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The Posttraumatic Growth Inventory: A Revision Integrating Existential and Spiritual Change

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Spiritual Change (SC) is one of 5 domains of posttraumatic growth (PTG). The current Posttraumatic Growth Inventory (PTGI) assesses this area of growth with only 2 items, one focusing on religiosity and the other focusing on spiritual understanding. The addition of 4 newly developed spiritual–existential change (SEC) items, creating an expanded PTGI (Posttraumatic Growth Inventory-X), reflects a diversity of perspectives on spiritual–existential experiences that are represented in different cultures. Samples were obtained from 3 countries: the United States ($n = 250$), Turkey ($n = 502$), and Japan ($n = 314$). Analyses indicated that the newly added items capture additional experiences of growth outside traditional religious concepts, yet still are correlated with the original SC items, especially in the U.S. and Turkish samples. Relationships of the PTGI-X to established predictors of PTG, event-related rumination, and core beliefs, were as predicted in all 3 countries. The new 6-item SEC factor demonstrated high internal reliability, and the 5-factor structure of the expanded scale was supported by confirmatory factor analysis. The resulting 25-item PTGI-X can be used as a validated instrument in a wide range of samples in which traditional religious beliefs are less dominant.

The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1995; 1996) has become the most widely used measure of the positive changes people report as they struggle with the aftermath of highly stressful and potentially traumatic events (Helgeson, Reynolds, & Tomich, 2006; Linley & Joseph, 2004). The items in the PTGI were based primarily on interviews with persons who had suffered physical disabilities in adulthood or the death of a spouse in later life, and were tested in a large sample of college students who reported a variety of traumatic life events. Emerging from this work were 21 items, with a 5-factor structure comprising domains of Personal Strength, New Possibilities, Relating to Others, Appreciation of Life, and Spiritual Change (Tedeschi & Calhoun, 1996). Related measures include a short form (PTGI-SF; Cann, Calhoun, Tedeschi, Taku, et al., 2010), forms for children (PTGI-C; Cryder, Kilmer, Calhoun, & Tedeschi, 2006; PTGI-C-R; Kilmer et al., 2009), and a version that enables researchers to examine both positive changes, termed *posttraumatic growth*, and negative changes, termed *posttraumatic depreciation*, on the same five dimensions (PTGI-42; Growth and Depreciation; Baker, Kelly, Calhoun, Cann, & Tedeschi, 2008; Cann, Calhoun, Tedeschi, & Solomon, 2010). The 5-factor structure of the PTGI has emerged in many samples, although there has been some variability across cultures (Brunet, McDonough, Hadd, Crocker, & Sabiston, 2010; Lee, Luxton, Reger, & Gahm, 2010; Taku, Cann, Calhoun, & Tedeschi, 2008; Tedeschi & Calhoun, 1996; Weiss & Berger, 2010).

The Spiritual Change (SC) factor has generated some concern given its brevity and limited content. It is comprised of two items: "I have a better understanding of spiritual matters" and "I have a stronger religious faith." There are two potential problems with this factor. A factor with only two items can be considered psychometrically weak (Jaarsma, Pool, Sanderman, & Ranchor, 2006). Morris, Shakespeare-Finch, Rieck, and Newbery (2005) added three additional items with religious and spiritual content in an earlier study to address this. In some studies, SC operates differently in comparison to the other four factors (e.g., Danhauer et al., 2013; Hullmann, Fedele, Molzon, Mayes, & Mullins, 2014). In terms of content, these two items address growth that has a spiritual or religious aspect, but they do not capture growth that may be considered more existential in nature. As a result, in cultures that are more secular or commonly utilize a less traditionally religious understanding of events, there is a potential for a floor effect on this factor as was found in a study comparing a Westernized Hong Kong sample with a more traditional Taiwanese sample (Ho et al., 2013), and in work conducted in Spain (Vazquez & Paez, 2010) and Germany (Wagner & Maercker, 2010). Yet persons who do not report a strengthening of religious beliefs or a better

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understanding of spiritual matters still may be addressing existential concerns that are not tied to traditional religious beliefs. In some studies, the Appreciation of Life and SC factors have appeared to combine into a single construct that may reflect the existential connections between them, as was found in Japanese samples (Taku et al., 2007; Taku, Tedeschi, & Cann, 2015). Thus, if existential concerns are part of the process of examining changes experienced in the aftermath of significant life stressors, the current items in the PTGI may be missing those changes.

From the beginning of work on the construct of posttraumatic growth, there has been a strong existential flavor, influenced in part by Frankl (1963). "A significant element in the positive change that individuals experience in the wake of trauma is a transformation of their understanding of themselves, of their understanding of the priorities of life, and of their place in the universe. These are areas that are viewed by some persons as religious, and more generally as existential issues" (Calhoun & Tedeschi, 1998, p. 219).

Others also have recognized the connection between religious, spiritual, and existential concerns. Pargament (1999) views religion as a process of searching for meaning and significance, whereas Huguelet and Koenig (2009) describe spirituality as involving the ultimate questions about life's meaning in relation to the transcendent, usually but not always arising from a religious tradition. Linley and Shaw (2005) reviewed studies that showed that PTG is associated with religious openness and engagement in existential questions, indicating that these concerns are perhaps at the center of PTG. In an integration of PTG with spiritual and existential themes in trauma survivorship, brain injury in particular, McGrath (2011) pointed out that spirituality and PTG are so interconnected that not only can spirituality be considered a component of PTG, but that PTG itself may be an aspect of spirituality.

It appears that some combination of religious, spiritual, and existential concerns or connectedness is common in the process of PTG, a view that is supported by qualitative studies (Shakespeare-Finch, Martinek, Tedeschi, & Calhoun, 2013). The combination of spiritual and existential concerns may differ between cultures that vary in their religious, spiritual traditions, and existential understandings. To allow for a broader assessment of spiritual and existential change, a better cross-cultural examination of growth, and an increased sensitivity to the ways more secular and atheistic people examine existential issues in the aftermath of trauma, new items need to be added to the current PTGI. The resulting factor would better reflect Spiritual–Existential Change (SEC; and be so named). It also might be stronger psychometrically if it could be shown that the factor has substantial internal consistency and that it maintains the theory-driven relationships with the known predictors of PTG, such as core beliefs disruption (Cann, Calhoun, Tedeschi, Kilmer, et al., 2010) and cognitive processing, including deliberate rumination (Cann et al., 2011).

In the present study we attempt to broaden the assessment of spiritual growth in PTG by developing additional items for the PTGI (PTGI-expanded [PTGI-X]) that represent a diversity of perspectives on spiritual–existential experiences. We present an evaluation of the reliability and validity of the newly added items by using samples from three different cultural contexts: the United States, Turkey, and Japan. Our approach also relies on the use of confirmatory factor analysis (CFA) to determine if the 5-factor model of PTG continues to be represented in the PTGI-X.

Method

Participants and Procedure

U.S. sample. There were 250 undergraduate students (83 men and 167 women) recruited from introductory psychology courses at a large American state university. Participants received course credit for their participation. The mean age was 20.7 years ($SD = 5.75$). Participants stated their religious affiliations as follows: 15.2% Protestant ($n = 38$), 18.4% Catholic ($n = 46$), 2.0% Jewish ($n = 5$), 2.8% Muslim ($n = 7$), 0.4% Buddhist ($n = 1$), 46.8% other affiliation (including various nondenominational Christian churches ($n = 117$), and 14.4% no religious affiliation ($n = 36$). A prescreening survey ensured that only people who had experienced a potentially traumatic event in the past 6 months could participate. The events reported were 37.6% serious medical event for close other ($n = 94$), 27.6% unexpected death of close other ($n = 69$), 7.6% serious medical event ($n = 19$), 6.4% serious injury to close other ($n = 16$), 5.6% faced potential death or serious harm ($n = 14$), 5.2% serious injury to self ($n = 13$), 3.6% being stalked ($n = 9$), 2.4% robbery or mugging ($n = 6$), and 4.0% various others ($n = 10$). The participants rated the stressfulness of their traumatic experiences at the time of the event, on a scale of 1 = *not at all stressful* to 7 = *extremely stressful* ($M = 5.64$, $SD = 1.57$), and degree of stressfulness at the survey point ($M = 3.48$, $SD = 1.80$). Participants responded to the PTGI with the new items, the Event-Related Rumination Inventory (ERRI), and the Core Beliefs Inventory (CBI) based on their traumatic experiences. The research was conducted online, and took approximately 20 min to complete. The research was approved by the University of North Carolina at Charlotte Institutional Review Board.

Turkish sample. There were 502 undergraduate students (122 men, 379 women, 1 did not report gender) that comprised the Turkish sample, which was recruited from introductory psychology classes at three universities in Turkey. The mean age was 21.9 years ($SD = 3.96$); they stated their religious affiliations as follows: 89.2% were Muslim ($n = 448$); 4.4% were nonreligious ($n = 22$); 3.4% preferred to not reply ($n = 17$); 3.0% selected the other category, which included deist and agnostic humanist ($n = 15$).

Participants reported on events they had experienced during the previous 6 months including: serious health problems of family members or friends (24.1%), an unexpected death

(24.3%), being stalked (7.6%), accident reported by others (8.2%), their own serious health problems (5.4%), witnessing violence directed at close friends or relatives (3.2%), exposure to an event that could potentially result in death (3.0%), exposure to violence (3.0%), accidents (2.8%), exposure to natural disaster (2.6%), exposure to sexual or physical abuse (2.4%), being burgled (1.8%), exposure to war (1.6%) and others (10.0%).

Participants responded to demographic measures and Turkish translations of the PTGI with the new items, ERRI, and CBI based on their traumatic experiences. The research was conducted online, and took approximately 20 min to complete. The research was approved by the Abant Izzet Baysal University Institutional Review Board.

Japanese sample. There were 314 undergraduate students (158 men, 156 women) who experienced the Great East Japan earthquake that occurred on March 11, 2011, and comprised the sample from Japan. The mean age was 19.4 years (SD = 1.60). Participants were recruited from introductory psychology classes at two universities in Tokyo and the surrounding area, within 180–210 miles from the epicenter of the earthquake, 2 years and 3 months after the earthquake. Participants did not receive any compensation or course credit for their participation. More than half of the participants (57.3%, n = 180) identified as nonreligious, 35.0% identified as Buddhists (n = 110); 1.6% as Christians (n = 5); 2.2% as other (n = 7), such as Shinto; 3.8% (n = 12) did not report a religious affiliation.

Participants completed demographic measures, and Japanese-translated versions of the PTGI with the new items, the ERRI, and the CBI, focusing on their experiences with the earthquake. This was done using a paper-and-pencil survey in a group setting, which took approximately 30 min.

The study was approved by the Oakland University Institutional Review Board.

Measures

Posttraumatic Growth Inventory. The PTG was assessed using the PTGI (Tedeschi & Calhoun, 1996) for the American sample, the Turkish PTGI (Senol-Durak, Durak, Izmit-Gul, Tedeschi, & Cann, 2016) for the Turkish sample, and the Japanese PTGI (Taku et al., 2007) for the Japanese sample. The PTGI is a 21-item inventory that measures five domains of growth (Tedeschi & Calhoun, 1996; Taku et al., 2008). Participants were asked to identify the degree to which they did or did not experience the particular change (0 = *I did not experience this change as a result of my crisis* to 5 = *I experienced this change to a very great degree as a result of my crisis*). The score range for the total PTGI is 0 to 105 with higher scores indicative of greater growth. Because each domain has a different number of items, the means (ranges from 0 to 5) are reported.

Addition of items in the Spiritual–Existential Change domain. Based on definitions of spiritual and existential change in the published literature, 33 items were developed to measure spiritual–existential growth in ways that were cross-culturally appropriate. These items were evaluated by 10 independent judges (7 judges were American, 1 was bicultural, 1 was Turkish, and 1 was Japanese; 3 were psychologists with doctoral degrees, 5 were psychology students in doctorate programs, and 2 were undergraduates), who were familiar with PTG research and who were provided with definitions of spiritual growth. The judges identified items that were most consistent with the definition of spiritual and existential growth in the PTG literature (as described above), were comprehensive, and would be relatively straightforward when translated into other languages. Based on the judges' feedback, we discussed the appropriateness of each item and selected eight items that were minimally redundant to add to the PTGI. After gathering data, these eight items were reduced to four that were the most highly endorsed in the three samples, broadly covered the construct, and were easily translated. The four items ("I have greater clarity about life's meaning," "I feel better able to face questions about life and death," "I feel more connected with all of existence," and "I have a greater sense of harmony with the world") were added to the two original SC items ("I have a better understanding of spiritual matters" and "I have a stronger religious faith") to create the SEC factor.

Core beliefs examination. The examination of core beliefs that are challenged by stressful life events was assessed using the Core Beliefs Inventory (CBI; Cann, Calhoun, Tedeschi, Kilmer, et al., 2010) and its translated versions (CBI-J; Taku, Cann, Tedeschi, & Calhoun, 2015; CBI-T; Haselden, 2014). The CBI consists of nine items. Participants indicate the degree to which the focal event led them to seriously examine their core beliefs using a 6-point scale (0 = *not at all* to 5 = *a very great degree*). The internal consistency of the original measure was .82 for the English version, .87 for the Japanese version, and .85 for the Turkish version.

Intrusive and deliberate rumination. Intrusive and deliberate rumination in the aftermath of the stressful life event was assessed using the ERRI (Cann et al., 2011) and its translated versions (ERRI-J; Taku, Cann, et al., 2015; ERRI-T; Haselden, 2014). Participants were asked to respond to 10 items measuring intrusive rumination (e.g., "I thought about the event when I did not mean to") and 10 items measuring deliberate rumination (e.g., "I thought about whether I could find meaning from my experience") using a 4-point scale (0 = *not at all* to 3 = *often*). Internal consistency was reported as .94 for intrusive rumination and .95 for deliberate rumination for the English version, .96 for intrusive rumination and .91 for deliberate rumination in the Turkish version, and .93 for both types of rumination in the Japanese version.

Data Analysis

Descriptive statistics were first obtained to investigate the score distributions. Missing data were imputed using the expectation

Table 1
Descriptive Statistics and Internal Consistency of Each of the PTGI Domains Across Cultures

	U.S. ($n = 250$)			Turkey ($n = 502$)			Japan ($n = 314$)		
Variable	*M*	*SD*	α	*M*	*SD*	α	*M*	*SD*	α
Personal Strength	2.29	1.48	.86	2.90	1.30	.85	1.19	1.07	.82
Relating to Others	2.22	1.40	.90	2.26	1.15	.88	1.89	1.12	.87
New Possibilities	1.68	1.44	.88	2.60	1.26	.86	1.46	1.07	.84
Appreciation of Life	2.62	1.59	.85	2.85	1.32	.81	2.39	1.20	.67
Spiritual Change	1.69	1.63	.83	2.89	1.45	.76	0.67	0.94	.61
Spiritual and Existential Change	1.63	1.44	.91	2.76	1.30	.90	1.36	1.03	.82

Note. Score ranges for the means are 0 to 5. PTGI = Posttraumatic Growth Inventory.

maximization algorithm to replace all missing values with plausible values. A CFA on the 25-item PTGI-X was performed on each sample and on the combined sample. Finally, regression models determined the degree to which using the new items produce results that are consistent with the PTG theoretical model in terms of its relationships with CBI and ERRI scores.

Results

Descriptive Statistics

Descriptive statistics and Cronbach's α coefficients for each domain of the PTGI across cultures are presented in Table 1. The descriptive statistics for each of the six SEC items are presented in Table 2. Overall, the participants endorsed a wide range of responses on the spiritual–existential growth dimension, and the standard deviations were similar across countries. For the Japanese sample, although participants showed very low endorsement of the changes captured by the original two SC items, they reported change comparable to the U.S. sample on the four new items. However, there were also some differences in endorsement of these items across cultures. Results of one-way analyses of variance revealed that the effect of culture on SEC was significant, $F(2, 1059) = 137.16$, $p < .001$. Post hoc comparison using Scheffé's test indicated that the Turkish sample, $M = 2.76$, $SE = 0.06$, 95% confidence interval (CI) [2.65, 2.87], showed more spiritual–existential growth than the American sample, $M = 1.63$, $SE = 0.08$, 95% CI [1.48, 1.79], $p = .045$. The scores of the Japanese sample, $M = 1.37$, $SE = 0.07$, 95% CI [1.22, 1.51], were lower than both Turkish and American samples ($p < .001$).

Another way to assess the ability of the new items to capture change is to consider how many people report no growth (a 0 on the 0–5 scale indicates no change) when responding to the original two SC items versus the broader six SEC items. It can be seen in Table 3 that compared to the Turkish sample, fewer participants in the American sample and the Japanese sample reported experiencing no change when presented with the broader set of items. The differences between the two original items and the four new ones are especially noteworthy in the Japanese sample, where half the sample did not report changes on the original SC items, but most participants reported growth when the full set of six items was presented. These data suggest that the original two items were not fully capturing changes that people experienced in the broader spiritual–existential domain.

Reliability Analysis

Internal reliability values of the PTGI-X total scale were satisfactory across the three samples: .97 for the United States, .96 for Turkey, and .95 for Japan. In addition, increasing the SC factor from two items to the 6-item SEC factor resulted in improved internal reliability across all three samples (Table 1).

Table 2
Mean and Standard Deviation of the Spiritual Existential Change Items

	U.S. ($n = 250$)		Turkey ($n = 502$)		Japan ($n = 314$)	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*
I have a better understanding of spiritual matters	1.60	1.76	3.09	1.59	1.06	1.34
I have a stronger religious faith	1.78	1.77	2.69	1.64	0.31	0.82
I have greater clarity about life's meaning	1.68	1.76	2.90	1.57	1.60	1.50
I feel better able to face questions about life and death	1.87	1.73	2.85	1.63	2.17	1.58
I feel more connected with all of existence	1.47	1.71	2.63	1.58	1.71	1.54
I have a greater sense of harmony with the world	1.39	1.65	2.37	1.60	1.38	1.52

Note. The first two items are included in the original Posttraumatic Growth Inventory.

Table 3
Percentage of People Reporting No Growth on Spiritual Change Versus Spiritual Existential Change

Variable	U.S.	Turkey	Japan	Total
SC (2 items)	30.8	8.4	51.6	26.3
SEC (6 items)	18.0	5.4	11.0	10.0

Note. No growth = those who chose 0 ("*I did not experience this change at all as a result of my crisis"*) in the scale of 0–5 in the Posttraumatic Growth Inventory. SC = Spiritual Change; SEC = Spiritual Existential Change.

Confirmatory Factor Analysis

To assess whether the PTGI-X has the same factor structure as the original PTGI, the AMOS 21.0 (Arbuckle, 2013) software program was used to conduct a CFA using the combined sample. The 5-factor structure was maintained (see Table 4). Fit indices for the PTGI-X compared to a single-factor model and the models that include covariances among the error terms are presented in Table 5. In a comparison of these indicators with corresponding ones for the PTGI-X, there was little change in the structure with the additional four items included. Also, a 5-factor model with covariances revealed better results.

Concurrent Validity

To test the concurrent validity of the expanded scale, the scores of participants on the PTGI-X were compared with conceptually related constructs in the three samples. The PTGI-X was significantly associated with the examination of core beliefs and deliberate rumination about the event, but not with intrusive rumination (see Table 6). This pattern held for the SEC factor, except for deliberate rumination in the Japanese sample.

Discussion

The purpose of this investigation was to improve the PTGI by adding items that allow respondents in different cultural contexts to more fully report on their experiences with spiritual and existential growth. The result is an expansion of the PTGI: the PTGI-X. The original 2-item SC factor is now termed Spiritual–Existential Change (SEC) in the expanded scale. With the expansion of the items in that factor, the PTGI-X offers the

Table 4
Confirmatory Factor Analysis for 25 Items (21 Original PTGI Items + 4 New SEC Items) Using the Entire Sample

Variable	AL	PS	NP	RO	SEC
22. Greater sense of harmony with world					.823
23. More connected with existence					.836
24. Better able to face questions about life/death					.721
25. Greater clarity about life's meaning					.854
18. Stronger religious faith					.674
5. Better understanding of spiritual					.778
13. Better appreciate each day	.826				
2. Greater appreciation for value of own life	.723				
1. Changed my priorities	.690				
19. Stronger than I thought I was		.812			
12. Better able to accept		.739			
10. I can handle difficulties		.879			
4. Greater self-reliance		.805			
17. Try to change things			.796		
14. New opportunities			.667		
11. Do better things with my life			.861		
7. New path for life			.814		
3. Developed new interests			.654		
21. Better accept needing others				.670	
20. Learned how wonderful people are				.623	
16. More effort into my relationships				.780	
15. More compassion for others				.775	
9. More willing to express my emotions				.730	
8. Greater sense of closeness with others				.720	
6. Can count on people				.605	

Note. N = 1,065. PTGI= Posttraumatic Growth Inventory; AL = Appreciation of Life; PS = Personal Strength; NP = New Possibilities; RO = Relating to Others; SEC = Spiritual and Existential Change.

Table 5
Fit Indices of the Four Models of the PTGI-X 25 Items Using the Total Sample

Variable	χ^2	*df*	RMSEA	NFI	CFI	TLI	AIC	ECVI
1-factor model	3553.24	275	.106	.816	.827	.811	3703.24	3.48
1-factor model with covariances[a]	2807.03	272	.094	.854	.866	.853	2913.03	2.74
5-factor model	2347.93	265	.086	.878	.890	.876	2467.93	2.32
5-factor model with covariances[a]	1878.58	262	.076	.902	.915	.902	2004.58	1.88

Note. $N = 1{,}065$. PTGI-X = Posttraumatic Growth Inventory-Expanded; RMSEA = root mean square error of approximation; NFI = normed fit index; CFI = comparative fit index; TLI = Tucker-Lewis index; AIC = Akaike's information criterion; ECVI = expected cross-validation index.
[a]Three covariances were set between the error terms based on the modification indices > 100.00 (the three pairs were 23–24, 5–18, and 20–21). We selected these three pairs because each pair belongs to the same factor and we chose to avoid a very large number of covariances among the error terms just to improve the model fit to increase generalizability. The fit indices of the original PTGI 21 items were $\chi^2(179) = 1630.04$, RMSEA = .087, NFI = .892, CFI = .903, TLI = .886, AIC = 1734.04, and ECVI = 1.63.

Table 6
Regressions Predicting SC, SEC, PTGI, and PTGI-X Using Predictors of PTG for Three Samples

	Predictors (βs)			
Target	CBI	ERRI-D	ERRI-I	*R*
2-item SC				
Japan	.44***	.14	−.06	.48***
Turkey	.25***	−.02	.24***	.43***
U.S.	.16*	.36***	.11	.56***
6-item SEC				
Japan	.47***	.12	.12	.63***
Turkey	.32***	.18**	.06	.50***
U.S.	.23***	.41***	.06	.62***
21-item PTGI				
Japan	.47***	.17*	.07	.63***
Turkey	.31***	.21**	.08	.54***
U.S.	.23***	.46***	.04	.66***
25-item PTGI−X				
Japan	.47***	.18*	.08	.64***
Turkey	.32***	.23***	.06	.55***
U.S.	.24***	.46***	.04	.66***

Note. U.S., $n = 250$; Turkey, $n = 502$; Japan, $n = 314$. CBI = Core Beliefs Inventory; ERRI-D = Event Related Rumination Inventory–Deliberate Rumination subscale; ERRI-I = Event Related Rumination Inventory–Intrusive Rumination subscale.
*$p < .05$. **$p < .01$. ***$p < .001$.

possibility of capturing self-reported growth in a wider array of cultural contexts than was possible with the original 2-item SC factor.

The PTGI-X evidenced very good reliability, the newly expanded SEC factor demonstrated good reliability, and the inclusion of the four new SEC items did not adversely affect the internal consistency of the whole scale and improved the reliability of the SEC factor across all three samples. With the combined sample, including participants from the United States, Turkey, and Japan, the CFA results revealed that, consistent with the original PTGI, the PTGI-X with 25 items has a 5-factor structure similar to the original scale. The PTGI-X also showed the expected relationship with theoretically relevant variables. The inclusion of the four new items allowed more people, especially in a non-Western context, to report growth they had experienced in the domain. The broader representation of areas of existential growth allowed people who might have nonreligious perspectives to report growth they had experienced.

Additional support for the new items is demonstrated by the mean scores for the new items across cultures. Although the Japanese participants showed little endorsement of change on the original two SC items, on the new items they reported means similar to the U.S. sample. The overall means across samples showed that the more religiously homogenous Turkish sample had the highest means on the SEC factor, whereas in the Japanese sample, where traditional religious beliefs are less relevant, the overall means were the lowest. The U.S. sample represented a middle ground, with many religious people, but also many nonbelievers, or religiously unaffiliated people. Without the new items, the results would have indicated that Japanese participants were reporting virtually no spiritual growth; however, the new items revealed that in this Japanese sample, this type of growth was indeed present (see Table 2); therefore, the revised measure allowed for some expression of growth that would not have been evident with the original scale.

The results of the investigation of the concurrent validity of the PTGI-X were satisfactory. Consistent with findings in the literature (Cann, Calhoun, Tedeschi, Kilmer, et al., 2010), measures of rumination and core belief challenge were related to the PTGI-X scores in the Turkish sample; in this group spiritual experiences also were related to higher PTGI-X scores. Consistent with theoretical predictions, intrusive rumination was not related to PTG, whereas deliberate rumination was related to PTG across all samples. There also were indications of cultural differences, with the relationship between the PTGI-X and deliberate rumination showing more strength in the U.S. sample than in the other two cultures. There was no evidence that

adding the new items weakened the effectiveness of the PTGI as a measure of PTG. Using a truncated version of the measure, equivalent to the original 21-item PTGI, it is still possible to make comparisons with previous research that has used the original PTGI. However, the PTGI-X appears to provide additional insight into the experience of PTG in diverse cultures.

As with any investigation, limitations need to be noted. First, although the three samples do represent very different cultures, all of the participants were university students. This may place some limits on the degree to which results represent the broader population in each of the three countries. Second, although the samples of participants from the United States and Turkey included people dealing with a heterogeneous group of stressful events, the Japanese participants were all asked to focus on one single event, the earthquake. It is not clear what influence, if any, these differences between the samples made, but it is a matter that must be taken into account. Finally, it remains to be seen how the new SEC factor operates in other cultures, for example, in Europe and South America, two regions where there are likely to be significant differences in the centrality of religious and spiritual life.

The PTGI-X includes items that allow respondents to indicate changes in a broader spiritual and existential domain. This instrument may capture PTG among persons who are nonreligious but who found spiritual and existential beliefs to be important aspects of their posttrauma experience. These persons may be more often found in cultures that are more secular or have fewer adherents to traditional religious belief systems. Since the PTGI-X includes the original 21 PTGI items, it can be used to make direct comparisons to work using the original measure. In addition, the PTGI-X maintains the 5-factor structure of the original instrument, allowing for discussion of the PTG factors according to the original concept, with a broadened understanding of spiritual and existential growth.

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