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Stressful Life Events and Predictors of Post-traumatic Growth among High-Risk Early Emerging Adults

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Abstract

Stressful life events (SLEs) may elicit positive psychosocial change among youth, referred to as Post-traumatic Growth (PTG). We assessed types of SLEs experienced, degree to which participants reported PTG, and variables predicting PTG across 24 months among a sample of high risk, ethnically diverse early emerging adults. Participants were recruited from alternative high schools ($n = 564$; mean age=16.8; 65% Hispanic). Multi-level regression models were constructed to examine the impact of environmental (SLE quantity, severity) and personal factors (hedonic ability, perceived stress, developmental stage, future time orientation) on a composite score of PTG. The majority of participants reported positive changes resulted from their most life-altering SLE of the past two years. Predictors of PTG included fewer SLEs, less general stress, having a future time perspective, and greater identification with the developmental stage of Emerging Adulthood. Findings suggest intervention targets to foster positive adaptation among early emerging adults who experience frequent SLEs.

Keywords

Post-traumatic Growth; resilience; emerging adulthood; adolescents; alternative high school; Hispanic; stressful life events; future time orientation

Experiencing stressful life events (SLEs) (e.g., medical diagnosis, loss of a loved one, physical victimization, accidents, natural disaster) during adolescence contributes to poorer psychological and vulnerable emotional states (Buckner, Beardslee, & Bassuk, 2004; Wills & Shiffman, 1985). In contrast, SLEs may elicit positive psychosocial change in some individuals; change which is often referred to as Post-traumatic Growth (PTG), or variably, benefit finding, adversarial growth, or stress-related growth. For the purposes of this study, we refer to the phenomenon as PTG. PTG entails not only recovery from highly stressful events, but also meaning-making, and a transformative process that results in growth to a higher level of functioning than the pre-stressor state (Aldwin, Levenson, & Spiro, 1994;

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O'Leary & Ickovics, 1995; Park et al., 2008). Thus, PTG has been characterized as having positive changes occur in an individual's *relationships with others*, sense of personal strength and self-reliance, spiritual beliefs, as well as finding *new possibilities* and having a *greater appreciation of life* (Tedeschi & Calhoun, 1996), all of which are adaptations that may help individuals avoid long-term psychological and emotional distress.

Both personal and environmental level factors have been shown to influence PTG (e.g., see reviews by Helgeson, Reynolds, & Tomich, 2006; Linley & Joseph, 2004; Meyerson et al., 2011; Park & Fenster, 2004; Zoellner & Maercker, 2006). Personal factors may foster PTG by protecting individuals from experiencing feelings of distress, encouraging positive reappraisal, and aiding in the re-building of new life perspectives post-SLE (Calhoun & Tedeschi, 2001; Lambert et al., 2009; Maddi, 2006; Linley & Joseph, 2004; Schaefer & Moos, 1998). Hedonic ability, or one's fundamental capacity to feel pleasure, may enable development of PTG through one's appreciation for agreeable aspects of life. Although pleasurable experiences may be more ephemeral, recognizing them may have profound and enduring effects on one's cognitive, social, and psychological resources (Fredrickson, 2013). For instance, pleasurable experiences influence greater social openness, thought-action repertoires, and broad-minded coping such that individuals discover new, creative ways of thinking and acting as well as broader perspectives in order to generate multiple solutions for problem solving (Burns et al., 2008; Fredrickson & Joiner, 2002).

Orientation towards one's future may be another personal level indicator for PTG. For instance, in the aftermath of a SLE, a young person may be more likely to develop PTG if they engage psychological processes that compel them to focus on setting and achieving goals rather than dwelling on the past or the present. For example, some evidence shows the construct of future time perspective (Zimbardo & Boyd, 1999) is related to fewer mental health problems and greater use of active coping strategies when dealing with stress from terrorist attacks (Holman & Silver, 2005). Thus, it is likely that the aspects of future time perspective that motivate one to move forward post-SLE are related to factors that define PTG, including finding new possibilities and positive changes in direction for life.

Similarly, one's developmental stage in life may indicate a greater predilection for developing PTG. In particular, Emerging Adulthood (generally aged 18 to 25), is characterized by a distinct period of increasing autonomy for individuals who are exploring directions in love, work, and world views; feeling "in-between"; developing new identities; deciding upon the many possibilities of the future; and assuming more adult roles with responsibility toward others (Arnett, 2000). Although the time period brings instability in living situations (e.g., moving in with roommates, in and out of parental homes), school and employment (e.g., leaving high school, finding a job, balancing college and work, discontinuous school enrollment), the newfound autonomy, self-focus, and range of possibilities can be welcomed by some (Arnett, 2007). These dimensions of emerging adulthood have demonstrated positive relationships with resiliency constructs (Chassin et al., 1996; Masten, 2004) and may promote aspects of PTG post-SLE, such as relating to others, personal strength, and self-reliance. In the present study, participants are assessed for PTG at an age where they have just entered the period of emerging adulthood (mean age of 18.8 years), and thus are referred to as early emerging adults. Particularly for early emerging

adults who may have greater exposure to negative influences due to environmental context, characterizing the relationship between the social development and adjustment to SLEs may be salient for understanding PTG.

In contrast to hedonic ability, future time perspective, and emerging adulthood, the personal factor of greater perceived general stress may associate with lower PTG. This is because greater subjective stress levels from chronic sources may cause individuals to interpret subsequent SLEs more negatively, prolong distress, and thereby inhibit effective cognitive processing of the event (i.e., lower PTG).

In the present study, we examine predictors of PTG among ethnically diverse early emerging adults who attended alternative high schools. Typically, alternative high school students have left regular high schools for reasons of excessive truancy, poor academic performance, disruptive behavior, drug use, violence, or other illegal activity (Rohrbach et al., 2005). Compared to their regular high school counterparts, alternative high school youth are considered at higher risk for poorer psychological and emotional outcomes from presumably experiencing more SLEs (Zweig & Institute, 2003) and from the tendency to take on adult roles at a younger age. Such roles include becoming a young parent, taking on job or guardian responsibilities in the home in the absence of their parent, and cohabitating with a romantic partner (Rohrbach, et al., 2005). Therefore, unique predictors of PTG may emerge among this high-risk strata of youth that may identify as emerging adults.

Influence of Environmental Characteristics on PTG

Environmental factors, such as severity and types of SLE experienced may influence PTG (Helgeson, et al., 2006; Ickovics et al., 2006) particularly when they come to represent a significant challenge to the adaptive resources of the individual (Janoff-Bulman, 2002). With regard to severity of stressfulness, evidence suggests that the relationship between distress and growth may be non-linear but rather curvilinear, an inverted U-shape (e.g., Armeli, Gunthert, & Cohen, 2001; Kleim & Ehlers, 2009). Thus, those who experience a very low or very high level of distress from a SLE may be insufficiently or overwhelmingly impacted, respectively, and thus report lower levels of PTG whereas, those who report experiencing a moderately distressing SLE may report the highest levels of PTG. Reasons for this may be due to the event becoming central to one's post-SLE identity (Boals & Schuettler, 2011). However, with regard to cumulative exposure to SLEs, some research indicates a dose-response relationship with an increasing number of different types of SLEs resulting in poorer health outcomes (Anda et al., 2006; Larkin, Shields, & Anda, 2012). Particularly among at-risk individuals who have a higher likelihood for experiencing SLEs than the general population of older youth, it will be worthwhile to examine whether a higher sum total of SLEs experienced or relative level of severity of SLEs may negatively impact requisite cognitive processing in order for PTG to develop.

Because evidence indicates that PTG can develop as a result of various stressors (e.g., Alisic et al., 2008; Ickovics, et al., 2006; Milam, Ritt-Olson, & Unger, 2004; Park, Cohen, & Murch, 1996; Peterson et al., 2008; Seery, Holman, & Silver, 2010; Tedeschi & Calhoun, 1996) versus a common stressor among the entire sample, this study was designed to assess

the occurrence of PTG resulting from a range of SLEs, broad enough to enable a vulnerable sample of diverse youth to report any event that they considered as impacting enough to have elicited the cognitive perception of life change. Also because this study is the first to examine PTG with respect to multiple stressors among older youth emerging into adulthood, our first aim was to examine the types of SLEs reported by this understudied group. The second aim was to examine personal characteristics, previously shown to influence PTG among other samples, as predictors of PTG. We hypothesize that general stress will negatively impact PTG whereas hedonic ability, greater identification with the developmental stage of emerging adulthood, and tending towards future time perspectives will positively impact PTG (hypothesis 1). The last aim was to investigate if environmental factors, characteristics of the SLEs, influence PTG. We hypothesize that the cumulative stress from more SLEs will exhibit an inverse relationship with PTG (hypothesis 2) while the severity of SLEs will exhibit a curvilinear relationship with PTG (inverted U-shape) such that those who experience a SLE that is the lowest and highest in severity will report less PTG while those who report a SLE of moderate to high severity will report greater PTG (hypothesis 3).

Method

Participants

Participants were enrolled in a randomized controlled trial of *Project Towards No Drug Abuse*, a 12-lesson drug abuse prevention curriculum that targets youth in alternative high schools. The current trial examined the efficacy of the intervention coupled with a motivational interviewing booster program (Sussman et al., 2012). Twenty-four alternative high schools were randomly assigned to one of three experimental conditions: control, curriculum only, or curriculum plus motivational interviewing booster. At baseline, a total of 1704 (71.1%) of students enrolled in classes selected from the 24 alternative high schools consented to participate in the study. Of the students who completed a baseline survey, 1186 students completed the 1-year follow-up (29.2% attrition rate) and 703 students completed the 2-year follow-up survey (58.1% attrition rate). For this study, the analytic sample was comprised only of students who reported having experienced a SLE between baseline and 2-year follow-up, answered PTG items referring to the SLE, and were randomized to any of the three treatment conditions ($n = 564$).

Attrition Analyses

The sample retained for this study was compared to the group that was lost-to-follow-up from baseline to 2-year follow-up. Groups were compared for all baseline variables used in this study (5 variables) using the Student *t*-test or *chi-square* test in order to detect statistically significant differences between samples at p -value of .05 (two-tailed). The group retained for this study was comparable to the group lost-to-follow-up at 2-years on all variables except they were younger and more likely to live with both parents at baseline ($p < .0001$); thus, we controlled for these two variables in all analyses.

Data Collection

All consent and data collection procedures were approved by the IRB at the University of Southern California. Informed consent was obtained from students who were at least 18 years of age. Informed assent procedures were followed, in addition to informed consent for parents, if students were under 18 years old. Trained data collectors administered a paper and pencil survey in one 50-minute classroom period at baseline and one-year follow-up data collection sessions. At 1-year follow-up, students who provided consent but were absent the day of survey administration or had left the school (e.g., dropped out, transferred, or graduated) received a telephone call and were given the option to complete the survey verbally, by mail, or at home. The majority of students completed 1-year follow-up surveys by phone (60.5%). For the 2-year follow-up, 76.3% of students completed surveys by phone, 8.8% completed them in-person (at school or via home visit), and 14.8% completed them by mail.¹

Measures

As the primary aim of this study was to examine predictors of PTG, we measure some of the variables (sociodemographic variables, general stress) at baseline and future time perspective at 1-year follow-up, all prior to the assessment of PTG. However, because hedonic ability has shown to be mutable from adolescence to adulthood, and emerging adulthood assesses one's sense of independence and responsibility at a particular time point, we measure both hedonic ability and identification with emerging adulthood at two-year follow-up, contemporaneous with the assessment of PTG. Similarly, we assess retrospective variables on the number, type, and severity of stressful life events experienced in the prior two years at two-year follow-up.

Demographics—Socio-demographic information was collected for age (in years), gender, race/ethnicity categories (Asian or Asian American; Latino or Hispanic; African American or Black; White, Caucasian, Anglo, European American; not Hispanic; American Indian or Native American; Mixed: My parents are from two different groups; Other), and current living situation (living with both parents, one parent, or neither).

Stressful Life Events (SLEs) and Most Impactful SLE—The SLE checklist included in the 2-year follow-up survey was derived from an abbreviated (18-item) version of the Adolescent Negative Life Events Inventory (Wills, 1986; Wills & Cleary, 1996). For the present study, we included a checklist of the 8 life events that were most prevalently reported among adolescents (mean age=14.4 years $\pm$ 0.8) in a study by Rohrbach et al (2009). Participants were provided with a checklist of the 8 SLEs and asked to indicate which events they had experienced within the past two years (1=yes or 2=no to each item). Wording for some items was altered in order to be more relevant to these early emerging adults (mean age at the time of this survey = 18.8 $\pm$ 0.9). For example, "My parents had problems with money" was changed to "I did not have enough money for basics (like food)" and "I had a lot of arguments with my parents" was changed to "There were a lot of

¹Analysis of Variance showed that the method of data collection (by phone, on paper, or via home visit) did not significantly impact PTG scores ($p=.09$).

arguments that happened at home.” A ninth item allowed participants to indicate whether they had experienced other events not listed in the checklist, and provided a free-entry field for them to write in the event(s). Responses were summed to create a score of the total number of types of SLE experienced within the past two years. Subsequently, participants were asked to indicate which of the events listed (including anything listed in the “Other” category) affected their life the most.

Post-traumatic Growth—The instrument used to assess PTG at 2-year follow-up was an 8-item self-report scale. Due to constraints on space and time, these items were derived from an 11-item version of the Post-traumatic Growth Inventory (PTGI), which was modified from the original inventory by Tedeschi and Calhoun (Tedeschi, 1995; Tedeschi & Calhoun, 1996) and used among diverse adolescent and adult samples previously (Arpawong, Richeimer, et al., 2013; Milam, 2006; Milam et al., 2005; Milam, 2004). We selected 8 items from the 11-item PTGI (used in Arpawong, Richeimer, et al., 2013) in order to both maximize the variation that would be captured by the items and preserve statistical reliability and validity. In a factor analysis, each item had high factor loadings on the first unrotated factor, all at or above 0.61, with an eigenvalue of 5.44 demonstrating that the 8 items reflected a single dominant global factor. The means calculated for the 8-item and 11-item scale correlated at $r=0.98$. The internal reliability/consistency (Cronbach’s alpha) for the mean of the 8-items used in this study was 0.81.

Participants were asked to respond to the PTG items in reference to the single SLE that they designated as most life-altering of the past two years. Similar to prior studies (e.g., Arpawong, Oland, et al., 2013; Arpawong, Richeimer, et al., 2013; Frazier, Conlon, & Glaser, 2001; Milam, 2006; Milam, et al., 2005; Milam, 2004), and to better reflect theoretical perspectives of PTG, we avoided the potential bias from participants only being able to report positive valenced change that may have resulted from their stressful event by offering a dual-valenced response format for this scale. Participants were able to endorse either negative or positive change on items, with responses ranging from 1 (“Negative change”) to 3 (“Positive change”), while 2 indicated “No change”. An in depth discussion of the issues that underlie use of individual PTG items as outcomes is provided elsewhere (Bellizzi et al., 2010; Park & Lechner, 2006), with a general consensus that a unitary score is more appropriate for PTG. Also, factor analysis showed that although two factors had eigenvalues greater than 1 (3.40 for factor 1), the eigenvalue of the second value was only 1.01, and all items loaded at or above 0.61 on the first unrotated factor. Thus, for this study, a composite score calculated by averaging responses on all 8 items, was used.

Severity of Stressful Life Event—Development of the severity, or relative stressfulness, level for the most impactful SLE reported by participants was derived from both scores on Life Events for Students Scale (LESS) and independent raters. The LESS is a 36-item list of life events (Linden, 1984) likely to occur during the young adult or emerging adult age range (e.g., 17 to 25). The LESS was developed with the premise that different levels of coping efforts are required to adjust to life changing events that are stressful. Thus, events on the LESS were ranked in order of severity (1=highest to 36=lowest) with a “life

change unit” attached to each event, serving as an indicator of the level of adjustment needed to mitigate negative impact from the SLE.

In this study, a total of 114 students listed a SLE in the “Other” category of the SLE checklist, although 41 items could be re-categorized into an existing item on the original checklist. Thus, 73 remaining items plus the 8 items of the checklist yielded a total of 81 items to be scored. From that list, 30 items were matched to an item on the LESS (e.g., disciplined or suspended from school, serious illness or injury in the family, break-up with boyfriend/girlfriend/partner) and assigned the associated “life change unit” as the severity of stress score, thereby leaving 51 items to be scored and ranked.

To score unmatched SLEs, five independent alternative high school raters were recruited from the group of study respondents of the Project Toward No Drug Abuse three-year follow-up data collection. Raters were selected at random to inquire about their interest in helping with a sub-study. The first five students who responded were selected and provided ratings in-person.² Raters were provided with instructions, both written and verbal, and allowed to ask clarifying questions about the task. They were provided with 2 lists: (1) a list of the matched SLEs including the respective life change unit for each SLE and (2) the list of unmatched SLEs that had not yet been assigned a score. Raters were asked to assign scores to each item on the unmatched SLE list (list #2), based on how much stress s/he felt would be needed in adjusting to the particular SLE. Also, they were asked to anchor their ratings in accordance with the life change units of the SLEs that were already matched (from list #1). Ratings from all students were combined to create an average severity score for each of the items. Next, the SLEs were placed in rank order, according to their average severity score. The rank number of each SLE on the final list was used to create an ordinal severity score variable.

General stress—This subjective perception of stress scale was comprised of 4 items that were adapted from the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983; Cohen & Williamson, 1988). Items inquired about how often in the past month the student had been upset, felt difficulties were piling up, out of control, or stressed. Response options ranged from 1=Never to 5=Very often. A mean of the 4 items was calculated to represent a general perceived stress measure (Cronbach’s $\alpha = .88$).

Hedonic Ability—The items assessing hedonic ability were taken from the original 14-item Snaith-Hamilton Pleasure Scale (*SHAPS*) (Snaith et al., 1995). Although the *SHAPS* was designed to assess hedonic experience, when the scale was used in prior research (coded with 0 indicating greater ability and 3 indicating less ability to experience pleasure) it correlated strongly with the widely used Positive and Negative Affect Scale (*PANAS*) positive affect measure ($r = -.43, p < .0001$; Leventhal et al., 2009). Thus, in this study, it

²Spearman correlation coefficients on severity ratings from the five students ranged from $r = 0.53$ to 0.73 , indicating acceptable to high agreement. However because correlation coefficients are limited by not being able to take into account the agreement in ordering of items (versus agreement in scoring), Bland-Altman plots were constructed (Bland & Altman, 1986) to ascertain the range of agreement in rater coding, with agreement defined as a mean bias ± 2 standard deviations (SDs), and whether or not coding for each rater would be retained or additional raters would be needed. No additional raters were needed as 95% limits of agreement between each of the five raters ranged between 2 SDs of the mean differences comparing each rater to the other four.

serves as an indicator of an individual's ability to have positive affective experiences. Items included in this study assessed finding pleasure or enjoyment in "small things such as a bright sunny day or a telephone call from a friend", "a beautiful landscape or view", and "when I receive praise from others." The original items were asked in reference to the participant's ability to experience pleasure "in the last few days." However, the items for this study were adapted to assess "ability to experience pleasure in general" with response options provided using 4-point Likert-like scales ranging from 1 = "Strongly Disagree" to 4 = "Strongly Agree" with higher scores indicating greater pleasure. Convergent validity of the SHAPS has been demonstrated by its correlation with the positive affect subscale of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) through analysis by Snaith et al (Snaith, et al., 1995). The three items were averaged yielding a scale with good internal consistency ($\alpha=0.75$).

Future Time Perspective—This was measured using 7-items from the Future Time Perspective scale of the Zimbardo Time Perspective Inventory (ZTPI) (Barnett et al., 2013; Zimbardo & Boyd, 1999). Students were asked to identify how well the item describes their beliefs (e.g., "I finish projects on time by working on them a little bit every day," "It upsets me to be late for school or other commitments," "I keep working at difficult, boring tasks if they will help me get ahead") using 5-point Likert scales with responses ranging from 1 = "Not at all" to 5 = "Very well" with higher scores indicating greater future time perspective. Cronbach's alpha for the scale was .83.

Emerging Adulthood—This study variable was assessed with items from the Inventory of the Dimensions of Emerging Adulthood (*IDEA*; Reifman, Arnett, & Colwell, 2003). The original *IDEA* is a 31-item instrument used to assess six dimensions that characterize the period of emerging adulthood: time of identity exploration, experimentation, possibility, self-focus, other-focus, and feeling in-between. Each question item is assessed on a 4-point Likert scale ranging from 1 = "Definitely Not" to 4 = "Definitely Yes" with a higher score indicating a greater identification with being in the developmental stage of Emerging Adulthood. At the 2-year follow-up, a 10-item version of the scale was used, including items selected for their highest loadings in exploratory factor analysis (EFA) to represent 4 dimensions: experimentation, self-focused, identity exploration, and feeling-in-between. A principal components EFA on the present sample showed that three factors emerged although the internal consistency of factors two and three was not acceptable (Cronbach alphas were .70, .42, and .44, respectively) (Lisha et al., 2012). Thus, a maximum likelihood EFA was conducted, in which all 10 items loaded onto a single factor. The 10-item one factor solution showed good internal consistency (Cronbach's $\alpha = .79$). Thus, emerging adulthood was calculated from a mean score of all items.

Study Condition—A covariate was included in order to control for study condition to which students were assigned. As PTG scores did not significantly differ between intervention conditions ($p=.85$), the variable for study condition was dichotomously coded as *Toward No Drug Abuse* curriculum (either intervention arm) or Control.

Statistical Analysis

All analyses were performed using the SAS (v.9.3) statistical package. PTG was evaluated for normal distribution and, due to scores being negatively skewed, scores were reflected to a positive skew, log-transformed, and re-reflected to restore the original order of values for all analyses. To avoid problems of multicollinearity of personal characteristics, analyses on strength of relationships showed that tolerance levels were between 0.67 to 0.97 and variance inflation levels between 1.04 and 1.51; thus neither posed a problem. Because of insufficient numbers in the race categories other than Hispanic (35%), race/ethnic categories were recoded to Hispanic or non-Hispanic.

Variables assessing sociodemographics, the number and severity of SLEs, and personal characteristics were entered into a series of hierarchical multi-level regression models (PROC MIXED). All models were run as mixed models, with students nested in schools, to statistically control for the possibility that students within schools are more similar than students across schools. The PTG score, a log-transformed continuous variable, was entered as the dependent variable for all analyses. In order to test Hypothesis 3 regarding a curvilinear relationship between severity of SLEs and PTG, the variable for severity of SLEs was first centered, then squared to create the quadratic term, and then both the linear and quadratic terms were entered into the regression model predicting PTG (Stimson, Carmines, & Zeller, 1978). All models included treatment condition and variables from attrition analysis (age, living situation) as control variables.

In a stepwise process, Model 1 was constructed with age, gender, ethnicity, and living situation as predictors, evaluating the relationship between sociodemographic variables and PTG. To address the first hypothesis, Model 2 added personal characteristics (general stress, hedonic ability, emerging adulthood, future time perspective) to Model 1. To address the second and third hypotheses, Model 3 added the SLE variables (number of SLEs experienced in the past two years, linear and quadratic variables for the severity of stressfulness of the most life-altering SLE) to Model 2. A final model was constructed retaining all control variables as well as the significant predictors at a $p < .10$ level (Sun, Shook, & Kay, 1996) from Models 2 and 3.

Results

Stressful Life Events and Personal Characteristics

Table 1 provides participant characteristics at baseline, means and standard deviations for the primary variables examined in this study, as well as the frequency of SLEs experienced within the past two years. Figure 1 lists the types of SLEs reported by participants in order of prevalence (black bars). A total of 1784 SLEs occurring within the past two years were reported, which averages to 3.14 (SD=1.7) SLEs per individual. Also, of the SLEs within each category, Figure 1 shows the proportion of those SLEs that were designated as the most life-altering SLE of the past two years (gray bars). For example, 20.5% of SLEs (366 events of the 1784 total) were reported in the category, "Someone in my family had a serious illness, accident, or injury." However, of those 366 SLEs, only 156 of them (42.6%) were designated as the event that qualified as the *most* life-altering of the past two years compared

to any other SLEs reported by an individual. In contrast, only 0.06% (1 event) of SLEs were reported in the category of “got robbed” although that 1 event (100%) was designated as the most life-altering. Lastly, Figure 1 provides the relative stressfulness for each event category, in brackets. For example, “death of a parent” was designated as most stressful (ranked as 1) while “change in religious faith” was considered least stressful (ranked as 17).

Post-traumatic Growth

Participants were asked to respond to PTG items in regard to the SLE they designated as the most life-altering among all SLEs reported. The majority of students reported that some aspect of their life had improved post-SLE with the mean PTG score of 2.64 (SD=0.38; range 1-3) for the entire sample. Figure 2 provides frequencies of the item-level endorsement of PTG questions.

Regression Analyses

As shown in Table 2, Model 1 demonstrated that demographic characteristics did not significantly predict PTG. However, age and living situation were retained in all subsequent models due to both their empirical association with PTG (see reviews by Helgeson, et al., 2006; Linley & Joseph, 2004; Meyerson, et al., 2011) and as a control variable for attrition. Model 2 demonstrated that less general stress, greater future time perspective, and more strongly identifying with being in the stage of emerging adulthood significantly predicted PTG ($p<.05$) while greater hedonic ability approached significance ($p<.10$) in predicting PTG. Model 3 demonstrated that the number of stressful life events experienced was inversely related to PTG whereas there was no relationship between severity of SLE and PTG. Comparing the variance explained by both the linear and quadratic terms, adding the quadratic term for severity of SLE did not account for any additional proportion of variance in PTG (data not shown). As this method is the recommended one for evaluating the elimination of quadratic terms in regression models (Stimson, et al., 1978), the term was excluded from remaining models. The final model was constructed with higher PTG being predicted by fewer SLEs experienced, less general stress, greater future time perspective, a higher score on the emerging adulthood scale, and weakly by greater hedonic ability. Thus, findings supported Hypotheses 1 and 2, but not Hypothesis 3.³

Discussion

Because the occurrence of PTG varies across samples and types of SLEs, the present study addresses personal-level and environmental contributors to the variation in PTG over time, particularly among Hispanic adolescents who are moving into emerging adulthood. The impact of SLEs on PTG among early emerging adults can be pivotal since the novelty of particular events during this time may require more intensive psychological adjustment than for older adults. In this study, PTG was associated with fewer SLEs, less general stress,

³To address concerns on using a composite scale of PTG, in which response options were scaled from negative to positive, we conducted a sensitivity analysis in which the responses for PTG items were recoded as binary responses (1=positive changes, 0=no changes), then summed the items to produce a PTG score. The pattern of results was the same as presented, although hedonic ability was more strongly associated (at $p<.05$ vs. $p<.10$) while the number of stressful life events was more weakly associated (at $p<.05$ vs. $p<.001$) with PTG.

having a future time perspective, and greater identification with the developmental stage of Emerging Adulthood. PTG was weakly associated with hedonic ability, and not related to severity of SLE, age, gender, ethnicity, or living situation. Findings suggest possible intervention approaches to increase positive adjustment to SLEs, such as promoting future time orientation, capitalizing upon one's realization of her adult responsibilities and roles, and one's sense of growing independence.

Predictors of PTG were examined at baseline (sociodemographic variables, general stress) and 1-year follow-up (future time perspective), while correlates were assessed at 2-year follow-up (hedonic ability, emerging adulthood, stressful life events). Variables with largest effect sizes were emerging adulthood and future time perspective. Emerging adulthood characterizes a unique time-point in development when individuals tend to be optimistic about goals, choices, and future prospects (Arnett, 2004; Lisha, et al., 2012). Yet, the post-SLE state may parallel other processes that characterize the stage of emerging adulthood, such as experiencing less stability, struggling with meaning and identity, and deciding on how to navigate social relationships. The non normal distribution for PTG reported among this group supports prior speculation that PTG may be high in older youth (see reviews: Linley & Joseph, 2004; Meyerson, et al., 2011), although we are not able to make age-related comparisons within the current study. The high mean PTG score is due to more than 69% of the sample endorsing positive changes on specific PTG items (shown in Figure 2) including 'my own inner strength', 'direction for my life', 'handling my difficulties', and 'involvement in things that interest me'. However, as the social transition from adolescence to adulthood may occur at different rates by individual, particularly those who are predisposed to higher SLEs from high-risk environments, future studies may consider further exploring the variation in PTG due to developmental stages (e.g., Erikson's stages of development versus biological age). For instance, it would be worthwhile to examine whether fostering one's sense of independence or realization of adult responsibilities in older adolescence aids in stress adaptation.

With regard to having future time perspective, findings support the notion that those who are motivated to positively reappraise their circumstances post-SLE, and then take action towards achieving goals and meeting obligations to others (i.e., have greater future time perspective), would garner more positive psychological change. Much of the prior research on PTG and cognitive processes has focused on relationships with coping, rumination, and meaning-making, yet has yielded mixed results. Perhaps future time perspective serves as a moderator of the relationships. For example, those who engage in more meaning-making post-SLE and have high future time perspective are much more likely to develop PTG than those who are low on either predictor. In this way, those with future time perspective may possess more optimistic projections about future outcomes (Prati & Pietrantonio, 2009). Nonetheless, it would be useful to examine whether engaging in forward thinking facilitates positive adaptation among older youth after acute SLEs.

The weak relationship between hedonic ability and PTG was unexpected as previous studies among younger children and adults have shown a positive relationship to the highly correlated construct of positive affect (Currier, Hermes, & Phipps, 2009; Helgeson, et al., 2006). However, the measure of hedonic ability in particular represents the construct of

one's capability of experiencing pleasure. Yet, PTG tends to represent a eudemonic construct, associated with greater meaning in life and strengths of character (Park, et al., 2008; Peterson, et al., 2008). Thus, the finding suggests that in order to adaptively deal with a SLE, individuals may require other psychological, social, or character strengths rather than their hedonic ability.

With regard to the stress measures, general stress provided an indication of the level of baseline stress experienced. It was assessed prior to the two-year time period in which SLEs and PTG were measured. Thus, if participants reported greater general stress, they were more likely to report more SLEs overall, and vice versa, a pattern which could not be explained entirely by the small to moderate relationship between general stress and number of SLEs ($r=0.14$, $p<.0001$). Taken together, the findings that less general stress and fewer SLEs were associated with PTG, suggests that these early emerging adults who had greater PTG were perhaps better able to handle stressors, did not have as many, or did not perceive events as stressful compared to those with less PTG. Of note, *ad hoc* analysis showed that the number of SLEs reported was significantly related to a higher level of severity of the most life-altering SLE. This may be because those who have experienced a SLE that was more severe (e.g., death of a parent) were also more likely to experience other SLEs that were related to the initial event (e.g., financial difficulties, changes in living situation, relationship problems). Nonetheless, the finding replicates prior evidence. Future studies may consider using a comparison group of regular high school youth to decipher whether the background stress levels, types and the additivity of more acute events (sum) over a particular time period uniquely reflect the cumulative stress effects on PTG among vulnerable emerging adults.

Severity of the most life-altering SLE showed neither a linear nor curvilinear relationship with PTG. A possible explanation for this is that the severity rating for SLEs represents an *objective* rating and not a perceived severity score designated by the participants themselves. The importance of this distinction partly rests on the notion that SLEs may be considered more pivotal or insignificant by individuals based on the chronicity or novelty, the proximal nature of the stressor, other stressors, personal and contextual resources. For example, the break-up of a relationship may elicit different stress reactions depending on variables such as this being an individual's first versus fifth experience of a break-up, the intensity of the relationship, who initiated the break-up, social support received in the wake of the break-up, among others. Such considerations would likely impact the perceived severity rating as well as the relationship between severity and PTG. Therefore, future studies attempting to characterize the relationship between severity and PTG may consider including measures of perceived severity.

Lastly, there were no relationships found between PTG and sociodemographic variables. Among children, adolescents, and adults, some evidence suggests that females tend to report higher PTG, yet a few studies show males have higher PTG while the majority of studies have found no differences (see reviews: Jim & Jacobsen, 2008; Linley & Joseph, 2004; Meyerson, et al., 2011). In prior research, the equivocal findings were possibly due to the gender composition of studies (i.e., studies with more women showed higher PTG among women and vice versa for men), or the instruments used to assess PTG (see Barskova &

Oesterreich, 2009; Helgeson, et al., 2006). For the present study, it is likely that other factors were more salient to PTG than gender. With regard to ethnicity, some studies show that minority status contributes to higher PTG, yet that was not supported in the present study. Also, age showed no relationship with PTG, potentially due to the narrow age range of participants. It is possible that there are interactive effects occurring between age, gender, and ethnicity to influence PTG with some evidence indicating that females report higher PTG after development maturation has occurred (see meta-analysis by Vishnevsky et al., 2010). However, *ad hoc* analysis in the current sample showed no evidence of interactive effects.

Limitations and Future Directions

One limitation of this study concerns self-disclosure of SLEs. For all students surveyed at two-year follow-up time point, 80.2% (73.6% by paper survey, $n = 120$; 82.2% by phone survey, $n = 444$) reported a SLE and thus were included in the analytic sample. It is unknown why 19.8% of the sample (26.4% by paper survey, $n = 43$; 17.8% by phone survey, $n = 96$) did not report any SLEs, either because they truly did not experience any or were reluctant to report them, particularly if filling out the paper surveys ($p = .02$ for difference in reporting a SLE by paper versus phone surveys). Future research may consider using different methods for inquiring about SLEs, such as a verbal Traumatic Life Event Questionnaire (TLEQ) which includes more descriptive categories of life events (e.g., physical abuse by an intimate partner, robbery involving a weapon; see Kubany et al., 2000). It should be noted, however, that some researchers argue that checklists should provide general categories only versus a detailed list of events to capture better the breadth of events they might experience (e.g., provide the category of “socioeconomic problems” versus listing “did not have enough money for basics”, “had to move out of my home”; see Dohrenwend, 2006). For this study, we included a write-in response option to better characterize the profile of stressors experienced by a high-risk group.

Second, the date on which the most life-altering SLE occurred was not assessed as we inquired about any SLE that occurred within the past two-years. This may have impacted the participants’ ability to remember, or the way in which the SLE influenced PTG (e.g., level of PTG, strength of the relationship with other variables). Future studies may wish to include a time variable. However, the stress-PTG relationship is more complex than can be characterized by this study. Assessing PTG items by responses of negative, no, or positive change does not comprehensively capture the complexity of posttraumatic changes. Our use of a modified PTG scale with a narrow range for responses may have limited our ability to detect greater variation in the response levels of participants, and potentially stronger effects. Future studies may benefit from using an expanded response format. Furthermore, as we did not assess indicators of distress or struggle (e.g., post-traumatic stress symptoms, coping, cognitive processing), our interpretation on the unfolding process of the phenomenon of PTG post-SLE is limited.

With regard to the construct of PTG, many questions on whether the self-reported measure of growth reflects actual growth (from pre- to post-SLE) or only a perception of it (Frazier et al., 2009; Jayawickreme & Blackie, 2014). This is a concern because self-reported growth

can include aspects of illusory self-enhancement and/or derogation of the pre-SLE self, and these may be either helpful or inhibiting for long-term psychological well-being (e.g., Taylor, 1983; Tomich & Helgeson, 2004; Westphal & Bonanno, 2007). Studies that compare both perceived and actual growth (i.e., through demonstrated cognitive, behavioral, and personality change), in reference to a range of SLEs of differing severities, and collect growth measures over the course of time—prior to, shortly after, and repeatedly post-SLE—may help to disentangle whether PTG reflects perceived and/or actual positive change.

Relatedly, PTG was reported at a relatively high rate in this study with 100% of participants reporting positive change on at least 1 item. Direct comparisons to other studies, on prevalence, must be interpreted with caution because among other variations in study design, existing studies vary with respect to instruments used to assess PTG (i.e., single interview item versus 21-item inventory), do not employ random sampling methods (such that comparable prevalence rates cannot be established), and assess PTG at variable durations in time since the stressor occurred. For instance, in a review of 39 studies with varying designs, prevalence rates of PTG ranged from 3% to 98%, while 100% of participants reported PTG when participants were selectively included based on PTG reports (Linley & Joseph, 2004). Thus, it would be worthwhile to design a study in which benchmarking of PTG prevalence rates could be established given different characteristics of population-based samples (i.e., ethnic make-up, age groups, developmental stages, gender composition, types of stressors experienced, and duration since the stressor).

Although we assess future time perspective and report on its relationship with PTG, we are unable to decipher whether the future time orientation truly predicts PTG or if that relationship is influenced by related constructs, such as conscientiousness, or grit. Researchers might consider assessing such variables contemporaneously to assess potential confounding, or mediation effects. Additionally, it is possible that mean PTG scores in this sample were higher than would be reported among other alternative high school youth because of an impact of the substance use intervention. Although this study was not designed to assess if components of the intervention influenced PTG, results of this study provide promising evidence that alternative high school youth, living in high stress environments, may be adapting relatively well to SLEs. A question that remains is whether or not PTG represents normative change in this sample who were early in the emerging adulthood stage, or changes reported (positive and negative) distinctly reflect those occurring as a result of having experienced a life-altering SLE. Future studies that assess levels of PTG referencing a specific SLE compared to levels of PTG referencing aspects of the developmental time period in life would help answer this.

Further studies need to assess the long-term impact of PTG on the potential mitigation of deleterious outcomes (e.g., depression, anxiety, post-traumatic stress) among vulnerable, older youth. Additionally, for a clearer understanding of how to foster actual positive growth among more vulnerable youth, other directions for research include prospectively designed studies that examine how positive growth is impacted by perception of social status or marginality, developmental stages, levels of maturity, perceived severity of SLEs, time since the SLE, and positive mental health resources such as social support, and optimism. Nevertheless, the potential benefits of promoting PTG are vast. These include improved

health-related behaviors, such as less use of alcohol, eating a healthier diet, and better medication adherence (Harper et al., 2007; Littlewood et al., 2008; Luszczynska, Sarkar, & Knoll, 2007; Milam, et al., 2005; Milam, 2004), as well as greater use of problem-focused, acceptance, and positive reinterpretation coping strategies; greater optimism; and cognitive processing (see review: Linley & Joseph, 2004). There are also potential biological benefits. For example, PTG has been associated with improved survival and immune system function (Dunigan, Carr, & Steel, 2007). Thus, it is worthwhile to consider PTG in intervention efforts. Researchers and clinicians who aim to foster PTG among youth might consider implementing approaches that have demonstrated prior success in promoting PTG in other samples (e.g., cognitive-behavioral techniques, exercise-based programs, emotional expression through writing; see Knaevelsrud, Liedl, & Maercker, 2010; McGregor et al., 2004; Penedo et al., 2006; Sabiston, McDonough, & Crocker, 2007; Segal, Tucker, & Coolidge, 2009), while tailoring messages to the specific developmental stage (i.e., maturity level), promoting future time orientation, and focusing on fostering positive emotions, since they may be important in helping youth attempt to make sense of the SLE and assess directions and goals in life.

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Table 1Participant characteristics and correlates of post-traumatic growth ($n = 564$)

Variable	Mean (SD)	%
Age	18.8 (0.90)	
Gender: Male		54.4
Living with both parents		53.0
Ethnicity		
Non-Hispanic White or Caucasian		11.9
Latino or Hispanic		65.3
Black or African American		2.9
Asian or Asian American		0.4
American Indian or Native American		0.4
Mixed Ethnicity and Other		16.1
Post-traumatic Growth^a	2.64 (0.38)	
Personal Characteristics		
General stress ^b	3.01 (1.05)	
Hedonic ability ^c	9.86 (1.49)	
Emerging adulthood ^d	3.57 (0.39)	
Future time perspective ^e	3.65 (0.87)	
Environmental Characteristics		
Number of stressful life events	3.14 (1.70)	
1		20.2
2		21.1
3		19.7
4		16.8
5		12.6
6		5.7
7		2.8
8 or more		1.1

Notes:

^a Range of PTG was 1=negative changes to 3=positive changes^b Range for general stress was 1=never stressed to 5=more often stressed^c Range for hedonic ability was 3=lower ability to 12=greater ability^d Range for Emerging Adulthood was 1=less identification to 4=more identification with Emerging Adulthood^e Range for Future Time Perspective was 1=less to 5=more

Table 2

Regression models for the associations of socio-demographic characteristics, stressful life events, and personal characteristics with post-traumatic growth

Variable	β	SE
<i>Model 1: Demographics</i>		
Age	-0.009	0.05
Female	0.091	0.09
Live with both parents	0.100	0.09
Ethnicity	0.073	0.09
<i>Model 2: Add Personal Characteristics</i>		
General stress	-0.131 **	0.04
Hedonic ability	0.059 #	0.03
Future Time Perspective	0.163 **	0.05
Emerging Adulthood	0.478 ***	0.12
<i>Model 3: Add Stressful Life Events (SLEs)</i>		
Number of SLEs	-0.091 ***	0.03
Severity of SLEs: linear variable	-0.091	0.06
Severity of SLEs: curvilinear variable	0.004	0.00
<i>Final Model: Predicting Post-traumatic Growth</i>		
Age	-0.084	0.05
Live with both parents	0.051	0.09
General stress	-0.105 *	0.04
Hedonic ability	0.060 #	0.03
Future Time Perspective	0.150 **	0.05
Emerging Adulthood	0.467 ***	0.12
Number of Stressful Life Events	-0.091 ***	0.03

Notes:

All models include age, living situation, and treatment condition as control variables. All continuous variables were standardized to the global mean.

Model 1 $F = 3.41^{**}$; Model 2 $F = 6.33^{***}$; Model 3 $F = 6.68^{***}$; Final Model $F = 8.05^{***}$.

$p < .10$;

* $p < .05$;

** $p < .01$;

*** $p < .001$.