk* (MTurk; www.mturk.com, $n = 215$). Authentic Happiness users are typically people who are interested in learning about positive psychology, so we also used MTurk to mitigate the risk of selection bias; differences between samples are reported below. MTurk users are typically American or Indian adults who casually complete short surveys/tasks for Amazon.com credit (Ipeirotis, 2010). Of the original 346 who provided informed consent, 276 participants (79.2%) were ultimately included in analyses; 72 (20.8%) could not be included because they terminated their participation before completing one or more of the dependent or independent measures. The sample was relatively young (the median participant’s age group was 26–35); primarily Caucasian (63.4%) with a substantial minority of Asians, primarily Indians (25.4%); roughly split between men (45%) and women (55%); and slightly satisfied with their lives (mean Satisfaction With Life Scale score of 21.2, $SD = 7.50$).

Participants had experienced adversity: 78.3% reported at least 1 of the 10 events listed in a screening question (described below), with the median participant reporting two events. The most commonly reported event was the death of a close friend or family member (53.6% of participants). We included these individuals even though their bereavement was not necessarily traumatic, because even non-traumatic loss is associated with PTSD symptoms, depression, and morbidity (Zisook, Chentsova-Dutton, & Shuchter, 1998) as well as growth (Linley & Joseph, 2004). Of the sample 12.3% reported at least one event explicitly identified as a potential trauma in DSM-IV-TR (2000). A subset of participants (21.7%) had not experienced any of the traumatic or adverse events listed in the screening. These individuals were still included, and asked to report on the ‘most difficult’ events of their lives (most commonly, stressors in the family context, such as divorce,

loss of custody of one's children, and alcoholism in the family). Most frequently, participants reported on events that had happened 3–5 years ago.

All participants completed an online survey containing questions and measures related to growth, potential mediators, constructs used for validation of the new Doors Opening Questionnaire (DOQ), and demographic information.

Measures

Exposure to adversity

Participants indicated which traumatic/adverse events had happened to them, choosing from a list of 10 events and an *other challenging event* category with an open-response text box. Seven of the events listed are potential traumas noted in the DSM-IV-TR (2000): military combat, physical assault, sexual assault, natural disaster, severe accident, molestation, and observing a traumatic event. The other three events may not meet the DSM-IV-TR (2000) criteria for trauma, but are important in the growth literature: serious illness, serious illness of family/close friend, and death of family/close friend (Helgeson et al., 2006). If multiple events had occurred, participants identified which of these had the greatest impact. In addition, participants told us the time elapsed since the event, and whether they disclosed this event to others.

Growth

The Posttraumatic Growth Inventory 42 (PTGI-42) was used to measure growth and deterioration. This 42-item inventory is a revised format of Tedeschi and Calhoun's (1996) original PTGI, a reliable and valid five-factor measure. The PTGI-42 includes the original 21 items on growth, plus 21 items on corresponding forms of deterioration: for instance, participants can endorse 'I appreciate each day more' and/or 'I appreciate each day less.' As such, we were able to compute a growth score and a deterioration score. In this revised format, internal reliability is retained ($\alpha = 0.90$ for growth items; $\alpha = 0.89$ for deterioration items) and order of presentation does not appear to have an effect on item responses (Baker, Kelly, Calhoun, Cann, & Tedeschi, 2009). Importantly, we excluded the New Possibilities subscale of the PTGI-42 from all our analyses (unless noted otherwise below), to avoid confounding our predictor variable (engagement with new possibilities) and our outcome variable (growth). Except for this special treatment of the new possibilities subscale, we did *not* analyze each subscale of the PTGI-42 separately (choosing instead to sum all four remaining subscales).

Potential mediators of growth

We used the Core Beliefs Inventory (CBI), a reliable and validated nine-item inventory, to measure the extent to which the adverse event disrupted participants' core beliefs (Cann et al., 2010). We used the Multidimensional Scale of Perceived Social Support (MSPSS) to measure social support (Zimet, Dahlem, Zimet, & Farley, 1988). The MSPSS wording was modified to refer to respondents' level of social support at the time of the traumatic event rather than at present (e.g. 'my family really tries to help me' was changed to 'my family really tried to help me').

We created a new scale, the six-item DOQ, to measure the extent to which participants engaged with new possibilities after adversity. The final version of the DOQ showed high internal consistency ($\alpha = 0.91$) and high split-halves reliability ($r = 0.86$). Analyses indicate convergent validity of the DOQ as reported below. The DOQ contains the following six items, each rated on a 7-point Likert scale (0 = *strongly disagree*, 6 = *strongly agree*):

During the time I was dealing with the event ...

- (1) ... My eyes opened to paths I hadn't seen before.
- (2) ... My interactions with people showed me interesting new opportunities.
- (3) ... It seemed like 'when one door closes, another door opens'.
- (4) ... I saw new ways to help people.
- (5) ... I found a new inspiration.
- (6) ... I found a new source of meaning in life.

Measures used for validation of DOQ

To establish convergent validity of the DOQ and locate this construct in the nomological net, we measured the correlation between the DOQ and two related constructs: (a) we confirmed that the DOQ correlated moderately with approach orientation, as measured by the 13-item Behavioral Activation System (BAS) scale, a reliable and valid three-factor measure ($r = .33$, $p = 0.0001$) (Carver & White, 1994); and (b) we confirmed that the DOQ was correlated highly with the New Possibilities factor of the PTGI-42 ($r = 0.77$, $p < .0001$). This strong correlation suggests that the two measures capture very similar constructs. This is unsurprising; our aim was not to propose an entirely novel construct, but to frame engagement with new possibilities as a *mechanism* for growth rather than as an outcome. The DOQ is nonetheless theoretically distinct from the New Possibilities subscale: whereas on the PTGI, participants report changes they feel have already occurred (e.g. 'I established a new path for my life'), on the DOQ they report on an earlier process of discovery and possibility (e.g. 'my interactions with people showed

me interesting new opportunities'). In addition, the DOQ explicitly refers to the social and prosocial aspects of this process (e.g. 'I saw new ways to help people'), not included in the PTGI-42 subscale.

Analytic strategy

We analyzed and refined the draft DOQ before testing the study hypotheses. Participants responded to a 34-item draft version of the DOQ. We had created this draft by generating face-valid statements related to (a) seeing new opportunities and (b) acting on new opportunities. The Kaiser–Meyer–Olkin Measure of Sampling Adequacy (0.95) and Bartlett's test of sphericity ($\chi^2 = 7033.17$, $p < 0.0001$) indicated that the scale items were sufficiently intercorrelated to justify Exploratory Factor Analysis (EFA). Using the Principal Axis Factoring method with Promax rotation, we saw that the scree plot clearly indicated a one-factor solution (with this factor explaining 48% of variance). To make a brief (but reliable) scale, we eliminated items in an iterative process. First we retained the 13 items that loaded most strongly on the first factor. Then we eliminated items that were redundant (with inter-item correlations above 0.80) or that compromised reliability. To maximize content validity, we retained items that were as distinct from one another as possible, and general enough to encompass a range of individual experiences. The final DOQ correlated highly with the original 34-item draft DOQ ($r = 0.95$) indicating that reducing the number of scale items did not result in significant loss of information.

Having created the final six-item DOQ, we then conducted the convergent validity analyses reported above. We also examined the distributions of all measures and confirmed that the assumptions of parametric statistics were met. We conducted bivariate correlations and t -tests in order to (a) determine which variables were correlated with the outcomes and therefore needed to be included as covariates in our models; and (b) detect any differences in key variables based on either recruitment source or cultural background. AH ($n = 61$) and MTurk samples ($n = 215$) differed only in their exposure to adversity, with AH participants reporting more total events (mean = 3.07, SD = 1.82) than MTurk participants (mean = 2.20, SD = 1.37), $t(274) = 4.01$, $p < 0.0001$. Among MTurk participants, the Indian subsample ($n = 47$) differed significantly from the non-Indian subsample ($n = 168$) in reporting higher social support, $t(274) = -3.80$, $p = 0.002$, more core belief disruption, $t(274) = -3.19$, $p = 0.001$, and more engagement with new possibilities, $t(274) = -5.33$, $p = 0.001$.

Finally, we tested the study hypotheses using linear regression (with interaction terms to test moderation) and Preacher and Hayes' (2004, 2008) procedures for testing mediation. These procedures use a non-parametric

bootstrapped approach to test the cross-products of ab coefficients (i.e. the indirect effect) and to provide bias-corrected 95% confidence intervals for this effect.

Results

Hypothesis 1: Engagement with new possibilities will predict growth (main effect)

People who had engaged with new possibilities after adversity reported more growth. Most participants saw some new possibilities: the mean DOQ score of 20.34 (SD = 9.10), seen in Table 1, is roughly equivalent to endorsing *agree* for four of the six DOQ items. DOQ scores were roughly normally distributed. Most participants had also experienced growth: the mean PTGI-42 score of 60.52 (SD = 17.76) suggests a moderate level of growth.

Engagement with new possibilities and growth were highly correlated, with a Pearson's r of 0.74 ($p < 0.0001$), as seen in Table 2. After confirming that the assumptions of linear regression were met, we conducted a simultaneous multiple regression model that explained 67.5% of the variance in growth using core belief disruption ($\beta = 0.24$, $p < 0.001$), social support ($\beta = 0.15$, $p < 0.001$), engagement with new possibilities ($\beta = 0.49$, $p < 0.001$), and three covariates,¹ $F(6, 272) = 141.21$, $p < 0.0001$. Engagement with new possibilities explained a larger share of unique variance in growth (13.91%) than core belief disruption (4.49%) or social support (1.66%) did. Findings did not significantly differ depending on recruitment source (i.e. AH vs. MTurk subsample).

Hypothesis 2: Engagement will explain the connection between core belief disruption and growth (mediation)

As expected, engagement with new possibilities partially mediated the relationship between core belief disruption

Table 1. Means and standard deviations of all continuous variables.

Variable	Possible range	Mean	SD
Core Belief Disruption (CBI)	0–45	27.70	9.84
Social support (MSPSS)	12–84	56.70	17.50
Engagement with new possibilities (DOQ)	0–36	20.34	9.10
Growth ^a	0–80	60.52	17.76
Deterioration ^b	0–80	37.18	19.50
Approach orientation (BAS)	20–80	37.63	5.62
Satisfaction with life (SLS)	5–35	21.25	7.50
Total number of adverse events	0 or more	2.40	1.52

Note: $N = 276$.

^aGrowth = Sum of PTGI-42 growth items, excluding the new possibilities factor (to avoid confounding with DOQ).

^bDeterioration = Sum of PTGI-42 deterioration items, excluding the new possibilities factor (to avoid confounding with DOQ).

Table 2. Correlations (Pearson's *r*) of all continuous variables.

Variable	1	2	3	4	5	6	7	8
1. Core belief disruption	1.00	0.18**	0.46**	0.49**	0.12*	0.19**	0.10	0.15*
2. Social support		1.00	0.44**	0.49**	-0.14*	0.22**	0.40**	0.03
3. Engagement			1.00	0.74**	-0.08	0.33**	0.39**	0.08
4. Growth ^a				1.00	-0.28**	0.34**	0.40**	0.11
5. Deterioration ^b					1.00	0.00	-0.16**	-0.02
6. Approach orientation						1.00	0.21**	-0.05
7. Satisfaction with life							1.00	-0.02
8. Total adverse events								1.00

Note: *N* = 276.

**p* < 0.05.

***p* < 0.01.

^aGrowth = Sum of PTGI-42 growth items, excluding the new possibilities factor (to avoid confounding with DOQ).

^bDeterioration = Sum of PTGI-42 deterioration items, excluding the new possibilities factor (to avoid confounding with DOQ).

and growth. Following Preacher and Hayes' (2004, 2008) approach for testing mediation, we observed a significant indirect effect of core belief disruption on growth through engagement with new possibilities; the point estimate of this indirect effect (i.e. the product of *ab* coefficients) was 0.33, (SE = 0.07, 95% CI [0.20, 0.47]). See Figure 1 for a graphical representation of this partial mediation effect. The indirect effect was computed controlling for social support, satisfaction with life, approach orientation, and posttraumatic deterioration (as these variables were correlated with the outcome).

Hypothesis 3: Engagement will buffer against deterioration (moderation)

A moderation analysis indicated that those who had questioned their core beliefs (without engaging with new possibilities) reported negative changes in their relationships, spirituality, appreciation of life, and sense of personal strength. In contrast, people who both questioned their beliefs *and* saw new possibilities did not tend to experience these negative changes (see Figure 2). Following the procedures set forth by Aiken and West (1991), we centered the three predictor variables (core

belief disruption, social support, and engagement with new possibilities) and created product terms to represent two-way interactions. A simultaneous regression model including the three predictor variables and two interaction terms (core belief disruption *X* engagement and core belief disruption *X* social support) explained significant variance in participants' PTGI-42 deterioration scores, *F*(5, 270) = 4.64, *p* < 0.0001. This regression revealed the predicted interaction between core belief disruption and engagement with new possibilities ($\beta = -0.20$, *p* = 0.004; *sr* = -0.17). (The other predictors and interaction were not statistically significant.)

We computed simple slopes and tested them based on procedures of Aiken and West (1991), using Preacher, Curran, and Bauer's (2006) web-based application. Individuals with low engagement with new possibilities (one SD or more below the mean) experienced significantly more deterioration as core belief disruption increased (Figure 2). In contrast, individuals with average or high (one SD above the mean) engagement with new possibilities did *not* tend to deteriorate as core belief disruption increased (i.e. this slope was not significantly different from zero). This interaction was meaningful in addition to being statistically significant: as seen in Figure 2,

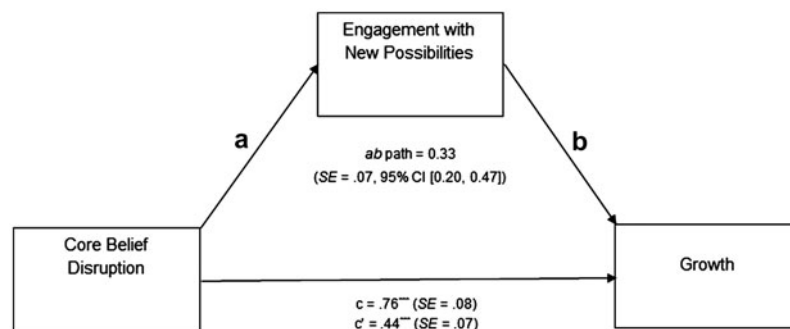


Figure 1. Graphical representation of mediation model: engagement with new possibilities partially mediates the effect of core belief disruption on growth.

Note: *N* = 276. The indirect effect (*ab* path) in this mediation model was calculated while controlling for social support, satisfaction with life, approach orientation, and posttraumatic deterioration. ****p* < 0.0001.

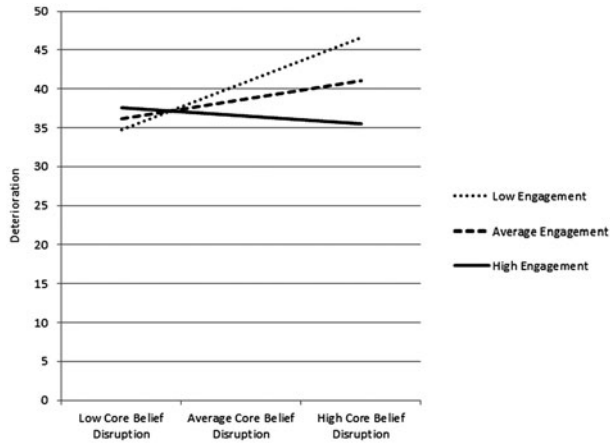


Figure 2. Interaction of core belief disruption and engagement with new possibilities in the prediction of deterioration.

Note: Low engagement and low core belief disruption represent scores (on the DOQ and CBI, respectively) that were one SD below the mean. High engagement and high core belief disruption represent scores that were one SD above the mean.

individuals tended to deteriorate (in four PTGI-42 domains) if they questioned their core beliefs without also engaging with new possibilities, but this deterioration did not occur if they questioned their beliefs while also engaging with new possibilities.

This moderation model suggested that engagement with new possibilities was a protective factor, buffering the otherwise negative effects of core belief disruption. These results should be interpreted cautiously, however, because they did not replicate when five additional covariates were added to the model: in that case, it appeared that people with badly disrupted core beliefs all deteriorated substantially, but people with little core belief disruption and little engagement with new possibilities fared better. This suggests complex (and non-predicted) interactions between the variables in this particular data-set.

Engagement did not moderate the relationship between core belief disruption and growth: people who engaged with new possibilities while questioning their core beliefs did not grow more than people who questioned their beliefs without engaging with new possibilities. A simultaneous regression model with the same predictor variables and interaction terms (described above) was used to predict growth rather than deterioration. This model explained significant variance in participants' PTGI-42 growth scores, $F(5, 270) = 86.06$, $p < 0.0001$, but showed a non-significant interaction between core belief disruption and engagement ($\beta = -0.08$, $p = 0.06$). When two covariates were added to the model, this interaction term became statistically significant but remained substantively unimportant: we used the same procedures described above to graph and

interpret the interaction, and found the negligible difference in slopes seen in Figure 3.

Discussion

Engagement with new possibilities – seeing new doors opening in the aftermath of adversity – was a powerful predictor of growth in this study. Engagement with new possibilities also partially accounted for the positive relationship between core belief disruption and growth, suggesting that core belief disruption needs to be transformed into a sense of new possibilities to create positive change. Engagement may also protect against negative changes that can occur when people are forced to question their core beliefs; engagement moderated the relationship between core belief disruption and deterioration. (Our moderation hypothesis was partially supported. We hypothesized that people who question their beliefs and engage with new possibilities would grow, while people who only questioned their beliefs would deteriorate. The moderation effect was not this dramatic. Instead, engagement buffers the negative effects of core belief disruption but does not amplify the positive effects of core belief disruption.) Overall, envisioning and pursuing new possibilities may be a vital part of the process by which disruption is transmogrified into growth.

Limitations

Cross-sectional design

Several limitations of this study prevent us from drawing definitive conclusions. First and foremost, the study's cross-sectional design precludes any determination of causality. Although engagement might prove to be just

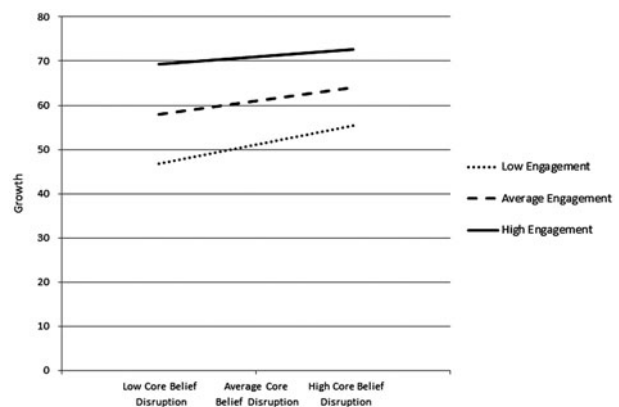


Figure 3. Interaction of core belief disruption and engagement with new possibilities in the prediction of growth.

Note: Low engagement and low core belief disruption represent scores (on the DOQ and CBI, respectively) that were one SD below the mean. High engagement and high core belief disruption represent scores that were one SD above the mean.

another correlate of growth instead of its mechanism, we took steps to clarify the relationship as much as possible within the limits of a cross-sectional design: (a) we attempted to establish a timeline: we instructed participants to think back to the time of the event to report on the new possibilities they saw, while we instructed them to report growth that happened since then. (Admittedly, the timeline is still imprecise, as we asked participants to report on the time period in which they were ‘dealing with the event.’ Although this flexible wording allows that the coping process unfolds more quickly for some people than others, this wording also sacrifices precision.); (b) we minimized confounds between the predictor (engagement) and the outcome (growth) by removing the new possibilities factor from the PTGI-42. Although these findings do not show that engagement gives rise to growth, they provide a strong foundation for longitudinal designs testing the hypothesis. Future prospective, longitudinal work will employ techniques like latent trajectory analysis to more rigorously model the growth process. To better distinguish temporal patterns in growth, future studies will also need to specify concrete time frames instead of referring to more abstract periods in the coping process.

Sample

Other limitations arise because of the participants we enrolled. Our participants were highly self-selected, so these relationships between engagement and growth may not generalize broadly. Additionally, most participants had experienced (heterogeneous) non-traumatic losses, so we cannot extend these findings to all trauma survivors. Notably, however, even non-traumatic loss is associated with PTSD symptoms, depression, morbidity, and stress-related growth (Linley & Joseph, 2004; Zisook et al., 1998).

Measurement issues

Our measurement strategy also had significant limitations. All our independent and dependent variables were retrospective, self-report measures. These scores are potentially influenced by memory biases, demand characteristics, response sets, and other well-documented sources of systematic and random error. Both of these limitations will be ameliorated by future prospective longitudinal designs with self-report data as well as informant reports and behavioral data. In this study, we were unable to account for some potentially important contextual variables (e.g. chronicity of the event and perceived threat), which might moderate our findings. Our new measure, the DOQ, is a diffuse and global questionnaire, and we did not test the process of *disengagement* with old goals, only engagement with new goals; we next

need to measure the specific things from which people are disengaging and with which they are engaging. Finally, the PTGI-42 provides a limited sampling of the relevant domains of stress-related deterioration. Future studies should include additional or alternative measures of deterioration (including PTSD, depression, and anxiety symptoms).

Theoretical and clinical implications

Despite these limitations, the findings are a useful springboard for further theoretical and empirical work. First, they suggest that Klinger’s (1975) incentive-disengagement cycle is a very useful concept in modeling growth: adversity leads us to disengage from old-valued activities and reinvest in new values, incentives, and goals. Second, these data inform the growing science of prospection (Seligman et al., 2013). People who see new opportunities after a trauma may be more likely to pursue new paths and grow. To grow, people may need adversity in the past and possibility in the future.

These findings also have clinical implications. Trauma survivors may experience better long-term outcomes if they engage with new possibilities in the acute post-trauma stage. Cognitively, survivors might broaden their perspectives to attend to new roles, goals, and sources of meaning. Behaviorally, they might make concrete efforts to take up new hobbies, find new passions, and broaden their social circles.

These findings stimulate important questions for future research. One key question is this: could most people actively adopt this strategy (engaging with new possibilities) as a way to cope with adversity and grow? Alternatively, is engagement just an epiphenomenon that occurs when adversity befalls people who already possess particular characteristics (e.g. optimism, openness to experience, secure attachment, and low neuroticism)? These questions can be investigated with various research designs. Prospective observational studies can include measures of key personal characteristics, and test (a) whether these predict the emergence of engagement with new possibilities; and (b) whether these moderate the relationship between engagement and growth. Experimental and intervention studies can attempt to actively cultivate engagement with new possibilities and test (a) whether this is truly a dynamic and teachable skill; and (b) whether certain personal characteristics moderate the success of the experimental manipulation or intervention. If engagement truly is an adaptive strategy that almost anyone can adopt, then it is a promising avenue for future interventions.

In conclusion, existing work on core belief disruption suggests that people obtain benefits by reflecting on shattered beliefs after a crisis. Here, we suggest that growth can happen without this existential earthquake, through

attention and imagination: people who see and pursue new opportunities may derive great benefit as they move forward after adversity.

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Note

1. Covariates: deterioration (PTGI-42 deterioration items), approach orientation (BAS), and life satisfaction (SLS).

References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- Baker, J. M., Kelly, C., Calhoun, L. G., Cann, A., & Tedeschi, R. G. (2009). An examination of posttraumatic growth and posttraumatic depreciation: Two exploratory studies. *Journal of Loss and Trauma, 13*, 450–465.
- Boelen, P. A., Kip, H. J., Voorsluijs, J. J., & van den Bout, J. (2004). Irrational beliefs and basic assumptions in bereaved university students: A comparison study. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 22*, 111–129.
- Cann, A., Calhoun, L. G., Tedeschi, R. G., Kilmer, R. P., Gil-Rivas, V., Vishnevsky, T., & Danhauer, S. C. (2009). The core beliefs inventory: A brief measure of disruption in the assumptive world. *Anxiety, Stress & Coping, 23*, 19–34.
- Cann, A., Calhoun, L. G., Tedeschi, R. L., & Solomon, D. T. (2010). Posttraumatic growth and depreciation as independent experiences and predictors of well-being. *Journal of Loss and Trauma, 15*, 151–166.
- Cann, A., Calhoun, L. G., Tedeschi, R. G., Triplett, K. N., Vishnevsky, T., & Lindstrom, C. M. (2011). Assessing posttraumatic cognitive processes: The event related rumination inventory. *Anxiety, Stress, & Coping: An International Journal, 24*, 137–156.
- Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *Journal of Personality and Social Psychology, 67*, 319–333.
- Diener, E., & Fujita, F. (1995). Resources, personal strivings, and subjective well-being: A nomothetic and idiographic approach. *Journal of Personality and Social Psychology, 68*, 926–935.
- Gilbert, D. T., & Wilson, T. D. (2007). Propection: Experiencing the future. *Science, 317*, 1351–1354.
- Helgeson, V. S., Reynolds, K. A., & Tomich, P. L. (2006). A meta-analytic review of benefit finding and growth. *Journal of Consulting and Clinical Psychology, 74*, 797–816.
- Ipeirotis, P. (2010). *Demographics of Mechanical Turk* (CeDER working paper. CeDER-10-01). New York, NY: New York University, Stern School of Business.
- Janoff-Bulman, R. (1992). *Shattered assumptions: Towards a new psychology of trauma*. New York, NY: Free Press.
- Janoff-Bulman, R. (2006). Schema-change perspectives on post-traumatic growth. In L. G. Calhoun & R. G. Tedeschi (Eds.), *Handbook of posttraumatic growth: Research and practice* (pp. 81–99). Mahwah, NJ: Erlbaum.
- Joseph, S., & Linley, P. A. (2005). Positive adjustment to threatening events: An organismic valuing theory of growth through adversity. *Review of General Psychology, 9*, 262–280.
- Klinger, E. (1975). Consequences of commitment to and disengagement from incentives. *Psychological Review, 82*, 1–25.
- Klinger, E., & Cox, W. M. (2004). Motivation and the theory of current concerns. In W. M. Cox & E. Klinger (Eds.), *Handbook of motivational counseling* (pp. 3–27). New York, NY: Wiley.
- Lehman, D. R., Davis, C. G., DeLongis, A., Wortman, C., Bluck, S., & Mandel, D. R. (1993). Positive and negative life changes following bereavement and their relations to adjustment. *Journal of Social and Clinical Psychology, 12*, 90–112.
- Lindstrom, C. M., Cann, A., Calhoun, L. G., & Tedeschi, R. G. (2011). The relationship of core belief challenge, rumination, disclosure, and sociocultural elements to posttraumatic growth. *Psychological Trauma: Theory, Research, Practice, and Policy, 5*, 50–55. doi:10.1037/a0022030
- Linley, P. A., & Joseph, S. (2004). Positive change following trauma and adversity: A review. *Journal of Traumatic Stress, 17*, 11–21.
- LoSavio, S. T., Cohen, L. H., Laurenceau, J. P., Dasch, K. B., Parrish, B. P., & Park, C. L. (2011). Reports of stress-related growth from daily negative events. *Journal of Social and Clinical Psychology, 30*, 760–785.
- MacLeod, A. K., & Byrne, A. (1996). Anxiety, depression, and the anticipation of future positive and negative experiences. *Journal of Abnormal Psychology, 105*, 286–289.
- Park, C. L., Cohen, L., & Murch, R. (1996). Assessment and prediction of stress-related growth. *Journal of Personality, 64*, 71–105.
- Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interaction effects in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Education and Behavioral Statistics, 31*, 437–448.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36*, 717–731.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*, 879–891.
- Schacter, D. L., & Addis, D. R. (2007). The cognitive neuroscience of constructive memory: Remembering the past and imagining the future. *Philosophical Transactions of the Royal Society of London B Biological Sciences, 362*, 773–786.
- Seligman, M. E. P., Railton, P., Baumeister, R. F., & Sripada, C. S. (2013). Navigating into the future or driven by the past. *Perspectives on Psychological Science, 8*, 119–141.
- Snyder, C. R. (1994). *The psychology of hope: You can get there from here*. New York, NY: Free Press.
- Snyder, C. R. (1996). To hope, to lose, and hope again. *Journal of Personal and Interpersonal Loss, 1*, 3–16.
- Swickert, R., & Hittner, J. (2009). Social support coping mediates the relationship between gender and posttraumatic growth. *Journal of Health Psychology, 14*, 387–393.
- Tedeschi, R. G., & Calhoun, L. G. (1996). The posttraumatic growth inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress, 9*, 455–471.

- Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry, 15*, 1–18.
- Thombre, A., Sherman, A. C., & Simonton, S. (2010). Post-traumatic growth among cancer patients in India. *Journal of Behavioral Medicine, 33*, 15–23.
- Zimet, G., Dahlem, N. W., Zimet, S. G., & Farley, G. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment, 52*, 30–41.
- Zisook, S., Chentsova-Dutton, Y., & Shuchter, S. R. (1998). PTSD following bereavement. *Annals of Clinical Psychiatry, 10*, 157–163.