

RESEARCH ARTICLE

Stress-Related Growth: Pre-Intervention Correlates and Change Following a Resilience Intervention

Christyn L. Dolbier¹, Shanna Smith Jaggars² & Mary A. Steinhardt^{3*}

¹Department of Psychology, East Carolina University, Greenville, NC, USA

²Senior Research Associate, Teachers College, Columbia University, New York, NY, USA

³Department of Kinesiology and Health Education, University of Texas at Austin, Austin, TX, USA

Summary

Correlates of stress-related growth and the effectiveness of a resilience intervention to enhance stress-related growth were examined. College students were randomly assigned to intervention ($n = 31$) and waiting list control ($n = 33$) groups. The intervention group received the psychoeducational intervention, Transforming Lives Through Resilience Education, in four weekly 2-hour sessions. Measures of personal, environmental and stressor characteristics, coping strategies, adjustment and stress-related growth were assessed. Multiple regressions revealed that pre-intervention self-esteem, self-leadership, hopeful coping and depressive symptoms significantly related to pre-intervention growth. A repeated measures analysis of variance yielded a significant group by time interaction for total growth; the intervention group showed greater increases in growth pre- to post-intervention compared with the control group. Our results supported the relationships of self-esteem and adaptive coping strategies to stress-related growth and introduce a new correlate of growth, self-leadership, to the literature. In addition, our results highlighted the complex role depressive symptoms may play in relation to growth, indicating that depressive symptoms might decrease one's inner resources while simultaneously serving as a catalyst for growth. Further, the findings supported the resilience intervention as a promising approach to facilitate growth. Copyright © 2009 John Wiley & Sons, Ltd.

Received 21 March 2009; Accepted 9 July 2009

Keywords

stress-related growth; post-traumatic growth; coping; resilience intervention; positive adaptation; depressive symptoms

*Correspondence

Mary A. Steinhardt, Department of Kinesiology and Health Education, University of Texas at Austin, Belmont Hall 222, Austin, TX 78712, USA.

*Email: msteinhardt@mail.utexas.edu

Published online 6 November 2009 in Wiley InterScience (www.interscience.wiley.com) DOI: 10.1002/smi.1275

Introduction

In the past, researchers traditionally focused on the negative effects of stressful situations to better understand physical and mental illness. While a necessary and important perspective, this deficit-oriented approach provides a limited view of individuals and their range of possible responses and outcomes (Tedeschi &

Kilmer, 2005). More recently, researchers have broadened their approach by including empirical evaluations of psychological processes and resources that may aid in adapting to stressful situations and lead to positive outcomes (Park & Fenster, 2004; Tedeschi & Calhoun, 2004).

The idea that positive change can emerge from suffering and distress is rooted in early philosophical and

religious writings. However, only recently have researchers employed the terms stress-related growth, post-traumatic growth and benefit finding to describe the positive changes experienced by individuals as a result of struggling with stressful situations or traumas (Tedeschi & Calhoun, 2004). We use the term stress-related growth because it encompasses positive changes that result from stressors with varying levels of severity. Stress-related growth is not merely recovering from a stressor, but rather the development of a higher level of adaptive functioning than was present prior to its occurrence. In general, stress-related growth dimensions have been classified into three broad categories: changed perceptions of self, changed relationships with others and changed philosophy of life (Calhoun & Tedeschi, 1998).

Stress-related growth is not an inevitable occurrence for all individuals struggling with a stressful situation. Many individuals will have bouts of anxiety, depression and anger as well as physical symptoms and intrusive ruminations about the event. However, negative changes due to stressful experiences may co-occur with positive changes (Calhoun & Tedeschi, 2001). In fact, it has been proposed that the painful struggle to come to terms with the stressful event is the source of potential benefit, and that for growth to take place, some degree of psychological discomfort must occur. In addition, individuals who experience growth may experience positive changes in some areas of their life but not all areas (Calhoun & Tedeschi, 2001). This variability in the occurrence of positive and negative changes as a result of stressful situations has led researchers to investigate the correlates of stress-related growth and to contemplate ways to intervene to facilitate growth.

Correlates of stress-related growth

Schaefer and Moos (1998) categorized determinants of stress-related growth as coping strategies, and personal, environmental and stressor characteristics. The majority of studies examining growth in relation to *coping strategies* have demonstrated a positive relationship. Growth has been positively related to problem-focused coping strategies such as active coping (Wild & Paivio, 2003), planning (Park & Fenster, 2004) and positive reappraisal (Sears, Stanton, & Danoff-Burg, 2003) as well as to emotion-focused coping strategies such as emotional support coping (Thornton & Perez, 2006) and religious coping (Park, 2006).

Growth has also been positively related to a number of *personal characteristics*, such as self-esteem (Abraido-Lanza, Guier, & Colon, 1998) and mastery (Park & Fenster, 2004), which may serve as inner resources that facilitate growth. A personal characteristic that may be related to growth, but has not been tested empirically, is self-leadership. The concept of self-leadership is based on the Internal Family Systems (IFS) model, which describes an individual as a complex system with multiple parts (e.g. the achiever, the caretaker, the critic) (Schwartz, 1995; 2001). Self-leadership refers to the extent to which this system is operated by a core self, an active compassionate inner leader providing a safe and nurturing environment in which the various parts can develop and relate to one another in a more harmonious way. Nichols and Schwartz (1991) described the self as follows:

In this leadership role the Self listens to each part and what it really wants, nurtures or comforts some parts, helps change the role of others, and negotiates with polarized parts to resolve their differences. For example, the Self may comfort and soothe frightened or sad parts, calm rageful defenders, or get striving achiever parts to compromise with parts that demand more relaxation (pp. 503–504).

Individuals who lead with the self have greater access to personal resources and adaptive coping ability (Steinhardt & Dolbier, 2001; Steinhardt, Dolbier, Mallon, & Adams, 2003), which may result in more favourable outcomes such as growth.

With regard to *environmental characteristics*, social support is commonly studied in relation to growth, with the majority of studies reporting a positive relationship (e.g. Siegel, Schrimshaw, & Pretter, 2005). *Characteristics of the stressful event* that may relate to growth include event type, stressfulness and recency. Most studies comparing growth levels by event type (e.g. Park, Cohen, & Murch, 1996) and recency (Helgeson *et al.*, 2006) have not found differences. A recent meta-analysis found that event stressfulness consistently relates to growth (Helgeson *et al.*, 2006), suggesting it is the subjective experience of the event that influences growth. Researchers have proposed that it takes a 'seismic' or severe stressor to disrupt one's world view enough to open the window for growth to occur (Tedeschi & Calhoun, 2004).

Adjustment and stress-related growth

A key question of interest to clinicians is whether stress-related growth relates to better psychological adjustment. Studies in this area have yielded mixed results. To make sense of the inconsistent findings, Helgeson *et al.* (2006) conducted a meta-analysis examining the relation of growth to psychological health. Results showed that growth was related to less depression and more positive well-being but also to more intrusive and avoidant thoughts about the stressor. The relationship of growth to positive well-being suggests that growth reflects more than a mere lack of distress. When intrusive and avoidant thoughts are viewed as markers of cognitive processing (which some suggest is necessary for growth to occur), their relationship with growth makes sense and is not necessarily inconsistent with the relationships of growth to depression and positive well-being (Helgeson *et al.*, 2006).

Interventions fostering stress-related growth

While studies of interventions facilitating growth are scarce in the literature (Lechner & Antoni, 2004), those that exist are promising and quite varied. For example, cognitive-behavioural (Penedo *et al.*, 2006) and mindfulness-based stress reduction and creative arts (Garland, Carlson, Cook, Lansdell, & Speca, 2007) interventions and an Internet-based support group (Lieberman *et al.*, 2003) increased stress-related growth with cancer patients. A journaling intervention with undergraduates also increased stress-related growth (Ullrich & Lutgendorf, 2002).

Our psychoeducational resilience intervention was designed to enhance personal and social resources with the goals of facilitating resilience (recovering from a stressor to a pre-stressor level of functioning) and when possible, thriving (developing a higher level of adaptive functioning than was present prior to a stressor's occurrence) (Steinhardt, 2008). The construct of resilience has been identified as a protective factor that may decrease adjustment problems and increase positive change when coping with stressful situations (Paton, Violanti, & Smith, 2003). The construct of thriving is congruent with the idea that adversity can eventually confer benefits, and stress-related growth has been identified as an indicator that thriving has occurred (Carver, 1998). To date, research has yet to test the effectiveness of a resilience psy-

choeducation intervention to enhance stress-related growth.

The current study

The objectives of the current study are to replicate and extend knowledge of correlates of stress-related growth and test the effectiveness of a resilience psychoeducation intervention to enhance growth. Two hypotheses were tested, the first of which proposes that pre-intervention coping strategies (problem-solving, support, hopeful and avoidant coping), adjustment (few depressive symptoms), and personal (resilience, self-esteem, self-leadership), environmental (social support) and stressor (event stressfulness) characteristics will relate to greater pre-intervention growth. We also included event type and recency in the analyses but did not expect to find relationships with growth based on previous literature. The second hypothesis proposes that the resilience psychoeducation intervention will lead to increased growth pre- to post-intervention.

Methods

Sample

The participant pool was composed of university students who volunteered in response to flyers posted around campus to participate in a resilience programme to learn how to manage stressful situations more effectively. Sixty-four students were recruited and randomly assigned to experimental ($n = 31$) and waiting list control ($n = 33$) groups. The majority were undergraduates (68.8 per cent), with equal percentages of masters (15.6 per cent) and doctoral (15.6 per cent) students. Eighty-four per cent were females and 16 per cent were males ranging in age from 18 to 53 years (Median = 21 years). The sample consisted of 42.4 per cent White, 25.0 per cent Asian, 21.9 per cent Hispanic, 4.7 per cent Black and 6.3 per cent self-identified as other. The two groups did not significantly differ on any demographic variables.

Procedures

The experimental group received the resilience intervention, *Transforming Lives Through Resilience Education*. The intervention drew upon the IFS model (Schwartz, 1995; 2001), cognitive-behavioural therapy (Burns, 1999), rational emotive therapy (Ellis, 2001),

the transactional model of stress and coping (Lazarus & Folkman, 1984), and resilience and thriving models (Carver, 1998; O'Leary & Ickovics, 1995), and included four weekly 2-hour classroom sessions. The *Transforming Stress into Resilience* session presented a resilience model that portrayed four typical responses to stress including 'give up', 'put up', 'bounce up' and 'step up'. Two broad categories of coping, problem-focused and emotion-focused, were discussed within the context of the model. The *Taking Responsibility* session presented a responsibility model in which a line was drawn between taking and not taking responsibility for one's behaviour. The participants engaged in a five-step process to help move above the line and take responsibility. The *Focusing on Empowering Interpretations* session helped the participants change their disempowering interpretations or thinking into empowering interpretations using a simple ABCDE thinking model (activating event; belief about activating event; consequence or how one feels and behaves in response to beliefs; disputing the disempowering beliefs and creating empowering interpretations; energy to handle the activating event). Finally, the *Creating Meaningful Connections* session focused on increasing awareness of the link between connecting with, or conversely withdrawing, from friends and loved ones and the corresponding impact on thinking, behaviour and health. This session also focused on how self-leadership facilitates taking responsibility, focusing on empowering interpretations and establishing meaningful connections. A complete description of the curriculum is described elsewhere (Steinhardt & Dolbier, 2008), and a modified version is available online (Steinhardt, 2008).

All participants completed pre-intervention surveys within a day prior to the experimental group starting the intervention, and completed post-intervention surveys 1 week following the experimental group's final intervention session on the last day of classes. A condensed 4-hour version of the intervention was offered to the waiting list control group upon conclusion of the study. Participants were compensated \$10 following completion of each survey and those in the experimental group received an additional \$15 if they attended all sessions.

Measures

Pre- and post-intervention surveys contained the same measures: stressful event, stress-related growth, resil-

ience, self-esteem, self-leadership, coping strategies, depressive symptoms and social support.

Stressful event

To increase the probability of assessing severe stressors that are more likely to result in growth, are still a source of distress and could benefit from the intervention, participants were asked to describe the most stressful/upsetting event they had experienced in their life that still felt unresolved for them and still affected them. Participants were asked to report how long ago the event occurred and the degree to which the event was stressful at the time it occurred as well as the degree that the event was currently stressful on a scale from 1 (*not at all stressful*) to 7 (*extremely stressful*) (Park *et al.*, 1996). A measure of stress-related growth was then completed in reference to this event.

Stress-related growth

A modified version of the Post-traumatic Growth Inventory (PTGI) assessed the positive and negative changes reported by the participants as a result of their stressful event (Tedeschi & Calhoun, 1996). Original PTGI items are worded in the positive direction (e.g. 'I have a stronger religious faith') and the respondents indicated the extent to which they experienced each positive change. Some researchers have suggested that restricting responses to only positive changes results in a loss of information about the range of potential responses, factor structure distortion, covariation among related items being weakened and demand characteristics to report positive change (Armeli, Gunthert, & Cohen, 2001). Thus, we used a modified PTGI in which items were reworded so that both positive and negative change could be reported; participants responded on a scale ranging from -3 (*greatly decreased*) to 3 (*greatly increased*). The 21-item scale includes five subscales: new possibilities, relating to others, personal strength, spiritual change and appreciation of life. Each subscale score, as well as a total score, was calculated to reflect net positive increases. While the internal consistency of the total scale was strong ($\alpha = 0.90$), with subscale reliabilities ranging from 0.71 (new possibilities) to 0.90 (spiritual change), a factor analysis of this modified PTGI was not possible because of the sample size.

Resilience

The 25-item Connor–Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003) includes items that represent a variety of resilient characteristics such as goal setting, patience, faith, humor and tolerance of negative affect as well as the ability to perceive a challenge, make a commitment and take control. Participants responded to items using a five-point scale ranging from 0 (*not true at all*) to 4 (*true nearly all the time*).

Self-esteem

The 10-item Rosenberg Self-Esteem Scale measured self-esteem, with participants indicating on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) the extent to which they agreed with each item (Rosenberg, 1965).

Self-leadership

The 20-item Self-Leadership Scale instructed participants to indicate the frequency of their experiences of leading with the self on a five-point scale ranging from 1 (*never/almost never*) to 5 (*always/almost always*) (Steinhardt *et al.*, 2003).

Coping strategies

A broad range of cognitive and behavioural coping strategies were assessed using the 28-item Brief Coping Orientations to Problems Experienced scale (Brief COPE; Carver, 1997). For each item, participants indicated the extent to which they typically used the strategy in dealing with stressful situations on a four-point scale ranging from 1 (*not at all*) to 4 (*a lot*). Based on previous research, four coping categories were formed using 12 of the Brief COPE two-item subscales: (1) support coping, composed of emotional support, instrumental support and venting subscales; (2) hopeful coping, composed of positive reframing, religion and substance use (reverse scored to reflect substance use abstinence) subscales; (3) problem-solving coping was composed of active, planning and acceptance subscales; and (4) avoidant coping, composed of denial, behavioural disengagement and self-blame subscales. The Brief COPE subscales of self-distraction and humor did not load on any of these four factors. Complete details regarding the construction of these coping categories can be found in Steinhardt and Dolbier (2008).

Depressive symptoms

Depressive symptoms were measured using the 20-item Center for Epidemiologic Studies Depression Index (CES-D; Radloff, 1977). Participants indicated on a four-point scale ranging from 0 (*rarely or none of the time—less than 1 day*) to 3 (*all of the time—5 to 7 days*), the extent to which they experienced various depressive symptoms during the past week.

Social support

The 24-item Social Provisions Scale (Cutrona & Russell, 1987) measured the degree to which relationships with others supply guidance, reliable alliance, reassurance of worth, social integration, attachment and opportunity to provide nurturance. The participants indicated on a four-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*) the extent to which they agreed with each item.

Data analysis

Descriptive statistics were calculated for all variables pre-intervention. To test Hypothesis 1, multiple regressions were used to examine the ability of coping strategies, adjustment, and personal, environmental and stressor characteristics to predict stress-related growth. All participants who completed the pre-intervention survey were included in these analyses.

Hypothesis 2 pertained to whether total growth, as well as the five different types of growth, increased following the intervention; therefore, only those participants who completed the pre- and post-intervention surveys, and described the same stressful experience both times were included in this analysis. Total growth was analysed using a 2×2 repeated measures analysis of variance (ANOVA) with a between-subjects factor of group (experimental versus control), a within-subjects factor of time (pre-intervention versus post-intervention) and a group by time interaction. Growth subscales were analysed using a 2×2 repeated measures multivariate ANOVA. The *F*-ratios for each test were based on Wilks' approximation. Significant interaction effects were further investigated using follow-up simple main effects tests (Winer, Brown, & Michels, 1991). In addition, classical eta-squared (η^2) effect sizes were calculated for each interaction; each effect size is interpreted as the proportion of within-person variance for the given outcome that was explained by the interaction

effect. Lastly, based on our previous report that individuals undergoing this intervention demonstrated more effective coping strategies, greater levels of positive personal characteristics and better adjustment (Steinhardt & Dolbier, 2008), we conducted a follow-up analysis to examine whether changes in the predictors correlated with changes in growth.

Results

Descriptive statistics

The possible range of scores, means, standard deviations and internal consistencies for all continuous study variables pre-intervention, and frequency counts and percentages for categorical study variables pre-intervention are shown in Table I. The depressive symptoms mean was relatively high, with a normal distribution ranging from 3 to 40. A CES-D score of 16 or greater is considered a moderately severe level of depressive symptom (Radloff, 1977). The internal consistencies of problem-solving coping ($\alpha = 0.67$) and avoidant coping ($\alpha = 0.69$) categories were just below adequate. We were able to improve these alpha values to above 0.70 by dropping two items from each category. The

improved alpha values, however, produced similar results to the original coping categories. To be consistent with previous research using these coping categories, we opted to report the results using the original categories.

Stressor characteristics

The stressful events reported by participants pre-intervention were grouped into three categories: (1) relationship issues (e.g. parents' divorce, boyfriend/girlfriend problems); (2) uncertainty about how events would unfold in the future (e.g. academic stressors such as failing a class or exam, financial stressors such as losing or quitting a job, dealing with change such as moving to the United States); and (3) traumatic events (e.g. being kidnapped, death of a loved one, serious illness of self or relative). These events occurred within a range of 0 to 292 months (approximately 24 years) prior to the study, with an average of approximately 3 years. The distribution was positively skewed, with 50.8 per cent of the events occurring within the past year, 65.1 per cent occurring within the past 2 years and 84.1 per cent occurring within the last 5 years. The rated stressfulness of the events at the time of their occur-

Table I. Pre-intervention study variables: descriptive statistics, internal consistencies and correlations with stress-related growth ($n = 64$)

	Possible range	M	SD	α	r	Count	%	r_{pb}
Stress-related growth	-63-63	19.87	18.16	0.90	1.00	—	—	—
Personal characteristics						—	—	—
Resilience	0-100	69.41	11.17	0.87	0.46**	—	—	—
Self-esteem	10-50	38.72	7.03	0.89	0.52**	—	—	—
Self-leadership	20-100	68.14	13.36	0.92	0.63**	—	—	—
Coping strategies						—	—	—
Avoidant coping	6-24	9.89	2.93	0.69	-0.22	—	—	—
Hopeful coping	6-24	17.73	3.69	0.72	0.47**	—	—	—
Problem-solving coping	6-24	19.02	2.72	0.67	0.49**	—	—	—
Support coping	6-24	16.84	3.88	0.77	0.22	—	—	—
Adjustment						—	—	—
Depressive symptoms	0-60	18.14	9.97	0.88	-0.31*	—	—	—
Environmental characteristic						—	—	—
Social support	24-96	82.98	8.64	0.90	0.31*	—	—	—
Stressor characteristics						—	—	—
Stressfulness event at occurrence	1-7	5.88	1.55	—	0.00	—	—	—
Stressfulness event now	1-7	4.28	1.80	—	-0.24	—	—	—
Event recency (in months)	Open-ended	36.35	60.59	—	0.20 (r_s)	—	—	—
Relationship issues	—	—	—	—	—	28	43.80	-0.07
Uncertainty	—	—	—	—	—	24	37.50	-0.04
Traumatic events	—	—	—	—	—	12	18.80	0.05

* $p < 0.05$, two-tailed; ** $p < 0.01$, two-tailed.

rence was high and at the time of the study (pre-intervention), was moderately high (see Table I).

Variables related to stress-related growth

With respect to Hypothesis 1, Table I also shows the correlations between growth and coping strategies, adjustment, and each of the personal, environmental and stressor characteristics (event-type correlations are point-biserial and event recency correlation used Spearman's rho because of its positively skewed distribution). The three event categories were recoded into two dummy variables representing relationship issues and uncertainty (with traumatic events serving as the reference category). Growth correlated positively and significantly with resilience, self-esteem, self-leadership, hopeful coping, problem-solving coping and social support. Growth correlated negatively and significantly with depressive symptoms, and did not correlate significantly with avoidant coping, support coping or any of the stressor characteristics. Significant growth correlates were entered into a multiple regression equation; non-significant predictors were sequentially deleted one at a time. None of the demographic variables (i.e. gender, age, student ranking, race) significantly related to growth and thus were not included in the regression as possible covariates. The first regression equation accounted for a substantial portion of the variance in growth ($adjusted R^2 = 0.59$; $p < 0.001$); diagnostics indicated no issues with multicollinearity. Resilience was the first non-significant variable [$\beta = 0.01$; *not significant (ns)*] to be deleted. A second regression equation with the remaining six variables also significantly predicted growth ($adjusted R^2 = 0.60$; $p < 0.001$), with social support being the next non-significant variable ($\beta = 0.04$; *ns*) to be deleted. A third regression equation with the remaining five variables also significantly predicted growth ($adjusted R^2 = 0.61$; $p < 0.001$), with problem-solving coping being the only non-significant predictor ($\beta = 0.11$; *ns*). The final regression model included the variables self-leadership ($\beta = 0.65$, $p < 0.001$), depressive symptoms ($\beta = 0.35$, $p < 0.05$), hopeful coping ($\beta = 0.40$, $p < 0.001$) and self-esteem ($\beta = 0.26$, $p < 0.05$) and significantly predicted growth ($adjusted R^2 = 0.60$; $p < 0.001$).

Note that the correlation between depressive symptoms and growth is negative, while the coefficient for depressive symptoms in the regression equation is positive. A reversal in the apparent relationship between

two variables after additional variables are taken into account could signal an inconsistent-mediation mechanism (see MacKinnon & Fairchild, 2009). For example, depressive symptoms may exert a negative indirect influence on growth through the mediators of self-esteem, self-leadership and hopeful coping (that is, those who have depressive symptoms may also have lower levels of these personal resources, which in turn leads to less growth) while exerting a positive direct influence on growth. To investigate the potential indirect effects of depression on stress-related growth via multiple mediators, we estimated a series of regression equations in three steps (MacKinnon, 2008). Firstly, we regressed the outcome on the predictor of depressive symptoms alone, resulting in a significant overall equation ($adjusted R^2 = 0.08$, $p < 0.01$) with a negative beta coefficient for depressive symptoms ($\beta = -0.31$, $p < 0.05$). Secondly, we regressed each of the suspected mediators on the predictor of depressive symptoms; this required three separate equations, one for each of the potential mediators of hopeful coping, self-esteem and self-leadership. Depressive symptoms was a significant predictor of self-esteem ($adjusted R^2 = 0.38$, $\beta = -0.63$, $p < 0.001$) and self-leadership ($adjusted R^2 = 0.58$, $\beta = -0.76$, $p < 0.001$) but not hopeful coping ($adjusted R^2 = -0.02$, $\beta = -0.02$, *ns*). The third step, demonstrating that each mediator affects the outcome (controlling for depressive symptoms as well as other putative mediators) had already been performed in the original regressions; as noted earlier, all three mediators, as well as the predictor depressive symptoms, were positive and significant in the final regression model. Taken together, the results of these regressions suggested that self-esteem and self-leadership partially mediated the relationship between depressive symptoms and growth. To test the significance of the mediated paths, we applied a macro developed by Preacher and Hayes (2008) that uses a bootstrapping technique to produce point estimates and several varieties (percentile, bias-corrected, and bias-corrected and accelerated) of 95 percent confidence interval for indirect paths; these calculations are more appropriate than the traditional Sobel test for multiple mediator models with small sample sizes. While the three varieties of confidence interval varied slightly in their estimates, all agreed that the indirect effects of depression were significant and negative via the mediators self-esteem and self-leadership but non-significant via the mediator hopeful coping. Thus, depression had a positive direct effect on growth

but negative indirect effects via self-esteem and self-leadership; the overall negative indirect effect is so strong that when unaccounted for, it overwhelms the positive direct effect, resulting in the observed negative bivariate relationship between depression and growth.

Effectiveness of the resilience intervention

Hypothesis 2 pertained to whether or not growth increased following the resilience intervention. Seven participants ceased participation prior to completing the post-intervention portion (one experimental; six control). To test Hypothesis 2, the participants needed to reflect on the same stressful event pre- and post-intervention. Therefore, only participants who wrote about the same stressful event pre- and post-intervention were included in this analysis. Of the stressful events reported by participants on the post-intervention survey, 19 out of 30 in the experimental group and 19 out of 27 in the waiting list control group wrote about the same stressful event. Participants who wrote about different stressful events ($n = 19$) indicated doing so for a variety of reasons, such as: (1) the event was resolved (e.g. relationship issue); (2) the event was accepted (e.g. death); (3) the event was out of their control (e.g. loss of job); or (4) they could not remember what they wrote about the first time (suggesting they had not identified a truly stressful/traumatic event). There were no differences between those who wrote about the same event and those who did not with respect to any of the other study variables pre-intervention.

Table II shows the means and standard errors for total growth and growth subscales pre- and post-

intervention. Independent *t*-tests found no significant differences between the experimental and control groups pre-intervention in terms of total growth or the growth subscales. Correlations among the growth subscales ranged widely (from $r = 0.09$ to $r = 0.68$ pre-intervention; from $r = 0.49$ to $r = 0.89$ post-intervention). The univariate analysis for total growth yielded a significant main effect for time [$F(1,36) = 11.00, p < 0.01$], non-significant main effect for group [$F(1,36) = 0.60, ns$] and significant group by time interaction [$F(1,36) = 4.41, p < 0.05$]. Follow-up simple main effects tests within each group showed that the degree of change was negligible in the control group ($M = 2.54, SE = 2.95, ns$) and substantial in the intervention group ($M = 11.32, SE = 2.95, p < 0.001$). The multivariate analysis for the five growth subscales showed a significant main effect for time [$F(5,32) = 3.55, p < 0.05$], marginal main effect for group [$F(5,32) = 2.21, p < 0.10$] and non-significant group by time interaction [$F(5,32) = 1.52, ns$]. A visual inspection of the means for each group in Table II revealed that the intervention group showed greater increases over time than the control group for each subscale (the control group actually decreased in three of the subscales over time). However, the small sample size for this study was insufficient to detect the multivariate interaction effect.

The group by time interaction effect size for the total growth scale ($\eta^2 = 0.09$) was moderate; of the growth subscales, appreciation of life had the strongest effect size ($\eta^2 = 0.10$), followed by the personal strength subscale ($\eta^2 = 0.08$) and the new possibilities subscale ($\eta^2 = 0.06$); the effect sizes for relating to others and spiritual change were small (each $\eta^2 = 0.01$).

Change scores were created for stress-related growth and for each of the coping, adjustment, and personal

Table II. Repeated measures ANOVA and MANOVA results, and means and standard errors for stress-related growth pre- and post-intervention

Variables	Experimental				Waiting list control			
	Pre-intervention		Post-intervention		Pre-intervention		Post-intervention	
	M	SE	M	SE	M	SE	M	SE
Stress-related growth*	17.26	4.36	28.58	4.91	16.84	4.36	19.39	4.91
New possibilities	4.95	1.06	7.00	1.24	4.74	1.06	4.68	1.24
Relating to others	6.95	1.63	9.47	1.74	3.95	1.63	5.65	1.74
Personal strength	1.68	1.13	6.16	1.00	2.90	1.13	4.32	1.00
Spiritual change	1.68	0.68	1.84	0.54	1.05	0.68	0.68	0.54
Appreciation of life	2.00	0.99	4.11	0.98	4.21	0.99	4.05	0.98

* $p < 0.05$.

and environmental characteristic variables by subtracting the pre-intervention score from the post-intervention score. Correlations were conducted between the growth change score and the change scores of the other variables. Change in growth significantly and positively correlated with changes in resilience ($r = 0.67, p < 0.001$), self-leadership ($r = 0.47, p < 0.05$) and self-esteem ($r = 0.41, p < 0.05$); it also significantly and negatively correlated with change in depressive symptoms ($r = -0.33, p < 0.05$). Change in growth did not significantly correlate with changes in social support ($r = 0.22, ns$), hopeful coping ($r = 0.16, ns$), support coping ($r = -0.23, ns$) or avoidant coping ($r = -0.10, ns$) but demonstrated a trend towards significance for problem-solving coping ($r = 0.31, p = 0.06$).

Discussion

This study examined correlates of stress-related growth and the effectiveness of a resilience intervention to enhance growth. The personal characteristics of self-esteem and self-leadership, and the coping category of hopeful coping related to greater growth. Although depressive symptoms were correlated with lower stress-related growth in the bivariate analysis, multiple regression analysis revealed a more complicated relationship. Depressive symptoms had an indirect negative relationship with growth through the mediators of self-leadership and self-esteem, as well as a positive direct relationship. In the final regression model, none of the environmental (i.e. social support) or stressor (i.e. event type, stressfulness, recency) characteristics were related to growth. The experimental group had greater increases in total growth compared with the control group. In terms of the degree to which the experimental group changed more sharply than the control group, effect sizes for each outcome ranged from small to moderate.

That growth was positively related to self-esteem is consistent with previous research (Abraido-Lanza *et al.*, 1998). Individuals with high self-esteem are more likely to feel capable of handling stressful events, feel less threatened by them and utilize adaptive coping strategies, all of which may serve as precursors to growth. While resilience significantly correlated with growth, perhaps it was not a significant predictor when included in the regression because of its conceptual overlap with the other personal characteristics, coping and adjustment predictors.

Self-leadership was positively related to growth, a finding that contributes a new correlate of growth to the literature. A major tenet of the IFS model is that individuals have at their core, or seat of consciousness, a self. When leading with the self, people describe feeling centred, calm, a sense of well-being and trustworthiness. This state is similar to what others have described as mindfulness, being in the flow, following one's bliss or having a secure sense of self (Csikszentmihalyi, 1990; Kabat-Zinn, 1995). Just as an organization with effective leaders will be able to achieve greater success, individuals with greater self-leadership will be able to lead their internal family or system of parts (e.g. the achiever, the caretaker, the critic) more effectively (Schwartz, 1995; 2001). When the system of parts is balanced and working effectively, the individual is better able to adapt to and grow from stressful situations.

The current study employed a unique combination of the Brief COPE subscales represented by four coping categories (Steinhardt & Dolbier, 2008). Of the four coping categories, only hopeful coping was a significant predictor of growth after personal characteristics and adjustment were included in the regression. Hopeful coping was composed of positive reframing, religion and substance use (reverse scored to reflect substance use abstinence) coping subscales, which all seem to reflect the underlying theme of having hope. Hopeful coping's relation to growth is consistent with other studies that have related growth to positive reframing (Sears *et al.*, 2003; Thornton & Perez, 2006) and religious coping (Park, 2006; Park & Fenster, 2004). The problem-solving coping category significantly correlated with growth but did not remain a significant predictor when included in the regression with the other predictors. This is unexpected given it consists of active, planning and acceptance coping subscales, all of which have been associated with greater growth (Park & Fenster, 2004; Park *et al.*, 1996; Wild & Paivio, 2003). However, research supports the idea that problem-focused coping is less effective in situations that cannot be changed (Zakowski, Hall, Klein, & Baum, 2001), and many of the stressors cited by the participants were not amenable to change.

A significant contribution of this study is that it helps to elucidate the complex relationship between depressive symptoms and stress-related growth. Depressive symptoms negatively related to growth, yet became a positive predictor after controlling for hopeful coping,

self-leadership and self-esteem. Mediation tests suggested that depressive symptoms exert an indirect negative influence through the mediators of self-leadership and self-esteem; that is, those who have high depressive symptoms may also have lower levels of these personal characteristics, which in turn lead to less growth. Simultaneously, however, depressive symptoms have a direct positive relationship with growth; that is, when self-leadership and self-esteem are controlled, depressive symptoms may serve as a 'wake up call' to the individual. These results suggest that growth occurs when individuals have a sufficient foundation of self-leadership and self-esteem present, yet sufficient distress to merit an examination of current beliefs and feelings in the context of past trauma and adaptations. As such, depressive feelings serve as a catalyst to disrupt and then help reshape basic beliefs about oneself and the world (Carver, 1998).

This is the first study to examine the effectiveness of a resilience intervention to enhance stress-related growth. The intervention significantly increased total growth with a moderate effect size. Moderate effect sizes were also found for the subscales appreciation of life, personal strength, and new possibilities, and small effect sizes for the subscales of relating to others and spiritual change. While the sample size was not sufficient to test for mechanisms by which growth occurred, we previously reported that those who underwent this intervention demonstrated more effective coping strategies, greater levels of positive personal characteristics and better adjustment (Steinhardt & Dolbier, 2008). Our follow-up correlational analysis of change scores indicates that increases in resilience, self-leadership and self-esteem and decreases in depressive symptoms correspond with increases in growth. Thus, we propose that these improvements in personal resources and psychological functioning are potential mechanisms by which the resilience intervention facilitates growth. These results and our proposed mechanisms are consistent with intervention studies that propose cognitive and emotional processing, improved psychological functioning, and development of stress management skills as mechanisms by which growth may be facilitated (Penedo *et al.*, 2006; Ullrich & Lutgendorf, 2002).

Implications for practice

The results of this study have several implications for practice. Most important for clinicians is an awareness

that negative outcomes associated with trauma and stressful experiences may co-occur with positive outcomes and possibilities for growth, creating an opportunity to facilitate stress-related growth. However, as others have cautioned, growth is not an inevitable outcome of struggling with a stressful situation and it is important not to rush or lead the client towards identifying positive change, especially in the immediate aftermath of a stressful experience (Calhoun & Tedeschi, 1998; 2001). Rather, the clinician should remain cognizant that it is often the painful struggle and discomfort of the stressful situation that simultaneously serves as the source of potential growth.

Traditionally, intake procedures have focused on identifying deficits such as symptoms, problem behaviours, and functional difficulties (Tedeschi & Kilmer, 2005). Our results support a more comprehensive intake process akin to strength-based assessment that would also assess personal resources and competencies. This process may require clinicians to adjust their underlying clinical framework, but would provide a more holistic view of individuals to draw upon during case conceptualization, as well as inform and guide treatment plans (Tedeschi & Kilmer, 2005).

For example, if the intake process indicates the client is overwhelmed with distress, the clinician must first reduce symptoms and stabilize the client's psychological state rather than focus on facilitating growth (Calhoun & Tedeschi, 2001). Although growth may occur most readily when helping a client rebuild a shattered or damaged world view, a foundation of resources may be necessary to allow the presence of distress to serve as a motivating factor. Nonetheless, as our results suggest, distress may facilitate growth, so the removal of all distress could limit the potential for growth to occur (Calhoun & Tedeschi, 1998; Tedeschi & Calhoun, 2004). Clinicians must first help stabilize and then strengthen a client's general psychological state in order for the client to examine, restructure and rebuild their general assumptions and views of themselves and the world, such that growth can occur (Calhoun & Tedeschi, 1998).

Limitations and future directions

The findings of the current study should be considered in light of several limitations. The sample size is relatively small and precluded an examination of mechanisms of growth. However, the significant findings we

observed are consistent with the literature and extend knowledge in this area in important ways. Secondly, because of the use of a waiting list control group rather than an alternative intervention, it is possible that the observed effect on growth is due to a placebo effect or demand characteristics, rather than a real impact of the intervention. Future research should employ an alternative intervention to ensure that the enhancements we observed are not simply the result of interest being shown to participants or their attempts to discern the experimenter's hypotheses and to confirm them.

A third limitation concerns the measurement of stress-related growth in this study. We employed a modified version of the PTGI that allowed for both positive and negative changes to be reported as suggested by others (Armeli *et al.*, 2001). It is possible this modification influenced the findings and may have resulted in a different factor structure or diluted the meaning of positive change. Further testing with such modified growth measures is needed. Additionally, some research casts doubt on the validity of self-reports of growth, i.e. whether such reports reflect actual life changes (Frazier & Kaler, 2006). However, even if perception of growth is an illusion that serves self-protective and self-enhancing functions, the perception has inherent value and has been shown to be adaptive (Davis & McKearney, 2003). Further, our correlational analysis of change scores increases our confidence in the validity of self-reports of growth in this study. Nonetheless, future research should continue to examine the specific meaning of increased growth scores and whether such increases are related to a greater zest for life as well as enhanced cognitive and emotional processing (Weinrib, Rothrock, Johnsen, & Lutgendorf, 2006).

Fourthly, and closely related to the issue of measuring stress-related growth, is the time frame between the occurrence of the stressor and the assessment of stress-related growth. Some research has found growth to increase as the time since the stressful event increases (Cohen, Cimboric, Armeli, & Hettler, 1998), while others have found growth to stabilize after approximately 2 years (Weinrib *et al.*, 2006). However, consistent with a recent meta-analysis (Helgeson *et al.*, 2006), the recency of the stressor was not a significant predictor of growth in our study. Although the most frequent time frame for assessing growth is years after the occurrence of the stressor, an assessment of the appropriate time frame depends in part on the researcher's intent.

For example, evaluation of changes in interpersonal relationships following the diagnosis of cancer would be more appropriate in a shorter time frame than evaluation of changes in life philosophy following the diagnosis (Cohen *et al.*, 1998). Future research should continue to examine perceived growth as a function of time elapsed since the occurrence of the stressful situation.

A fifth potential limitation of the study is the unique combination of the Brief COPE subscales. Researchers have warned against the practice of assuming that certain coping strategies are always grouped in the same way across different contexts (Lazarus & Folkman, 1984). Therefore, we chose to see how the subscales grouped together to form broader coping categories in college students rather than imposing categorizations a priori. Nonetheless, the unique combination of subscales complicates the interpretation and generalizability of the study results.

Finally, the sample had a relatively high level of depressive symptoms on average that limits the generalizability of the findings. It is possible individuals with high depressive symptoms self-selected into the study to seek help. In fact, this study specifically recruited individuals who wanted to learn how to manage stressful situations more effectively as those are the individuals for whom the intervention may be most beneficial. However, it is also possible that the observed high depressive symptoms resulted from increased stress associated with the end of the semester. Future research should employ larger samples to further investigate predictors of growth, as well as the effectiveness of this resilience intervention and other interventions, to enhance growth and its various dimensions and the mechanisms by which they do so.

REFERENCES

- Abraido-Lanza, A.F., Guier, C., & Colon, R.M. (1998). Psychological thriving among Latinas with chronic illness. *Journal of Social Issues, 54*, 405–424.
- Armeli, S., Gunthert, K.C., & Cohen, L.H. (2001). Stressor appraisals, coping, and post-event outcomes: The dimensionality and antecedents of stress-related growth. *Journal of Social and Clinical Psychology, 20*, 366–395.
- Burns, D.D. (1999). *Feeling good: The new mood therapy*. New York: Harper Collins.
- Calhoun, L.G., & Tedeschi, R.G. (1998). Beyond recovery from trauma: Implications for clinical practice and research. *Journal of Social Issues, 54*, 357–371.

- Calhoun, L.G., & Tedeschi, R.G. (2001). Posttraumatic growth: The positive lessons of loss. In R.A. Neimeyer (Ed.), *Meaning construction and the experience of loss* (pp. 157–172). Washington, DC: American Psychological Association.
- Carver, C.S. (1997). You want to measure coping but your protocol's too long: Consider the brief COPE. *International Journal of Behavioral Medicine*, 4, 92–100.
- Carver, C.S. (1998). Resilience and thriving: Issues, models, and linkages. *Journal of Social Issues*, 54, 245–266.
- Cohen, L.H., Cimboric, K., Armeli, S.R., & Hettler, T.R. (1998). Quantitative assessment of thriving. *Journal of Social Issues*, 54, 323–335.
- Connor, K.M., & Davidson, J.R. (2003). Development of a new resilience scale: The Connor–Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*, 18, 76–82.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper & Row.
- Cutrona, C.E., & Russell, D.W. (1987). The provisions of social relationships and adaptation to stress. In W.H. Jones, & D. Perlman (Eds), *Advances in personal relationships* (pp. 37–67). Greenwich, CT: JAI Press.
- Davis, C.G., & McKearney, J.M. (2003). How do people grow from their experience with trauma or loss? *Journal of Social and Clinical Psychology*, 22, 477–492.
- Ellis, A. (2001). *Overcoming destructive beliefs, feelings, and behaviors: New directions for rational emotive behavior therapy*. New York: Prometheus Books.
- Frazier, P.A., & Kaler, M.E. (2006). Assessing the validity of self-reported stress-related growth. *Journal of Consulting and Clinical Psychology*, 74, 859–869.
- Garland, S.N., Carlson, L.E., Cook, S., Lansdell, L., & Specia, M. (2007). A non-randomized comparison of mindfulness-based stress reduction and healing arts programs for facilitating post-traumatic growth and spirituality in cancer outpatients. *Supportive Care in Cancer*, 15, 949–961.
- 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.
- Kabat-Zinn, J. (1995). *Wherever you go, there you are*. New York: Hyperion.
- Lazarus, R., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer Publishing.
- Lechner, S.C., & Antoni, M.H. (2004). Posttraumatic growth and group-based interventions for persons dealing with cancer: What have we learned so far? *Psychological Inquiry*, 15(1), 35–41.
- Lieberman, M.A., Golant, M., Giese-Davis, J., Winzenberg, A., Benjamin, H., Humphreys, K., Kronenwetter, C., Russo, S., & Spiegel, D. (2003). Electronic support groups for breast carcinoma: A clinical trial of effectiveness. *Cancer*, 97(4), 920–925.
- MacKinnon, D.P. (2008). *Introduction to statistical mediation analysis*. New York: Erlbaum.
- MacKinnon, D.P., & Fairchild, A.J. (2009). Current directions in mediation analysis. *Current Directions in Psychological Science*, 18, 16–20.
- Nichols, M.P., & Schwartz, R.C. (1991). *Family therapy: Concepts and methods*. Boston: Allyn & Bacon.
- O'Leary, V.E., & Ickovics, J.R. (1995). Resilience and thriving in response to challenge: An opportunity for a paradigm shift in women's health. *Women's Health*, 1, 121–142.
- Park, C.L. (2006). Religiousness and religious coping as determinants of stress-related growth. *Archive for the Psychology of Religion*, 28, 303–337.
- Park, C.L., & Fenster, J.R. (2004). Stress-related growth: Predictors of occurrence and correlates with psychological adjustment. *Journal of Social and Clinical Psychology*, 23, 195–215.
- Park, C.L., Cohen, L.H., & Murch, R.L. (1996). Assessment and prediction of stress-related growth. *Journal of Personality*, 64, 71–105.
- Paton, D., Violanti, J.M., & Smith, L.M. (2003). *Promoting capabilities to manage posttraumatic stress: Perspectives on resilience*. Springfield, IL: Charles C. Thomas.
- Penedo, F.J., Molton, I., Dahn, J.R., Shen, B.J., Kinsinger, D., Traeger, L., Siegel, S., Schneiderman, N., & Antoni, M. (2006). A randomized clinical trial of group-based cognitive-behavioral stress management in localized prostate cancer: Development of stress management skills improves quality of life and benefit finding. *Annals of Behavioral Medicine*, 31(3), 261–270.
- 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(3), 879–891.
- Radloff, L.S. (1977). The center for epidemiologic studies depression index. *Applied Psychological Measurement*, 1, 385–401.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Schaefer, J., & Moos, R. (1998). The context for posttraumatic growth: Life crises, individual and social resources, and coping. In R.G. Tedeschi, C.L. Park, & L.G. Calhoun (Eds), *Posttraumatic growth: Positive changes in the aftermath of crisis* (pp. 99–125). Mahwah, NJ: Lawrence Erlbaum Associates.
- Schwartz, R.C. (1995). *Internal family systems therapy*. New York, The Guilford Press.
- Schwartz, R.C. (2001). *Introduction to the internal family systems model*. Oak Park, IL: The Center for Self-Leadership.

- Sears, S.R., Stanton, A.L., & Danoff-Burg, S. (2003). The yellow brick road and the emerald city: Benefit finding, positive reappraisal coping, and posttraumatic growth in women with early-stage breast cancer. *Health Psychology, 22*, 487–497.
- Siegel, K., Schrimshaw, E.W., & Pretter, S. (2005). Stress-related growth among women living with HIV/AIDS: Examination of an explanatory model. *Journal of Behavior Medicine, 28*, 403–414.
- Steinhardt, M., & Dolbier, C. (2008). Evaluation of a resilience intervention to enhance coping strategies and protective factors and decrease symptomatology. *Journal of American College Health, 56*, 445–453.
- Steinhardt, M., Dolbier, C., Mallon, M., & Adams, T. (2003). The development and validation of a scale for measuring self-leadership. *Journal of Self-Leadership, 1*, 20–31.
- Steinhardt, M.A. (2008). *Transforming lives through resilience education*. Retrieved from the University of Texas at Austin Website: <http://www.utexas.edu/education/resilience/viewings>.
- Steinhardt, M.A., & Dolbier, C.L. (2001). The relationship between self-leadership and enhanced psychological, health and work outcomes. *Journal of Psychology, 135*, 469–485.
- 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.
- Tedeschi, R.G., & Kilmer, R.P. (2005). Assessing strengths, resilience, and growth to guide clinical interventions. *Professional Psychological Research and Practice, 36*, 230–237.
- Thornton, A.A., & Perez, M.A. (2006). Posttraumatic growth in prostate cancer survivors and their partners. *Psychooncology, 15*, 285–296.
- Ullrich, P.M., & Lutgendorf, S.K. (2002). Journaling about stressful events: Effects of cognitive processing and emotional expression. *Annals of Behavioral Medicine, 24*(3), 244–250.
- Weinrib, A.Z., Rothrock, N.E., Johnsen, E.L., & Lutgendorf, S.K. (2006). The assessment and validity of stress-related growth in a community-based sample. *Journal of Consulting and Clinical Psychology, 74*(5), 851–858.
- Wild, N.D., & Paivio, S.C. (2003). Psychological adjustment, coping, and emotion regulation as predictors of posttraumatic growth. *Journal of Aggression, Maltreatment & Trauma, 8*, 97–122.
- Winer, B.J., Brown, D.R., & Michels, K.M. (1991). *Statistical principles in experimental design*. New York: McGraw-Hill.
- Zakowski, S.G., Hall, M.H., Klein, L.C., & Baum, A. (2001). Appraised control, coping, and stress in a community sample: A test of the goodness-of-fit hypothesis. *Annals of Behavioral Medicine, 23*, 158–165.

Copyright of Stress & Health: Journal of the International Society for the Investigation of Stress is the property of John Wiley & Sons Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.