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ORIGINAL ARTICLE

Assessing Disruptions in Meaning: Development of the Global Meaning Violation Scale

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Abstract Models of meaning making following stressful events are based on the notion that individuals' appraisals of events (i.e., their situational meaning) can violate their goals and beliefs (i.e., global meaning), and that resulting discrepancies between situational meaning and global meaning negatively affect their psychological adjustment. To date, research has relied primarily on indirect measures of meaning violation. We describe the development of a new instrument, the Global Meaning Violation Scale (GMVS), for *directly* assessing belief and goal violations. We establish the psychometric integrity of the GMVS across three studies. In Study 1, we identify and replicate a factor structure consisting of three subscales: belief violation, intrinsic goal violation, and extrinsic goal violation. In Study 2, we provide evidence for the reliability and validity of the GMVS. In Study 3, we test the predictive validity of the GMVS in a sample of undergraduates reporting on the most stressful experiences of their lives. Our findings indicate that the GMVS is a reliable and valid tool for directly examining global meaning violation. We anticipate that the GMVS will advance research on stress, trauma, and coping by giving researchers a tool to directly explore the role of violations in meaning making processes.

Keywords Meaning · Goal violations · Stress · Trauma · Coping

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Introduction

Individuals coping with or recovering from highly stressful or traumatic events often attempt to find meaning in their experiences (Davis et al. 2000; Gillies and Neimeyer 2006; Janoff-Bulman 2004; Triplett et al. 2012). Theories of stress appraisal and meaning making posit that people hold overarching beliefs and life goals that form their *global meaning* (Folkman and Lazarus 1984; Janoff-Bulman 1989; Park 2010). Most of the time, people's appraisals of their daily life experiences are congruent with their global meaning. However, highly stressful events can violate global meaning, resulting in discrepancies between situational appraisals and global meaning. The theoretical discourse on meaning making discusses belief and goal violation in great detail (Davis and Novoa 2013; Heine et al. 2006; Steger 2012). To date, however, empirical research has failed to keep pace with this rich theoretical literature, due in large part to the absence of a direct measure of meaning violation. To advance the science of meaning making, stress and trauma, researchers need a psychometrically sound measure of measuring global meaning violation.

The Meaning-Making Model

The work of many meaning making theorists (e.g., Davis et al. 2000; Gillies and Neimeyer 2006; Horowitz 1986; Janoff-Bulman and Frantz 1997; Thompson and Janigian 1988; Wortman and Silver 1989) converges on a general meaning making model (Park 2010) that conceptualizes meaning making as involving two levels of meaning: global and situational. Global meaning refers to an individual's systems of beliefs and overarching goals (George and Park, in press), while situational meaning constitutes the

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appraised significance of a situation or event. Stressful events often produce situational meanings that violate the beliefs and goals that comprise an individuals' global meaning. That is, events are stressful to the extent to which they violate individuals' understanding of themselves and the world or are at odds with what they want to have happen. The meaning making model posits that discrepancies between situational meaning and global meaning determine the severity of distress experienced, which in turn initiates efforts to reconcile this discrepancy to reduce distress (Dalgleish 2004; Everly and Lating 2004; Janoff-Bulman and Frieze 1983; Watkins 2008). We define "meaning making" as the process through which individuals reduce the discrepancy between appraised and global meaning and thereby restore a sense of the world and their existence as meaningful, comprehensible, and worthwhile. This model proposes that meaning making facilitates adaptive adjustment by eliminating discrepancies in meaning by changing either situational appraisals or global meanings (Gillies and Neimeyer 2006; Park 2010; Skaggs and Barron 2006).

The meaning making model describes the process of recovery from highly stressful events and forms the basis of many clinical interventions for trauma (e.g., Aderka et al. 2013; Morland et al. 2011; Sloan et al. 2012), bereavement (e.g., Neimeyer 2014) and serious illness (Henry et al. 2010). Meaning making continues to be the subject of empirical and scholarly research as well (e.g., Holland et al. 2014). However, research has produced inconsistent findings: While some studies demonstrate that the search for meaning mitigates distress (e.g., Bower et al. 2005; Davis et al. 1998; Sears et al. 2003), others indicate that it exacerbates distress and dysfunction (e.g., Bonanno et al. 2005; Roberts et al. 2006). These inconsistent findings are not surprising given the myriad definitions, research designs, and measurement tools implemented across studies (Davis et al. 2000; Thompson and Janigian 1988). Moreover, discrepancies in meaning are almost never directly assessed (Park 2010).

The Central Role of Meaning Violation in Adjustment to Stress and Trauma

The meaning making model posits that global meaning is composed of an individual's cherished goals and deeply-held beliefs. Both belief violation and goal violation have been associated with increased distress (Dalgleish 2004; Everly and Lating 2004; Koss and Figueredo 2004; Rasmussen et al. 2006). In studies using instruments such as the Post-Traumatic Cognitions Inventory (PTCI; Foa et al. 1999) or the World Assumptions Scale (WAS; Janoff-Bulman 1989), more negative views of the self and the world following exposure to highly stressful events were associated with higher levels of distress (e.g., Agar et al. 2006; Moser et al. 2007; Varra et al. 2008). However, the PTCI and the WAS do not assess situational appraisals of violation or global meaning changes, but rather only the degree to which global beliefs are negative.

Several measures that indirectly tap into violation of global meaning have been developed. The Core Beliefs Inventory (CBI; Cann et al. 2010) assesses respondents' retrospective reports of the extent to which they examined their beliefs following an event. While relevant to the meaning making process, the CBI does not directly assess meaning violation, only engagement in a specific type of cognitive processing following an event. The CBI also fails to assess reconsideration of goals, an important aspect of the meaning making framework (Park 2010). The Integration of Stressful Life Experiences Scale (ISLES) [Holland et al. (2014) subscale, footing in the world (FW)], assesses the extent to which respondents felt disoriented in the world following a stressful life event (e.g., "My beliefs and values are less clear since this event."). The ISLES-FW refers to both beliefs and goals, but again, only indirectly refers to violations (i.e., presumes violations have occurred to make FW less assured).

To our knowledge, only a handful of studies of cancer survivors (Exline et al. 2011; Park et al. 2008), the bereaved (Park 2005, 2008), trauma-exposed college students (Park et al. 2012) and veterans (Steger et al. 2015) directly assessed global belief violation, using earlier versions of the measure developed here. These studies demonstrated positive associations between reports of belief violation and distress. Researchers have more frequently asked participants about perceived goal violation, and this developing literature demonstrates links between perceived goal violation and distress (e.g., Schroevers et al. 2007; van der Veek et al. 2007). While this literature offers a promising start, direct measurement of meaning violation remains both rare and unsophisticated.

Our Aim: Developing a Psychometrically Sound Measure of Belief and Goal Violation

Given that distress is hypothesized to depend on perceived severity of global meaning violation and that global meaning violation is presumed to initiate the meaning making process (Janoff-Bulman 1992; Park 2010), it is surprising that no psychometrically sound measure for directly assessing violations to global meaning exists. We contend that continued progress in meaning making research requires such a measure. To address this need, we conducted three studies to develop, refine, and test a direct measure of belief and goal violations, the Global Meaning Violations Scale (GMVS). First, in a large sample of undergraduates who reported on the most stressful event of

their lives, we conducted exploratory and confirmatory factor analyses. In a second sample of participants reporting on a chronic stressor, we replicated the factor structure and examined preliminary validity. Finally, we conducted a third study of undergraduates reporting on a traumatic event to examine additional aspects of validity.

Study 1

In Study 1, we assessed the factor structure of the GMVS. The meaning making model suggests that global meaning consists of core beliefs and goals (Emmons 1986; Koltko-Rivera 2004). We generated a list of items that we hypothesized would best assess global meaning violation, and anticipated finding two underlying factors among the items: one representing violation of global *beliefs* and another representing violation of global *goals*. We examined the factor structure using both exploratory and confirmatory factor analyses in the context of the most stressful event participants reported experiencing in their lives.

Study 1 Method

Participants

Six hundred twenty-four participants (mean age = 18.7 - years, *SD* = .91; 69.7 % female; 80 % Caucasian, 3 % Black/African American, 8 % Asian, 5 % Hispanic/Latino, and 4 % Biracial or "Other") were recruited via the participant pool at a large Northeastern university.

Procedures

Participants completed surveys online. We presented the GMVS to participants among a number of other measures not analyzed for the present study (see Hale-Smith et al. 2012). A second round of data collection was conducted with a small subsample of this study to examine test–retest reliability and social desirability. All participants were given course credit.

Measures

Global Meaning Violation Scale (GMVS) Participants were asked to report the most stressful event of their lives and how long ago the event occurred. They then completed the GMVS items in response to that event. To develop the GMVS, we developed 17 items to separately assess violations of beliefs and violations of goals (see Table 1). Items for belief violation were based on the major categories of global beliefs commonly discussed within the meaning making literature (e.g., Janoff-Bulman 1989; Koltko-Rivera 2004). Goal violations were likewise drawn from research on goal seeking and major stressful events (Boersma et al. 2005a, b; Emmons 2003). Participants were asked, "How much does the occurrence of this stressful experience violate…" followed by the specific belief or goal (see "Appendix" for the prompt and specific item wording). Items were rated on a scale of 1 (*not at all*) to 5 (*very much*).

Paulhus Deception Scales Socially desirable responding was evaluated using the Paulhus Deception Scales (PDS) (Paulhus 1998). The 40-item measure includes a *Self-Deceptive Enhancement* subscale (SDE) measuring individuals' unconscious denial of thoughts and feelings that may threaten their self-concept and an *Image Management* (IM) scale identifying conscious attempts at self-enhancement. Items are self-administered in a seven-point Likert format with choices ranging from 0 (*not true*) to 6 (*very true*). The reliability coefficient alpha is .70–.75 for the SDE subscale and .83 for the IM scale. The PDS was subsequently administered to a subsample of 93 participants who also completed test–retest data.

Study 1 Results

The most stressful events reported by participants included college academics/transitions (40.3 %), family/social conflict (20.4 %), death/significant loss (13.9 %), serious illness of self or other (11.3 %), romantic relationship break-ups/conflicts (7.5 %), other events (6.1 %), and legal issues (.6 %). Mean time since the event was 1.8 years (*SD* = 1.4 years). The sample was randomly split into two subsamples (each $n = 312$), and an exploratory factor analysis (EFA) was conducted on the first subsample. The resulting model was tested using a confirmatory factor analysis (CFA) in the second subsample.

Exploratory Factor Analysis

We used three criteria in determining the number of factors to extract: Scree test (Cattell 1966), parallel analysis (Horn 1965), and revised minimum average partial procedure (Velicer 1976; Velicer et al. 2000). We conducted an EFA using principal axis factoring and oblique oblimin rotation. All three criteria indicated the extraction of three factors. Most items showed simple structure and had adequate communality values (see Table 1). We evaluated each item based on extraction communalities and factor loadings. We eliminated item eight (spirituality) due to having factor loadings <.40 on all three factors. We also eliminated item 12 (financial security) on account of low primary loading (.35) and communality value (.18). Finally, item 10

Table 1 Factor loadings and communalities based on Study 1 EFA and CFA, and Study 2 CFA

	EFA				Study 1 CFA			Study 2 CFA		
	Pattern coefficients			Communalities	Standardized factor loadings			Standardized factor loadings		
	I	II	III		I	II	III	I	II	III
(6) Companionship (being with others)	.95		−.12	.78	.84	–	–	–	–	–
(17) Intimacy (emotional closeness)	.84				.73	–	–	.63	–	–
(7) Social support and community	.80			.72	.79	–	–	.74	–	–
(9) Self-acceptance	.61		.28	.62	.68	–	–	.75	–	–
(11) Inner peace	.52		.10	.39	.69	–	–	.69	–	–
(10) Physical health	.40		.30	.41	.53	–	–	.68	–	–
(1) How much does the occurrence of this stressful experience violate your sense of the world being fair or just?		.84	−.18	.69	–	.76	–	–	.77	–
(5) How much does this stressful experience violate your sense that the world is a good and safe place?		.75		.58	–	.78	–	–	.84	–
(2) How much does this stressful experience violate your sense that other forces have control in the world?		.63		.37	–	.61	–	–	.74	–
(3) How much does this stressful experience violate your sense that God is in control?		.52		.25	–	.53	–	–	.61	–
(4) How much does this stressful experience violate your sense of being in control of your life?		.52	.18	.39	–	.66	–	–	.67	–
(8) Spirituality	.19	.35	.13	.29	–	–	–	–	–	–
(14) Achievement in my career	−.15		1.03	.92	–	–	89	–	–	.83
(13) Educational achievement		−.11	.84	.71	–	–	.91	–	–	.76
(15) Creative or artistic accomplishment	.19		.52	.41	–	–	.57	–	–	.57
(16) Athletic accomplishment	.23		.41	.39	–	–	.49	–	–	–
(12) Financial security		.18	.35	.18	–	–	–	–	–	–

Factor I named intrinsic goal violations; Factor II named belief violations; Factor III named extrinsic goal violations; for the EFA pattern coefficients, only loadings >.10 are listed. Items 8 and 12 were dropped after the EFA. Items 16 and 6 were dropped after CFA 1 (item 6 dropped due to redundancy and to reduce scale length)

(physical health) was split across two factors with loadings of .40 and .30. However, given the centrality of meaning making processes in the context of health concerns (Kendler et al. 2001) and the focus on health-related stressors in meaning making research (e.g., Park et al. 2008), we retained this item and opted to re-evaluate it in the CFA.

A three-factor model emerged in the EFA, with six items on factor one, five items on factor two, and four items on factor three. We named the first factor "intrinsic goal violation," as its items pertained to goal violations related to well-being (e.g., maintaining interpersonal relationships, inner peace, and physical health). The second factor, which we named the "belief violations" factor, contained items hypothesized to comprise beliefs such as safety and justice. The third factor, which we named "extrinsic goal violation," comprises violation of achievement goals related to career, education, creativity, and athleticism.

Confirmatory Factor Analysis

CFA was conducted using AMOS 21 (Arbuckle 2012). Three latent variables were modeled based on the three-factor structure that emerged in the EFA, and all 15 items were loaded on their respective factors. Latent variables were scaled using the marker variable strategy and full-information maximum likelihood estimation was employed to estimate the model. Cases with missing data (4.0 %) were excluded via listwise deletion (remaining $n = 299$). Because the χ^2 test is often significant in CFA models due to the influence of sample size (see West et al. 2012), we relied primarily on the root mean square error of approximation (RMSEA) and the comparative fit index (CFI) values to assess model fit.

The initial model exhibited poor fit as indicated by high $\chi^2(364.75, df = 87)$, low CFI (.86) and high RMSEA (.10) (Kline 2011). We removed items 16 (athletic

accomplishment) and six (companionship) due to their low R^2 value and their redundancy with other items, which produced a model with acceptable fit ($\chi^2 = 181.47$, $df = 62$; CFI = .92; RMSEA = .08; see Browne and Cudeck 1993, for model fit standards). We also tested dropping item ten (physical health) from the model, but this did not substantially improve the model, so we retained the item given its conceptual relevance. Our final CFA model retained five items on the belief violation factor, five items on the intrinsic goal violation factors, and three items on the extrinsic goal violation factor.[1,2]

Reliability and Social Desirability

In addition to the EFA and CFA, reliabilities and social desirability were also tested in a smaller subsample ($n = 93$). Cronbach's alpha indicated acceptable internal consistency for each GMVS subscale (Belief Violation Subscale $\alpha = .85$, Intrinsic Goal Violation Subscale $\alpha = .85$, Extrinsic Goal Violation Subscale $\alpha = .80$). Although test–retest reliability was attempted in this subsample, some participants reported either a general stressor (e.g., "college") or changed the event identified as most stressful, so the actual number (i.e., those who listed the same stressor at a subsequent assessment) included in test–retest analysis was considerably smaller than anticipated ($n = 62$). Test–retest correlations were adequate: .65 for the Belief Violation subscale, .72 for the Extrinsic Goal Violation subscale, and .83 for the Intrinsic Goal Violation subscale. Bivariate correlations between each subscale and both social desirability constructs were also conducted and no significant relationships were found (all $ps > .14$).

Study 1 Discussion

In Study 1, we assessed the factor structure of the GMVS. Although we had hypothesized a two-factor solution, three factors emerged in the EFA: a single belief violation factor and two goal violation factors. This three-factor solution was theoretically compatible with our expected two-factor solution insofar as belief violation and goal violation were conceptually distinct, but the division of our hypothesized goal violations factor into two distinct factors—intrinsic and extrinsic goal violation—refined our hypothesized two-factor structure. Intrinsic goals have an inherent personal value that does not depend on external reward or reinforcement. By contrast, extrinsic goals are pursued because they represent rewards external to the individual. Given that self-determination theory distinguishes between intrinsic goals (e.g., self-acceptance, affiliation, community feeling) and extrinsic goals (e.g., appearance, financial success, social recognition; Kasser and Ryan 1996; Sheldon et al. 2004), our three-factor model was consistent with theory and research on goal categorization. We note that these labels are not ideal in that we do not really know *why* someone is pursuing these goals (e.g., an individual could pursue physical health at the behest of a family member, or could pursue athletic accomplishment as a deeply-held personal goal).

In general, Study 1 indicated that the GMVS has good reliability and is not unduly influenced by social desirability. Its test–retest reliability was lower than expected for the Belief Violations subscale, but was otherwise within acceptable limits. Given the small sample size that could be used for these analyses it seems clear that the scale's test–retest reliability should be examined in future studies and specific attention should be given to re-orienting individuals to their identified stressful event, should researchers wish to explore the stability of individuals' meaning violations across time.

Study 2

Study 1 demonstrated that a three-factor model of meaning-making violation was supported in a sample of college students who had experienced a major stressful life event. In Study 2, we tested this factor structure of global meaning violation in a second sample of college students dealing with an ongoing chronic stressor. This longitudinal study allowed us to assess the replicability of the factor structure and to examine the GMVS's psychometric properties in the context of a different type of stressful experience over time.

[1] The use of a college student sample may raise concerns regarding type of stressor: Are most of the stressors experienced by participants of an academic nature, and what are the implications of this for the factor structure? To address these concerns, we coded the stressors reported by Study 1 participants as non-academic or academic stressors. We created two subsamples based on this coding and examined the final CFA model within each. In the non-academic stressors subsample ($N = 363$), the factor structure was intact (e.g., well defined factors) and model fit was similar to what we initially found ($\chi^2 = 161.97$, $df = 62$; CFI = .95; RMSEA = .07). The academic stressors subsample ($N = 212$) showed inadequate model fit, but most of this misfit could be attributed to a single item regarding "creative or artistic accomplishments." Dropping this item resulted in model fit similar to what we initially found in the entire sample ($\chi^2 = 140.06$, $df = 51$; CFI = .92; RMSEA = .09). More importantly, the factors were all well-defined with factor loadings of adequate magnitudes. Thus, the factor structure from the final CFA model appeared to be relatively robust across both non-academic and academic stressors.

[2] One of the items on the scale refers to violation of belief in God as being in control. Potential concerns are whether this item may be problematic among those who do not believe in God and whether factor analysis results may not be consistent in such a subgroup. To explore this possibility, we created a subsample of individuals who identified as atheist or agnostic and replicated the final model in just this group. The results however did not change substantially ($\chi^2 = 132.14$, $df = 62$; CFI = .94; RMSEA = .07) and the item regarding God continued to have a significant loading ($\beta = .44$, $p < .01$) with a magnitude similar to that found in the full sample.

In Study 2, we examined the validity of the GMVS subscales. We examined predictive validity using correlations between change in GMVS subscale scores and change in distress. Consistent with the meaning making model, decreases in violations over time were hypothesized to decrease distress over time. We also examined concurrent validity by examining cross-sectional correlations of each of the three GMVS subscales with event appraisals and distress. We hypothesized that all violations would be positively correlated with appraisals of uncontrollability and distress and negatively correlated with appraisals of controllability. Based on previous research, we hypothesized that appraisals of centrality (i.e., perceived importance to one's wellbeing) would be more strongly associated with intrinsic goal violation than with extrinsic goal violation, as intrinsic goal violations have been shown to be perceived as more stressful and important, and that intrinsic goals are a pre-requisite for wellbeing (e.g., Peacock and Wong 1990; Kasser and Ryan 2001; Kasser and Ahuvia 2002). We also predicted that appraisals of centrality would be related to belief violations, as stressors that are meaningful would be more likely to challenge one's beliefs about the world. We hypothesized that threat and challenge appraisals would be linked to all three violations subscales, as events perceived as threatening or challenging may violate global beliefs and goals.

Finally, we assessed discriminant validity by comparing the GMVS subscales with those of the CBI in terms of appraisals and distress. We hypothesized that the CBI and the GMVS would be correlated but differentially related to distress outcomes, given that the CBI only concerns global beliefs and does not directly assess violation, but rather meaning-making efforts (i.e., reconsideration of beliefs). The CBI does not measure goal-related phenomena, so we expected that the CBI would be more weakly associated with distress than would the GVMS goal violation subscales, given previous research demonstrating that goal violation is more strongly associated with distress than is belief violation (e.g., Park et al. 2012; Steger et al. 2015). Further, per the meaning making model, we anticipated that the GMVS would predict distress above and beyond the CBI moreso than the CBI would predict distress above and beyond the GMVS.

Study 2 Method

Participants

Two hundred and eighty-four participants (mean age = 19.2 years, *SD* = .9; 76.8 % female; 72.1 % Caucasian, 14.2 % Asian, 5.0 % Black/African American, 4.6 % Hispanic/Latino, 4.1 % Biracial or "Other") were recruited via the participant pool at a large Northeastern university.

Procedure

Participants completed a battery of online questionnaires at two time points administered 1 month apart. We asked participants to report reactions to the same event at both time points. Participants also reported appraisals of the stressor and distress. Participants were given course credit.

Measures

Stressor At Time 1, participants were asked: "What is the most stressful ongoing thing with which you are currently dealing?" and then responded to event-specific questions with this chronic stressor in mind. At Time 2, participants were prompted with the stressor reported at Time 1 and asked to respond to the event-specific questions with regard to this stressor.

Core Belief Disruption The CBI (Cann et al. 2010) is 12-item measure of the extent to which people reconsidered their core beliefs in light of a stressful experience. Participants rated each item from 0 (*not at all)* to 5 (*to a very great degree*). An example item from the CBI includes, "Because of the event, I seriously examined the degree to which I believe things that happen to people are fair." The CBI demonstrated good internal consistency in this study (Time 1 $\alpha = .83$, Time 2 $\alpha = .78$).

Stress Appraisals The Stress Appraisal Measure (SAM; Peacock and Wong 1990) is a 24-item scale (four per each subscale of Controllable by self, Controllable by others, Threat, Centrality, Uncontrollable, and Challenge). The SAM measures how individuals interpret stressful events on a scale from 1 (*not at all*) to 5 (*very much*), with higher scores indicating a higher degree of endorsement of appraisal of each domain. Sample items include, "I believe I will overcome the problem," (controllable by self), "I feel it is beyond anyone's power," (controllable by others; reverse scored), "The outcome will have a negative impact," (threat), "This stressor has serious implications," (centrality), "I feel the outcome is uncontrollable," (uncontrollable), and "I am eager to tackle it" (challenge). In this study, internal consistency for the SAM scales were good (Time 1 αs $> .73$, Time 2 αs $> .87$).

Post-traumatic Stress (PTS) Symptoms The PTSD Checklist-Civilian (PCL-C; Blanchard et al. 1996) is a self-report measure that assesses symptoms of posttraumatic stress (PTS) and has demonstrated good psychometric properties in college students (e.g., Adkins et al. 2008). Participants indicated how much they were bothered by various experiences (e.g., *repeated, disturbing memories, thoughts, or images of the stressful experience*) in the past

month from 1 (*not at all*) to 5 (*extremely*). Internal consistency in the present sample was high (Time 1 $\alpha = .95$, Time 2 $\alpha = .97$). Means indicated posttraumatic stress was moderately low (Time 1 mean = 32.66 SD = 14.37, Time 2 mean = 31.58, SD = 14.94; National Center for PTSD 2012).

Depression, Anxiety, and Stress The Depression, Anxiety, and Stress Scale-21 (DASS-21; Lovibond and Lovibond 1995) uses three seven-item subscales to assess depression, anxiety and stress. Participants rated how much each item applied to them over the course of the past week on a scale from 0 (*did not apply to me at all*) to 3 (*applied to me very much or most of the time*). The DASS-21 exhibits strong psychometric properties (e.g., Norton 2007). All subscales showed good internal reliability in our study (Time 1 αs > .82, Time 2 αs > .78).

Study 2 Results

Types of Stressors Reported

Sixty-one percent (61.3 %) of participants reported their most significant ongoing stressor was related to academics broadly construed, 20.9 % interpersonal, 11.5 % time management, 3.1 % sports, 1.0 % illness, .5 % a job, and 1.6 % "other".

Factor Structure Replication: CFA 2

A CFA was conducted using maximum likelihood estimation to replicate the factor structure found in Study 1 (see Table 1). As in Study 1, AMOS 21 was used to conduct the analyses. Results indicated that model fit closely mirrored that found in Study 1 [$\chi^2(62) = 132.31$, $p < .01$; CFI = .92; RMSEA = .08] and reached standards of acceptable fit as before (Browne and Cudeck 1993).

Reliability

Cronbach's alpha indicated acceptable internal consistency for each GMVS subscale (Belief Violation subscale $\alpha = .72$, Intrinsic Goal Violation subscale $\alpha = .66$, Extrinsic Goal Violation subscale $\alpha = .61$). Split-half reliability was also tested and was within the acceptable range for all subscales (.80, .66, and .61, respectively).

Validity

We examined predictive validity using bivariate correlations between change scores for GMVS subscales and change scores for distress (see Table 2). Results showed that reductions in violations were generally linked to reductions in distress. For example, reductions in extrinsic goal violation and belief violation over time were associated with decreases in depression, anxiety, stress and PTS symptoms. Reductions in intrinsic goal violations were similarly associated with decreases in PTS symptoms.

We then examined concurrent validity using cross-sectional bivariate correlations (see Table 3). As expected, the three GMVS subscales were strongly correlated, but demonstrated differential relations with other variables. While all three subscales were all significantly related to wellbeing outcomes of depression, anxiety, stress, and PTS symptoms, they were differentially related to types of appraisals. For example, the intrinsic goals violations subscale was significantly related to appraisal of centrality ($r = .34$, $p < .01$), whereas beliefs and extrinsic goals were not. Also, while violation of beliefs and intrinsic goals were both negatively related to the appraisal of controllable by self ($r = -.29$, $p < .01$; $r = -.16$, $p < .05$), violation of extrinsic goals were not. Per our hypotheses, greater violations of beliefs and goals were related to more negative appraisals of the stressor (e.g., uncontrollability, challenge) and higher levels of distress, demonstrating concurrent validity.

We first tested discriminant validity with cross-sectional bivariate correlations between the GMVS subscales and the CBI (see Table 3) with appraisals and distress. All three GMVS subscales were correlated with the CBI, with belief violations having the strongest relationship. We expected that appraisals and distress would be more consistently related to the GMVS subscales than to the CBI. We found that GMVS subscales were indeed more consistently correlated with appraisals than was the CBI (see Table 3). Specifically, appraisals of control by self, control by other, threat, and challenge were related to GMVS subscales, but were not significantly correlated with the CBI. Further, distress outcomes were significantly correlated with both the GMVS subscales and the CBI, but the violation of belief subscale scores appeared to have stronger relationships with distress than did the CBI.

To demonstrate the utility of the GMVS over the CBI, we conducted a regression analysis in which CBI was entered in step one and GMVS in step two. Results showed that the GMVS predicted additional variance in appraisals of controllable by self ($\Delta R^2 = .095$), threat ($\Delta R^2 = .061$), centrality ($\Delta R^2 = .111$), uncontrollability ($\Delta R^2 = .091$), controllable by others ($\Delta R^2 = .128$), and challenge ($\Delta R^2 = .082$). Additionally, the GMVS predicted additional variance in depression ($\Delta R^2 = .095$), anxiety ($\Delta R^2 = .302$), stress ($\Delta R^2 = .238$), and posttraumatic stress symptoms ($\Delta R^2 = .284$). We conducted the analysis switching the order of entry of GMVS and CBI, such that GMVS was entered in step one and CBI in step two. Results showed that CBI predicted variance that the GMVS did not in appraisals of centrality ($\Delta R^2 = .031$), controllable by

Table 2 Study 2 bivariate correlations of change scores for GMVS subscales with change scores for distress

	Belief violations change	Intrinsic goals violations change	Extrinsic goal violations change
Depression change	.16*	.15	.24**
Anxiety change	.26**	.09	.27**
Stress change	.16	.12	.27**
PTS symptom change	.27**	.29**	.34**

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

Table 3 Study 2 bivariate correlations among GMVS subscales and CBI and with appraisals and distress

	GMVS subscales			CBI
	Beliefs	Intrinsic goals	Extrinsic goals	
Controllable by self appraisal	−.29**	−.16*	−.12	−.09
Threat appraisal	.24**	.27**	.16*	.13
Centrality appraisal	.12	.34**	.12	.19*
Uncontrollable appraisal	.35**	.14	.33**	.26**
Control by other appraisal	−.22**	−.06	−.28**	−.02
Challenge appraisal	−.16*	.02	−.12	.04
Depression	.61**	.36**	.40**	.30***
Anxiety	.54**	.39**	.36**	.28**
Stress	.56**	.34**	.33**	.20**
PTS symptoms	.60**	.39**	.42**	.34**
Belief violations	–	–	–	–
Intrinsic goal violations	.52**	–	–	–
Extrinsic goal violations	.48**	.23**	–	–
Core belief inventory (CBI)	.46**	.23**	.37**	–

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

others ($\Delta R^2 = .033$), and challenge ($\Delta R^2 = .027$), although CBI did not predict statistically significant additional variance in appraisals of controllable by self ($\Delta R^2 = .011$), threat ($\Delta R^2 = .003$), uncontrollability ($\Delta R^2 = .008$), posttraumatic stress symptoms ($\Delta R^2 = .002$), depressive symptoms ($\Delta R^2 = .000$), anxiety ($\Delta R^2 = .001$), or stress ($\Delta R^2 = .002$).

Study 2 Discussion

In Study 2, we confirmed the three-factor structure identified in Study 1 with a different sample reporting on chronic stressors. Internal consistency for the extrinsic goal violation subscale was weak relative to the other subscales. Considering the other indicators of goodness of fit for the CFA (i.e., χ^2, RMSEA, and CFI) and the strong standardized factor loadings, the relatively low internal consistency of the extrinsic goals violation subscale may primarily reflect the small number of items for this subscale. It is also possible that the lower internal consistency may reflect that the goals are distinct and that only some goal violations are relevant for specific stressors.

Tests of validity supported our hypothesis that constructs related to meaning making processes (e.g., changes in one associated with changes in the other). For example, a reduction in violations was correlated with a reduction in PTS symptoms, as expected (see Table 2). That changes in the factors were significantly correlated with changes in distress provides empirical support for the predictive validity of the scale based on the meaning making model. However, changes in intrinsic goal violations were less consistently related to changes in distress than were changes in extrinsic goal violation or belief violation, perhaps because two-thirds of the stressors on which participants reported were academic in nature and thus more relevant to extrinsic goals.

Other hypotheses regarding appraisals and the three GMVS subscales were also supported, further establishing the validity of the scale. For example, appraisals of controllability and uncontrollability were related to belief and goal violations in the predicted direction. Also, as supported by previous literature, appraisals of centrality were linked with intrinsic goal violations, but not extrinsic goal or belief

violations (Kuchinke et al. 2011). However, surprisingly, intrinsic goal violations were not related to belief violations; more research is needed to understand these interrelationships among violations. Further, as hypothesized, threat appraisals were linked to all three subscales. Construct validity was demonstrated in the stronger and more consistent associations of the GMVS subscales with appraisals and distress indices relative to those of the CBI. Interestingly, the belief violations subscale appeared to be more robustly related to distress than was the CBI. Additionally, and importantly, the GMVS predicted additional variance above and beyond the CBI on all outcome variables, while the CBI predicted additional variance only on several appraisals but not any of the distress variables, indicating that the GMVS uniquely predicts important outcomes.

Overall, Study 2 results demonstrate that the GMVS relates in expected and theoretically consistent ways to appraisals and distress, suggesting that the GMVS may be a useful tool for studying meaning making processes, possessing good psychometric properties and providing differential assessment of violations of beliefs and goals.

Study 3

In Study 3, we further assessed the predictive validity of the GMVS by testing whether violations to beliefs, intrinsic goals, and extrinsic goals impacted meaning making by testing a hypothesis derived from meaning making theory: that the specific nature of a highly stressful event will influence the aspects of meaning that are violated (e.g., an interpersonal conflict may more strongly violate a belief in the benevolence of others, whereas an academic stressor may more strongly violate an achievement-oriented goal; Janoff-Bulman 1989) and (2) more stressful events will produce greater violations to meaning (Dalgleish 2004; Girelli et al. 1986; Park et al. 2012).

Study 3 Method

Participants

Participants were undergraduates at a major Northeastern university participating in a larger study on meaning making processes (see Park and Gutierrez 2013). Approximately two-thirds of participants were women ($n = 128$, 64.3 %). Mean age was 18.61 years ($SD = 1.18$), with a range of 18–25 years of age. Eight (4.0 %) participants identified as Black, 155 (77.9 %) as White, 15 (7.5 %) as Asian or Asian-American, 11 (5.5 %) as "other"; 10 (5.0 %) did not identify a racial or ethnic group.

Procedure

To ensure a sample that had experienced a highly stressful event relatively recently, potential participants were asked, "Have you experienced any major negative event in the past 5 years that caused you significant stress and affected your psychological or physical well-being, such as an injury or death in the family?" Only students who responded "yes" to this prescreen were eligible to participate. Of the 1867 respondents who were prescreened, 713 (38 %) indicated having had experienced a major negative event in the past 5 years. Participants completed surveys at the beginning of the fall semester and received course credit.

Measures

Most Stressful Event of Life A single open-ended item asked participants to report the most stressful event that they had experienced in their lives. After briefly describing the event, participants were asked an open-ended question about how long ago the event occurred from the time of survey administration. Participants were also asked to rate the stressfulness of the event, from 0 (*not at all stressful*) to 4 (*extremely stressful*). Finally, participants were asked to report on the GMVS for that event.

Data Analysis

We employed a grounded theory approach to categorize responses into thematically-consistent categories (Corbin and Strauss 1990). Three research assistants developed an initial codebook for categorizing participant responses and independently categorized responses following the codebook. Following Miles and Huberman's (1994) recommendation, coding differences were reconciled and the codebook was revised until the team reached 85 % agreement. The final codebook contained seven thematic codes: social conflict; intimate relationship stressors (i.e., conflict or discord with an intimate partner, including break-ups, fights, or emotional, physical, or sexual abuse); injury, illness, or accident; death or loss; academic problems; legal problems; and miscellaneous stressors. The three coders had an inter-rater agreement of 87.9 % (Cohen's $K = .90$).

Using these codes, we conducted two analyses to test our hypotheses. First, we explored the extent to which meaning violation varied by type of event. These analyses allowed us to test the hypothesis that the specific character of a highly stressful or traumatic event will influence the aspects of meaning that are violated: For example, we hypothesized that death or loss experiences would be more likely to violate beliefs, and that academic stressors would be more likely to violate external goals (e.g., Janoff-

Bulman 1989). Second, we conducted correlations between the perceived stressfulness of the event and GMVS to test the hypothesis that events perceived as more stressful would incur greater violations to meaning (Dalgleish 2004; Girelli et al. 1986; Park et al. 2012).

Study 3 Results

Most Stressful Event of Life

Of the 199 participants who reported on their life's most stressful event, their events were respectively coded as pertaining to social conflict ($n = 21$), intimate relationship stressor ($n = 20$), injury, illness, or accident ($n = 47$), death or loss ($n = 47$), academic ($n = 43$), legal problems ($n = 3$), and miscellaneous stressors ($n = 18$). The "miscellaneous" label was applied to uncodable items, which were excluded from further analysis. Further, the "legal" category was excluded from further analysis due to its small sample size. Finally, participants who failed to clearly indicate the time since the stressful event occurred were removed from the final analysis. Our final sample had 162 participants.

Across types of events, participants reported that the most stressful event of their life occurred, on average, 2.56 years ago ($SD = 2.34$). Of participants who indicated that the most stressful experience of their life was a death or loss ($M_{years} = 3.33$, $SD = 2.72$), an illness, injury, or accident ($M_{years} = 2.54$, $SD = 1.55$), or a social conflict ($M_{years} = 3.58$, $SD = 3.60$), more than 80 % of participants reported that this event had occurred over a year prior to the study. No participants reported having experienced a death or loss within the week prior to the study, and fewer than 7 % indicated that the social conflict, illness, injury, or accident that constituted the most stressful event of their life took place within the last week. Participants who indicated that their most stressful life experience was academic ($M_{years} = 1.62$, $SD = 1.67$) or was an intimate relationship stressor ($M_{years} = 1.55$, $SD = 1.46$) were slightly more like to report that the event occurred within the past year (39.6 % of academic stressors, 30.0 % of intimate relationship stressors). The majority of people identifying their most stressful life event as academic or involving an intimate relationship reported that the event occurred over a year ago (58.1 % of academic stressors, 70.0 % intimate relationship stressors).

Intimate relationship stressors were reported as most stressful ($M = 2.53$, $SD = 1.37$), followed by illness, injury, and accident events ($M = 2.09$, $SD = 1.28$), death and loss ($M = 2.00$, $SD = 1.13$), and social conflicts ($M = 1.83$, $SD = 1.20$). Academic events were the least stressful ($M = 1.49$, $SD = 1.50$). We ran a one-way ANOVA to assess whether mean event stressfulness differed by type of event: however, no such differences were found, $F(4, 157) = 2.22$, $p < .05$.

Testing Violations as a Function of Stressor Type and Stressfulness of the Event

We conducted three analyses of covariance (ANCOVAs) to explore how different types of stressors were related to violations in beliefs, intrinsic goals, and extrinsic goals after controlling for the stressfulness of the reported event and the time since the event occurred. One ANCOVA model was conducted for each of the three GMVS subscales. To conservatively identify significant differences between groups who had experienced a given type of life stressor, we conducted post hoc analyses using Tukey's procedure.

Mean belief violation, intrinsic goal violation, and extrinsic goal violation scores as a function of the type of stressor reported is presented in Table 4. Significant mean differences between scores on the beliefs violations subscale were found as a function of the type of stressor experienced after controlling for the stressfulness of the event and the time since the event occurred, $F(4, 155) = 4.85$, $p < .001$. The stressfulness of the event accounted for a significant proportion of variance in belief violation scores, $F(1, 155) = 7.45$, $p < .01$. Tukey post hoc comparison of the five stressor groups found that belief violation scores were significantly higher for those who had experienced a loss than for those who had experienced an illness, injury, or accident, $t = 3.14$, $p < .05$. Individuals who had experienced a loss likewise reported higher belief violations than did individuals who had suffered an academic stressor, $t = 3.99$, $p < .001$. No other significant post hoc mean belief violation differences were found between stressor groups.

Finally, significant mean differences between scores on the intrinsic goal violations subscale were found as a function of the type of stressor experienced after controlling for the stressfulness of the event and the time since the event occurred, $F(4, 155) = 3.16$, $p < .05$. The stressfulness of the event accounted for a significant proportion of variance in intrinsic goal violation scores, $F(1, 155) = 8.90$, $p < .01$. Tukey post hoc comparison of the five stressor groups found that participants who identified an intimate relationship stress as the most stressful event of their life reported higher intrinsic goal violations than did participants who reported a death or loss, $t = 3.10$, $p < .05$, or an academic stressor, $t = 3.11$, $p < .05$.

No significant mean differences between scores were found on the extrinsic goal violations subscale as a function of the type of stressor experienced after controlling for the stressfulness of the event and the time since the event occurred, $F(4, 155) = 1.49$, $p = ns$. Likewise, the stressfulness of the event failed to account for a significant proportion of variance in extrinsic goal violation scores, $F(1, 155) = .54$, $p = ns$. Tukey post

Table 4 Study 3 GMVS subscale scores as a function of type of stressful event

Type of stressor	Belief violations		Intrinsic goals violations		Extrinsic goal violations	
	M	*SD*	*M*	*SD*	*M*	*SD*
Academic	9.22	3.41	9.73	4.13	6.10	2.63
Death or loss	13.24	4.28	9.60	3.46	4.89	2.44
Illness, injury, or accident	10.68	3.92	10.49	4.49	4.96	2.66
Intimate relationship stressor	12.47	3.41	14.00	3.64	6.35	3.46
Social conflict	10.94	3.00	10.94	3.51	4.78	2.26
All stressor types	11.28	4.08	10.49	4.11	5.32	2.69

Observed range for belief violations and intrinsic goal violations = 5–20. Observed range for extrinsic goal violations = 3–12. Observed ranges equal possible ranges for all GMVS subscales scores

hoc revealed no statistically significant pairwise differences among the five stressor groups.

Study 3 Discussion

In Study 3, we assessing the predictive validity of the GMVS with a series of ANCOVAs testing whether different stressful events differentially impacted meaning violation after controlling for the stressfulness of the event and the time since the event occurred. We found that individuals who had experienced a loss had greater belief violations than did individuals who had experienced an accident or an academic stressor, and individuals who had experienced an intimate relationship stress reported greater intrinsic goal violations than did individuals who had experienced a loss or academic stressor. As predicted, the stressfulness of the event was a significant predictor of belief and intrinsic goal violation. These results suggest that the impact that events have on meaning violations may depend on the type and quality of the event. In short, different types of stressful events have the capacity to violate different aspects of meaning. The loss of a loved one may not violate an individual's life goals, but does create a social and emotional void by way of undermining an individual's beliefs in the benevolence and meaningfulness of the world (Neimeyer et al. 2010; Schwartzberg and Janoff-Bulman 1991). Intimate relationship stressors, on the other hand, are among the most negative experiences that college students report, and have serious consequences for self-esteem, development of healthy and adaptive relationships, and mental health outcomes (Bachtel 2013; Eshelman et al. 2012; Gutierrez and Park 2015). Taken together, these findings support the theoretical contention that different types of stressors are differentially related to meaning violation, and that more stressful events are more likely to produce these types of violations. These conceptual and empirical differences illustrate the need to assess the different factors that comprise global meaning independently. Our findings suggest that the GMVS is a useful and psychometrically valid tool for doing so.

However, extrinsic goal violations were related to neither the type of stressful event nor its stressfulness. We attribute these null findings to two possible causes. First, given that the extrinsic goal violation subscale is composed of fewer items, and thus has a more restricted range of sum scores, it is possible that this subscale may not have captured sufficient variance for detecting real differences in extrinsic goal violation as a function of type of event (i.e., Type II error). Alternatively, it may be that, for college students who may still be identifying long-term educational or career goals, the most stressful events that they have experienced to date are not ones that significantly impact extrinsic goals. Recall that our sample in Study 3 is composed primarily of first-year college students at a major Northeast university; while participants reported stressful events related to academic achievement and transition, it may be that college students in this age range still have ample opportunity to pursue long-term goals despite temporary setbacks, and thus do not experience significant extrinsic goal violations as a result. Older adults who have experienced unemployment, relationship dissolution, home foreclosure, or a disabling disease or condition may experience more significant and long-lasting impediments to extrinsic goal pursuit (e.g., Haynie and Shepherd 2011; Talbot et al. 2015). Future research should assess extrinsic goal violation in populations that have experienced stressful events that have a more severe impact on long-term educational, career, or creative goals.

General Discussion

To advance research on meaning making following stressful events, we developed a direct measure of global meaning violation, the Global Meaning Violation Scale (GMVS). This is the first such measure of its kind. Results from three separate studies provide empirical support for

the soundness of its psychometric properties. In Study 1, we developed items for the GMVS and identified a three-factor structure of meaning violation that measures violations to beliefs, intrinsic goals, and extrinsic goals. In Study 2, we established the concurrent and divergent validity of the GMVS using a longitudinal design. Finally, in Study 3, we examined the capacity of the GMVS to distinguish between different types of meaning violation in response to a variety of different stressors. In so doing, we supported the notion that the GMVS may be a psychometrically valid direct measure for providing novel insights into meaning making processes. For these reasons, the GMVS may be an important tool for advancing research on recovery following stressful and traumatic life experiences.

Until now, very little research has directly assessed meaning violations (cf., van der Veek et al. 2007). To advance this area of research, a reliable and valid way to examine this construct was needed. The GMVS represents a promising method for assessing violations as conceptualized in the trauma and meaning making literatures (Ehlers and Clark 2000; Holland et al. 2014). The GMVS showed relationships with important adjustment measures above and beyond the CBI, suggesting that it taps meaning violations. The GMVS also distinguishes between appraisals of two different categories of goal violations: intrinsic and extrinsic. This distinction, commonly made in goal theories (e.g., Schmuck et al. 2000), enables researchers to study the effects of both types of goals violations on coping and adjustment and compare their relative impact. These findings will inform meaning making theory, which has not yet distinguished between different classes of goals.

While the GMVS evidenced acceptable psychometrics in these studies, we consider the present work as just the beginning of this line of research. We acknowledge that these studies have substantial limitations. First, our studies were conducted with undergraduate samples. Although they constitute a specific subset of the general population, undergraduate students experience high levels of trauma and other highly stressful events and constitute a reasonable group in which to study meaning making (Frazier et al. 2009; Gold et al. 2005). However, the very fact that these students were attending university suggests that they comprise a relatively high-functioning group. Relatedly, participants in our studies reported a range of stressors, but many were particularly germane to undergraduate students (e.g., academic stressors). Further, participants were simply asked to report on their most stressful or traumatic event rather than using a standard trauma exposure measure such as the TLEQ (Kubany et al. 2000); use of such exposure measures may yield more standardized types of traumas. Clearly, the GMVS will require further testing with adults and clinical samples to determine the generalizability of these findings and the usefulness of the measure. Second, in all three studies reported here, partcipants reported on a heterogeneous set of stressful events. Additional research should explore the GMVS's psychometric properties in groups who are all dealing with the same stressful event, such as highly traumatized individuals or veterans of war or combat. Further research with the GMVS might justify modifications to the scale, particularly for specific populations or stressors.

None of the studies measured neuroticism or other personality characteristics that may be closely related to the GMVS. It will be important to demonstrate the validity of the GMVs above and beyond neuroticism and other personality factors in future research.

A more general limitation of the GMVS is that it implicitly asks participants to retrospectively recall their pre-event levels of global beliefs and goals to determine violations. Given that many of the most difficult events people experience are unexpected or unanticipated, and thus measures of beliefs and goals prior to that event are typically unavailable, such an assessment approach is often necessary. Yet it is important for self-report measures such as the one we have developed to demonstrate that they reflect violations rather than simply tapping pre-existing negative beliefs. However, bivariate correlations between the GMVS subscales and the WAS subscale beliefs suggest that these reported violations (results not reported; available from the authors) are only minimally associated with beliefs about the world even post-trauma, rendering it unlikely that GMVS scores reflect negative beliefs prior to the stressful event. Further, many of the measures used in trauma research have the same potential issue of tapping into pre-existing beliefs or other characteristics [e.g., the CBI (Cann et al. 2010); the Posttraumatic Growth Inventory (Triplett et al. 2012)]. With instruments such as the Posttraumatic Growth Inventory, it has been argued that while these reports of growth may or may not reflect veridical growth, the perceptions of this growth constitutes an important psychological phenomenon in and of itself as well (Park 2009) and have important implications for posttraumatic stress and adjustment. Such an argument could be made in support of the GMVS as an important psychological factor as well.

With these limitations acknowledged, the GMVS represents an important advance in research on stressful and traumatic events. In particular, this measure will allow researchers to directly assess the extent to which people experience stressful or traumatic encounters as violating their beliefs and goals. The GMVS will enable researchers to study the naturalistic processes of resilience in terms of who is more or less likely to experience initial violations. Scholars will also be able to study recovery over time, examining how changes in perceptions of violations relate

to adjustment to a variety of specific stressful and traumatic events. Some future research directions include further examination of the factor structure and scoring of the GMVS. For example, the relatively modest internal consistency of the extrinsic goal violations subscale may be due to the fact that some events are particularly relevant only to some goals; an alternate scoring that determines the largest degree of violation on any belief or goal would be a potentially meaningful alternative approach to scoring and may lead the way to developing clinical cut-off scoring methods.

The conceptual breadth and brevity of the GMVS empowers researchers working with diverse populations to easily and directly explore meaning violations. Researchers who specialize in populations dealing with life-threatening illness, recovery following natural disasters or acts of violence, or war exposure, struggle to find survey measures that both minimize participant burden and that are easily understood by participants in stressful situations. These researchers have great interest in meaning making processes as well. Experiences of violation and recovery may differ by age or developmental stage (e.g., Shrira et al. 2014), a research issue awaiting future attention. To our knowledge, the GMVS is the first tool available to researchers working in these domains that is brief, clear, and psychometrically validated, and that directly assesses meaning violations.

Intervention research could employ the GMVS to determine the extent to which different therapeutic efforts reduce violations and how those reductions predict improvements in functioning. The GMVS will also allow the study of relative violation and reductions in violations over time of beliefs, intrinsic goals, and extrinsic goals. We anticipate that this research, conducted longitudinally, may represent a new wave of important research to better understand the human capacity to recover from highly stressful and traumatic experiences.

Compliance with Ethical Standards

Conflict of Interest Crystal L. Park, Kristen E. Riley, Login S. George, Ian Gutierrez, Amy E. Hale, Dalnim Cho and Tosca D. Braun declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the studies.

Animal Rights No animal studies were carried out by the authors for this article.

Appendix: The Global Meaning Violations Scale

When you think about how you felt before and after your most stressful experience:

(1) How much does the occurrence of this stressful experience violate your sense of the world being fair or just?
(2) How much does this stressful experience violate your sense that other forces have control in the world?
(3) How much does this stressful experience violate your sense that God is in control?
(4) How much does this stressful experience violate your sense of being in control of your life?
(5) How much does this stressful experience violate your sense that the world is a good and safe place?

How much does your stressful experience interfere with your ability to accomplish each of these?

(6) Social support and community
(7) Self-acceptance
(8) Physical health
(9) Inner peace
(10) Educational achievement
(11) Achievement in my career
(12) Creative or artistic accomplishment
(13) Intimacy (emotional closeness)

Scoring syntax for calculating subscale means

Belief violations subscale: items 1, 2, 3, 4, 5
Intrinsic goal violations subscale: items 6, 7, 8, 9, 13
Extrinsic goal violations subscale: items 10, 11, 12

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