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Relationships of Posttraumatic Growth and Stress Responses in Bereaved Young Adults

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The present study examined posttraumatic growth (PTG) and its associations with stress responses in bereaved young adults. It was hypothesized that the PTG domains that are more strongly endorsed among the bereaved would show an inverted-U-shaped relationship with stress responses. Japanese undergraduate students who reported their loss of loved ones as the most traumatic experience within the past 5 years completed the Posttraumatic Growth Inventory (PTGI) and the revised Impact of Event Scale. Results revealed that the hypothesized curvilinear relationships were observed in the PTG domain of relating to others and the combined domain of spiritual change and appreciation of life, whereas linear relationships were found in the personal strength and new possibilities domains. These results suggest that although a certain level of stress response may be crucial for experiencing PTG, the relationship varies across the PTG domains in these bereaved young adults.

KEYWORDS *bereavement, curvilinear relationships, posttraumatic growth, PTG domains, stress*

A better understanding of the psychological mechanisms underlying the experience of personal growth that may occur as a result of the struggle with highly stressful or traumatic life events, referred as *posttraumatic growth*

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(PTG; Tedeschi & Calhoun, 1996), has important implications for clinical intervention and theoretical perspectives of human psychological adjustment and growth. As described in the PTG theoretical model (Calhoun, Cann, & Tedeschi, 2010; Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 2004), a variety of elements, such as characteristics of the person pretrauma (e.g., personality, religious beliefs), seismicity of the triggering event (e.g., severity and subjective impact of the event), cognitive processing (e.g., intrusive and deliberate rumination), and sociocultural context (e.g., disclosure, cultural value), are all likely to play a role in determining the degree to which people experience PTG.

One ongoing research question involves the nature of the relationship between PTG and the psychological distress created by the event experienced. Because psychological distress is assumed to be the negative outcome of a stressful life event, and PTG has been conceptualized as positive psychological change resulting from a stressful life event, negative associations between these two have been predicted by some researchers. Researchers, in fact, have found this negative relationship in both a longitudinal study (Frazier, Conlon, & Glaser, 2001) and a cross-sectional study (Stockton, Hunt, & Joseph, 2011). But more researchers have found weak to moderate positive correlations between distress and growth in longitudinal studies (e.g., Dekel, Ein-Dor, & Solomon, 2012; Holgersen, Boe, & Holen, 2010) and cross-sectional studies (e.g., Morris, Shakespeare-Finch, Rieck, & Newbery, 2005; Nightingale, Sher, & Hansen, 2010; Nishi, Matsuoka, & Kim, 2010; Shigemoto & Poyrazli, 2011), supporting the notion that PTG and continuing psychological distress may coexist (e.g., Tedeschi & Calhoun, 2004). These positive correlations also support the idea that PTG is more likely to occur when the triggering event was severe enough to shake the assumptive world or core belief that the person holds (e.g., Calhoun, Cann, & Tedeschi, 2010), since the stress responses are likely to reflect the degree of severity of the event. Given the conflicting results, studies have also examined the possibility of a curvilinear relationship between PTG and distress, and most have confirmed an inverted-U-shaped relationship. People with low or high stress responses are likely to report lower PTG than those with intermediate levels of stress responses (e.g., Kleim & Ehlers, 2009; Levine, Laufer, Hamama-Raz, Stein, & Solomon, 2008; McLean et al., 2013; Tomich & Helgeson, 2012). These findings then lead to the next question of whether this relationship would be observed consistently across the different domains of PTG.

The majority of the studies supporting the quadratic relationship between PTG and psychological distress have focused solely on overall PTG (e.g., Kunst, 2010; McCaslin et al., 2009; McLean et al., 2013) by using only the total score from the Posttraumatic Growth Inventory (PTGI), the most commonly used instrument assessing psychological growth resulting from a trauma (Tedeschi & Calhoun, 1996). However, literature suggests that PTG is not a single-dimensional construct. Five broad dimensions of PTG

have been identified by exploratory factor analyses and tested by confirmatory factor analyses with diverse samples (e.g., Lee, Luxton, Reger, & Gahm, 2010; Linley, Andrews, & Joseph, 2007; Taku, Cann, Calhoun, & Tedeschi, 2008): *personal strength* (e.g., increased self-reliance or recognition of possessing a sense of strength), *relating to others* (e.g., greater sense of closeness, intimacy, or compassion for others), *new possibilities* (e.g., developing a new opportunity or taking a new path in life), *spiritual change* (e.g., deeper understanding of spirituality, including stronger religious beliefs), and *appreciation of life* (e.g., greater appreciation for the value of life). The factor structure of the PTGI, however, slightly varies depending on the sample characteristics, such as in translated versions. The Japanese version (PTGI-J; Taku et al., 2007), for example, was found to have four factors, with the first three (i.e., *personal strength*, *relating to others*, and *new possibilities*) being replicated and the remaining two (*spiritual change* and *appreciation of life*) being combined, possibly due to the different religious and cultural background in Japan (Taku et al., 2007).

Although these subdomains of the PTGI have been shown to be moderately intercorrelated (e.g., Cobb, Tedeschi, Calhoun, & Cann, 2006; Shakespeare-Finch & Enders, 2008), research also has suggested that these domains may have distinct features and may capture potentially different psychological processes and connotations (e.g., Nishi et al., 2010; Splevins, Cohen, Bowley, & Joseph, 2010; Zoellner & Maercker, 2006). For example, appreciation of life has been most commonly reported in various samples across different cultures, such as assault survivors in the UK (Kleim & Ehlers, 2009), adolescents exposed to terror in Israel (Levine, Laufer, Stein, Hamam-Raz, & Solomon, 2009), trauma survivors in Australia (Shakespeare-Finch & Barrington, 2012), coronary artery disease patients in Canada (Leung et al., 2010), and former U.S. prisoners of war (Feder et al., 2008). Personal strength, on the other hand, is often reported more in individualistic societies where independence and autonomy are highly valued, such as the U.S., than in collectivistic cultures where interdependence and harmony are highly valued, such as Japan (Taku, 2013). Spiritual change has been, as might be expected, observed more commonly in religious people than in nonreligious people (Currier, Mallot, Martinez, Sandy, & Neimeyer, 2012; Joseph, 2011). These studies raise questions about the adequacy of relying on the total score of the PTGI as an index of the experience of PTG, especially since the total number of items per subscale is variable in the PTGI. Of 21 PTGI items, the Relating to Others subscale consists of seven items, whereas Spiritual Change consists of only two items; thus, the overall PTGI score is more heavily affected by the subscale that has more items. Studies using the aggregated scores of the PTGI implicitly assume that people who report higher total scores would experience the same “growth”; however, it is a debatable question whether or not each of the PTG domains reveals the same psychological characteristics.

Another key element that is likely to affect both the form of PTG experienced and psychological distress is the characteristics of the triggering life events. Although only a few studies have conducted a direct comparison of the level of PTG across different types of triggering events, the findings have demonstrated that PTGI scores can differ according to the trauma type (e.g., Shakespeare-Finch & Armstrong, 2010; Taku et al., 2007). Death of a loved one, for example, is often associated with higher levels of PTG, characterized by high growth in the domains of appreciation of life and relating to others but relatively low growth in the domains of new possibilities and personal strength (Ickovics et al., 2006; Shakespeare-Finch & Armstrong, 2010; Taku et al., 2007). The purpose of this study is to test whether the curvilinear relationships between PTG and stress responses that have been identified using the PTGI total score would be replicated when examining each of the PTG domains separately in a sample of Japanese bereaved people. It is hypothesized that curvilinear relationships should emerge in the PTG domains that are more likely to be experienced by the bereaved, such as appreciation of life. The curvilinear relationships would also emerge in the PTG domain that has more items in the PTGI (i.e., relating to others), since the inverted-U-shaped relationship has been reported in studies using the total score of the PTGI. Specific hypotheses regarding the PTG domains of new possibilities and personal strength were not formulated, because the previous studies, especially in Japanese samples, have yielded only small or no zero-order correlations between these two domains and stress responses (e.g., Nishi et al., 2010; Taku et al., 2007), and little research has been conducted to test the possible curvilinear relationships in each PTG domain separately.

METHOD

Participants and Procedure

College students in Japan ($N = 589$; 327 women, 262 men) participated in this study. The majority of the participants ($n = 575$, 97.6%) identified their nationality as Japanese and specified Japanese as their first language. Eleven people identified as Korean or Chinese, and three identified as American. These people also reported that Japanese was not their first language; thus, they were excluded from the current analysis. The inclusion criteria also included the following: those who indicated that they had lost a loved one within the past 5 years ($n = 269$, 46.78%) and those who identified their loss as the most traumatic event they had experienced in the past 5 years. This resulted in a total of 144 participants (76 female, 68 male). Ages ranged from 18 to 44 years ($M = 20.22$, $SD = 3.13$). The majority were single ($n = 139$, 96.53%). In this subsample, losses occurred 2 to 12 months (21.4%), 1 to 2 years (26.4%), 2 to 3 years (17.1%), 3 to 4 years (17.9%), or 4 to 5 years (17.1%) prior to the administration of the survey.

The participants were recruited from introductory psychology courses at one university in the Tokyo area. All participants completed the consent form and then responded anonymously to a set of inventories without compensation. Data collection took place in classroom settings, and the measures required approximately 30 minutes to complete. Order of presentation of the measures was counterbalanced to avoid any order effects. This study was approved by the university's institutional review committee.

Measures

SOCIODEMOGRAPHIC VARIABLES

The participants provided demographic information such as gender, age, and marital status. They then reported whether they had experienced any stressful or traumatic life events within the last 5 years and, if so, what kind of event(s). Those who reported that they had experienced at least one stressful or traumatic event then identified the single most traumatic life event and described it in detail.

POSTTRAUMATIC GROWTH

The Japanese translation of the 21-item PTGI (PTGI: Tedeschi & Calhoun, 1996; PTGI-J: Taku et al., 2007) was used to measure the degree of positive change experienced in the aftermath of the loss that the participants identified as the most traumatic in the past 5 years. Each item was rated using a 6-point scale, with values ranging from 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 PTGI has satisfactory reliability and validity (Tedeschi & Calhoun, 1996) and has been widely used. Internal consistency for the total 21-item PTGI-J (Cronbach's α) was .93 in the current sample. The PTGI-J consists of four domains, with three out of the original five PTGI domains being replicated (i.e., relating to others, new possibilities, and personal strength) and the remaining two subscales being combined (spiritual change and appreciation of life) (Taku et al., 2007). The Cronbach's alphas for the subscales in the current sample were .89 for relating to others, .84 for new possibilities, .79 for personal strength, and .70 for the combination of spiritual change and appreciation of life.

STRESS RESPONSES

The Japanese translation of the 22-item Impact of Event Scale-Revised (IES-R: Weiss & Marmar, 1997; IES-R-J: Asukai et al., 2002) was used to measure posttraumatic stress responses or the perceived negative psychological impact of the event. Participants rated the degree to which symptoms occurred during the past 7 days on a 4-point scale ranging from 0 (not at all) to

3 (often). The IES-R and the IES-R-J have demonstrated good reliability and validity. Although the IES-R contains three subscales (i.e., intrusion, avoidance, and hyperarousal), the current study utilized the total score. The Cronbach's alpha coefficient for the total 22-item scale in the current sample was .93.

Data Analysis

The differences in the demographic characteristics between those who met the inclusion criteria for this study and those who did not were examined by using a series of *t* tests and chi-square tests. The linear and quadratic relationships between PTGI-J and IES-R-J total scores were tested through hierarchical regression analyses of the PTGI-J total and each of the PTGI-J subscales separately. The predictor (i.e., IES-R-J total score) was linearly transformed (centered) by subtracting the mean and entered into the model as Step 1. Then this score was squared to create the quadratic term and entered into the regression model as Step 2. Finally, a one-way repeated-measures ANOVA was conducted to compare the level of growth in each PTG domain. All of the analyses were conducted using SPSS Version 17.0 for Windows.

RESULTS

Assessment of the Inclusion Criteria

Of the 575 participants who identified their nationality as Japanese, 144 (25.04%) met the inclusion criteria. Their age ($M = 20.22$, $SD = 3.13$) was not significantly different from that of people who were excluded ($M = 20.54$, $SD = 5.40$), $t(573) = .66$, *ns*. The gender frequencies were not different between those who met the inclusion criteria (female = 76, male = 68) and those who did not (female = 240, male = 191), $\chi^2(1, N = 575) = .37$, *ns*, and no differences were found for marital status (single = 139, married or separated = 5 for those who met the inclusion criteria; single = 424, married

TABLE 1 Means and Zero-Order Correlations for the Study Variables.

	Range	Mean (<i>SD</i>)	Correlations			
			1	2	3	4
1. Relating to others	0–5	2.24 (1.28)				
2. New possibilities	0–5	1.75 (1.23)	.67**			
3. Personal strength	0–5	1.63 (1.10)	.66**	.78**		
4. Spiritual change and appreciation of life	0–5	2.30 (1.03)	.69**	.65**	.58**	
5. IES-R-J	0–3	0.72 (0.64)	.24**	.30**	.28**	.28**

** $p < .01$.

TABLE 2 Hierarchical Regression Analyses Explaining the PTGI-J Domains.

	Predictors	β	F	R^2	ΔR^2	Adjusted R^2
Relating to others						
Step 1	IES-R-J	.24**	8.62**	.06		.05
Step 2	IES-R-J	.47***				
	IES-R-J ²	-.33**	9.10**	.12	.06**	.10
New possibilities						
Step 1	IES-R-J	.30***	13.95***	.09		.08
Step 2	IES-R-J	.37**				
	IES-R-J ²	-.11	7.44**	.10	.01, <i>ns</i>	.08
Personal strength						
Step 1	IES-R-J	.28**	12.01**	.08		.07
Step 2	IES-R-J	.29*				
	IES-R-J ²	-.01	5.97**	.08	.00, <i>ns</i>	.07
Spiritual change and appreciation of life						
Step 1	IES-R-J	.27**	10.94**	.07		.07
Step 2	IES-R-J	.44***				
	IES-R-J ²	-.26*	8.34***	.11	.03*	.09

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

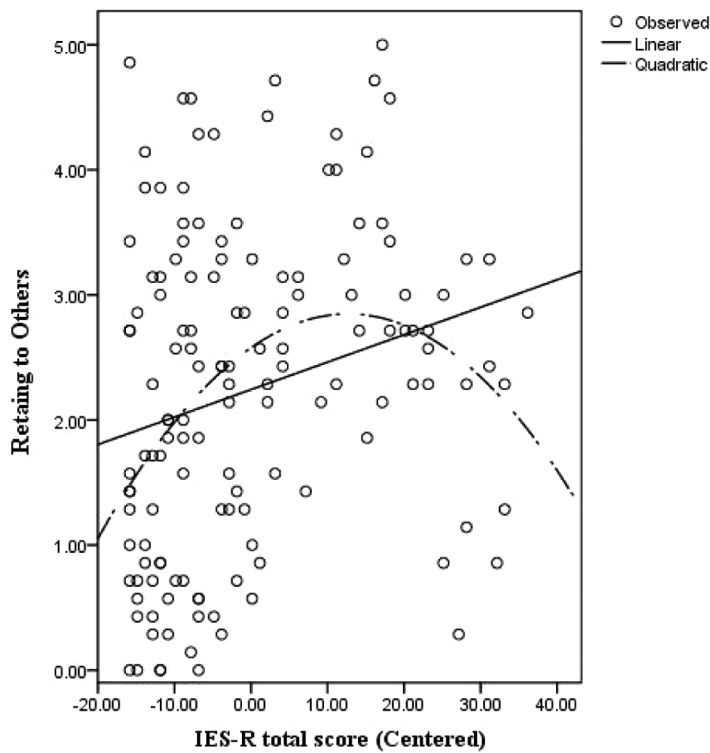


FIGURE 1 Scatterplots of the mean of the PTGI-J relating to others domain and the IES-R-J total score (centered).

or separated = 7 for those who did not), $\chi^2(1, N=575) = 1.80, ns$. The PTGI-J total score, ranging from 0 to 105, was also not different, $t(555) = -.23, ns$, between those who met the inclusion criteria ($M = 42.82, SD = 22.15$) and those who did not ($M = 42.32, SD = 22.40$). Finally, the IES-R-J total score, ranging from 0 to 88, was not different, $t(555) = .75, ns$, between those who met the criteria ($M = 15.58, SD = 13.92$) and those who did not ($M = 16.72, SD = 15.94$).

Linear and Curvilinear Relationships Between PTG and Stress Responses

The following analyses were conducted on the sample that met the inclusion criteria. The zero-order correlation between the PTGI-J and the IES-R-J total score was .29 ($p < .01$). Weak and positive correlations ($r_s = .24$ to $.30$) were found between PTGI-J subscales and the IES-R-J total score (Table 1). Thus, at the linear level, all of the relationships were positive and significant.

Hierarchical regression analyses were conducted to test whether the quadratic relationship between PTG and stress responses would exist over and above any linear relationship. The first regression analysis with the centered score of the IES-R-J total explaining PTGI-J total score was significant,

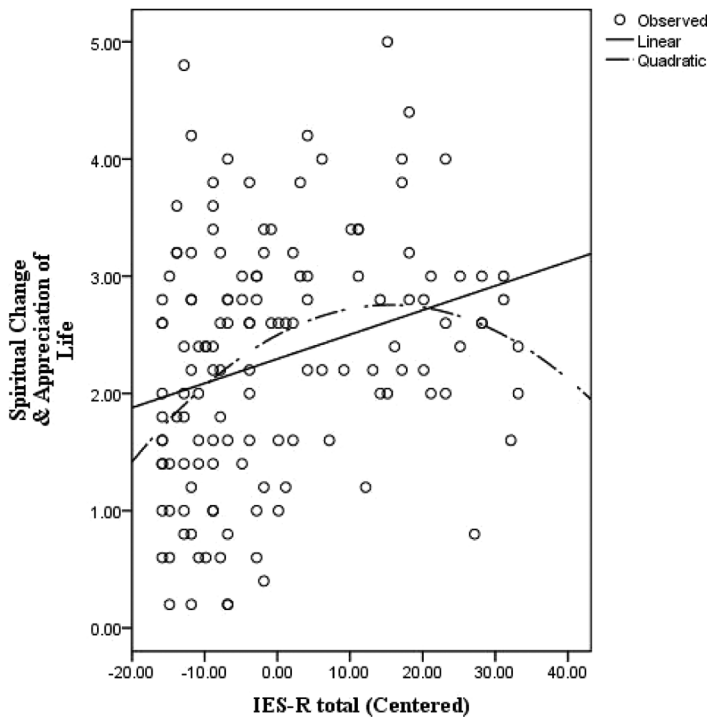


FIGURE 2 Scatterplots of the mean of the spiritual change and appreciation of life combined factor and the IES-R-J total score (centered).

$\beta = .28, p < .01, R^2 = .08, \text{adjusted } R^2 = .07, F(1, 141) = 12.09, p < .01$; however, in the second step, the addition of the quadratic term (squared centered IES-R-J total score) showed a significant increase in $R^2, \beta = -.25, p < .05, R^2 = .11, \text{adjusted } R^2 = .10, \Delta R^2 = .03, F(1, 140) = 5.14, p < .05$, indicating that there was a significant quadratic effect in predicting total PTGI-J score. The same hierarchical regression analyses were conducted for each domain of the PTGI-J. As seen in Table 2, of the four PTGI-J domains, relating to others (Figure 1) and the combined factor of spiritual change and appreciation of life (Figure 2) showed predicted inverted-U quadratic relationships beyond any linear relationships, supporting our hypothesis, whereas the addition of the quadratic term did not show a significant increase in R^2 in the models explaining new possibilities (Figure 3) and personal strength (Figure 4).

Level of Growth Among the PTG Domains

A one-way repeated-measures ANOVA was conducted to compare the mean levels of growth across the PTGI-J domains. Mauchly's test indicated that the assumption of sphericity had been violated, $\chi^2(5) = 16.68, p < .01$, and

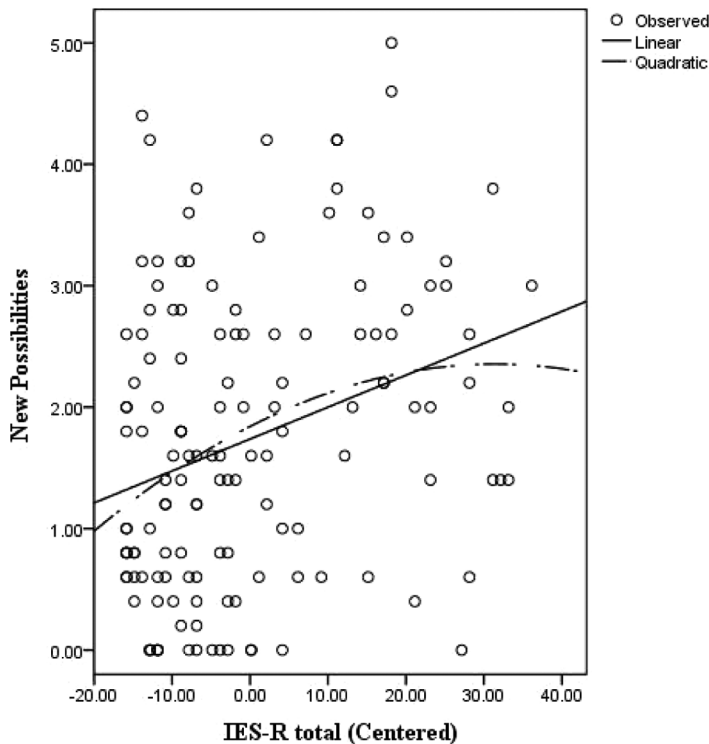


FIGURE 3 Scatterplots of the mean of new possibilities and the IES-R-J total score (centered).

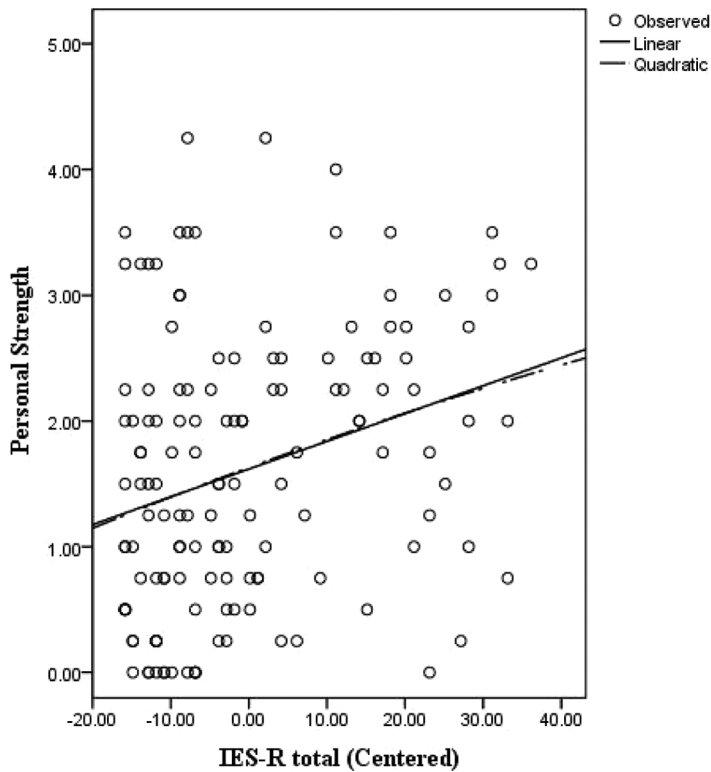


FIGURE 4 Scatterplots of the mean of personal strengths and the IES-R-J total score (centered).

therefore multivariate tests are reported ($\epsilon = .93$). Results showed that the level of growth differed depending on the PTG domain, Pillai's trace $V = .37$, $F(3, 137) = 26.56$, $p < .001$, partial $\eta^2 = .37$. Pairwise comparisons with the Bonferroni adjustment revealed that, among the four PTGI-J subscales, the degree of PTG reported in relating to others and the combined factor of spiritual change and appreciation of life was significantly more than PTG reported in personal strength and new possibilities at $p < .001$ (Table 1).

DISCUSSION

The aim of this study was to test whether the curvilinear relationships between PTG and stress responses would be replicated among bereaved Japanese young adults when examining the PTG domains separately. Although a few studies have addressed the potential problems of solely relying on the total score of the PTGI (e.g., Joseph, 2011) and at least one study has examined the curvilinear relationships between distress and growth in each of the PTG domain separately (Kleim & Ehlers, 2009), this is the first

study to examine these relationships in a bereaved sample. Overall, this study revealed the quadratic, inverted-U relationships between overall PTG and stress responses. This outcome is consistent with previous results found among assault survivors in the UK (Kleim & Ehlers, 2009), military medical personnel in the U.S. (McLean et al., 2013), adolescents in Israel (Levine et al., 2008), and university students in Sri Lanka (McCaslin et al., 2009). This may explain why the subjective severity of the event, which is thought to reflect the level of psychological distress or posttraumatic stress disorder (PTSD) symptoms, does not sufficiently explain the variance of PTG when considered as a purely linear relationship (e.g., Nishi et al., 2010).

Curvilinear relationships were not observed consistently across PTG domains. Rather, the domains that yielded a greater degree of PTG in bereaved people (i.e., relating to others and the combined factor of spiritual change and appreciation of life) supported the curvilinear relationships, whereas the domains that produced less PTG by the bereaved (i.e., personal strength and new possibilities) showed only a linear relationship. The likelihood of experiencing growth in each PTG domain is conceivably affected by the nature of the event. Our sample, bereaved young adults in Japan, commonly reported experiencing high growth in the domain of relating to others. Having more compassion for others or an increased sense of closeness with others were the examples that our participants reported as a result of loss. The current findings showed that the greatest growth in this PTG domain was associated with moderate levels of stress responses associated with loss, indicating that an optimal level of distress is linked to the greatest PTG in the relating to others domain. PTG may occur with concomitant states of psychological distress (Calhoun, Tedeschi, Cann, & Hanks, 2010); however, the current study suggests that greater levels of distress might suppress the positive changes in relationships.

The domain of spiritual change and appreciation of life also produced relatively high levels of growth in this bereaved sample, which is consistent with the literature (e.g., Shakespeare-Finch & Armstrong, 2010). The current data revealed that the bereaved young adults who reported moderate levels of psychological distress as a result of their loss reported greater growth in the domain of spiritual change and appreciation of life. As with the relating to others domain, the bereaved with high levels of stress responses overall reported lower growth, which may suggest that these are the ones who are struggling with PTSD symptoms and that this impedes a connection between their loss and growth.

The personal strength and new possibilities domains, on the other hand, did not yield the curvilinear relationships with stress responses. A possible explanation for the failure to find the inverted-U-shaped relationships is that these domains were reported at lower levels among our sample. It is possible that bereavement does not promote increased self-confidence by active engagement, compared to other highly stressful life events such as injury,

accident, or relationship issues. A previous study examining the possible curvilinear relationships between PTG and PTSD symptoms in separate PTG domains revealed that the quadratic terms were significant for most PTGI domains except for appreciation of life, spiritual change, and relating to others (Kleim & Ehlers, 2009), which is the opposite of our current findings. This might be due to the differences in sample characteristics and types of triggering life events. In Kleim and Ehlers's study, the sample comprised people who experienced a physical assault, and they were mainly European. In fact, several cross-cultural studies focusing on Japanese samples have indicated that the level of growth in the personal strength domain tends to be low (e.g., Kamibeppu et al., 2010; Taku et al., 2007), whereas this domain was reported at a high level in Kleim and Ehlers's study (2009). Although it may be due to the collectivistic cultural characteristics that Japan might hold, it is unknown to what degree culture influences growth in this domain or if it is more due to the characteristics of bereavement. Future research should sort out the potential impact of cultural values versus the psychological characteristics of the triggering event.

This study has advanced our knowledge about the relationships between PTG and stress responses by building on previous studies and demonstrating that there might be multiple pathways to the experience of PTG depending on the specific PTG domains, the sociocultural background of those experiencing the events, and the characteristics of the triggering events. However, there are several limitations to consider. First, potentially important information that might impact the relationships was not collected in this study. For example, the relationships between the bereaved and the deceased (e.g., family versus friends, how they were close) as well as the characteristics of death (e.g., the degree of unexpectedness, psychological preparedness, and time since the loss) might affect both PTG and stress responses. The current study solely focused on the relationships between the resulting PTG and level of distress; thus, it might be important to measure these additional characteristics to better understand the relationships.

Second, the PTG model (e.g., Calhoun, Cann, & Tedeschi, 2010) proposes that how much the triggering event shakes the person's assumptive world or core beliefs should play a key role in predicting the degree of PTG. Future studies are needed to evaluate the culturally validated measurement of this experience of disrupted beliefs and the cognitive processing predicted to follow (Cann et al., 2011). While an instrument to assess disruption of beliefs (Core Belief Inventory; Cann et al., 2010) has been developed, no data have assessed its appropriateness in diverse cultures. Due to our sample characteristics (i.e., those who showed relatively low levels of distress regarding their loss, reflected by the IES-R-J score) and procedure characteristics (i.e., cross-sectional method, relying on self-report methodologies), the generalizability of this study may be limited.

Third, since the PTGI-J utilizes the combined factor of spiritual change and appreciation of life, the differences between these two PTG domains were not investigated in this study. Measuring PTG is one of the most challenging tasks that researchers face in this field (Park & Lechner, 2006). As with the case of the spiritual change domain, it may be necessary to develop a system that allows each person to consider what he or she means by psychological growth as a result of his or her personal experiences. Finally, the current study only used the total score of the IES-R-J. Future research may benefit from investigating the contribution of each distress domain (i.e., intrusion, avoidance, and hyperarousal) separately.

Despite these limitations, the current study adds further evidence for the presence of an inverted-U-shaped relationship between PTG and stress responses, suggesting that PTG and psychological distress are not negatively related and may coexist, in line with earlier studies (e.g., McLean et al., 2013) and theoretical models (Calhoun et al., 2010; Calhoun & Tedeschi, 2006; Tedeschi & Calhoun, 2004). The cognitive work assumed to facilitate PTG is unlikely to occur in the absence of distress, and the recognition of positive change will not necessarily replace distress. To completely understand the potentially complex relationship between PTG and distress, it will be necessary to track the changes in each over time. Does the immediate level of distress in the aftermath of a trauma have the same relationship to later PTG as the current level of distress? Because our study was cross-sectional, the psychological distress that was assessed reflects the current subjective impact or severity of the loss, which should support the theoretical relationships between PTG and psychological distress depicted in the PTG model (e.g., Calhoun et al., 2010). However, if the study was longitudinal, changes in psychological distress could be assessed to possibly distinguish immediate distress, which would reflect the subjective impact of the triggering event, from later distress that may represent prolonged maladaptive responses (e.g., unsuccessful coping, loss of resources such as social support). Thus, the curvilinear relationships may not be evident, indicating the possibility that the negative relationships between PTG and distress depend on changes in distress (Tomich & Helgeson, 2012). In addition, we found that the relationships between growth and distress varied according to the PTG domains.

For clinical applications, future research needs to identify the different outcomes between people who experienced high growth and yet are still concurrently experiencing severe distress and those who show low growth and high distress, depending on the PTG domains. Since it is not clear if there is a causal relationship between levels of distress and PTG, clinicians may consider some options in their approaches to the bereaved. Perhaps efforts to reduce distress among the bereaved may promote PTG in some persons who are experiencing extreme levels of grief. It may also be possible that focusing on PTG as an aspect of grief will reduce these extreme levels of distress.

REFERENCES

- Asukai, N., Kato, H., Kawamura, N., Kim, Y., Yamamoto, K., Kishimoto, J., . . . Nishizono-Maher, A. (2002). Reliability and validity of the Japanese-language version of the Impact of Event Scale-Revised (IES-R-J): Four studies of different traumatic events. *Journal of Nervous and Mental Disease, 190*, 175–182.
- Calhoun, L. G., Cann, A., & Tedeschi, R. G. (2010). The posttraumatic growth model: Sociocultural considerations. In T. Weiss & R. Berger (Eds.), *Posttraumatic growth and culturally competent practice: Lessons learned from around the globe* (pp. 1–14). Hoboken, NJ: Wiley.
- Calhoun, L. G., & Tedeschi, R. G. (2006). The foundations of posttraumatic growth: An expanded framework. In L. G. Calhoun & R. G. Tedeschi (Eds.), *Handbook of posttraumatic growth: Research and practice* (pp. 3–23). Mahwah, NJ: Erlbaum.
- Calhoun, L. G., Tedeschi, R. G., Cann, A., & Hanks, E. A. (2010). Positive outcomes following bereavement: Paths to posttraumatic growth. *Psychologica Belgica, 50*, 125–143.
- Cann, A., Calhoun, L. G., Tedeschi, R. G., Kilmer, R. P., Gil-Rivas, V., Vishnevsky, T., & Danhauer, S. C. (2010). The Core Beliefs Inventory: A brief measure of disruption in the assumptive world. *Anxiety, Stress, & Coping, 23*, 19–34.
- Cann, A., Calhoun, L. G., Tedeschi, R. G., Triplett, K. N., Vishnevsky, T., & Lindstrom, C. M. (2011). Assessing posttraumatic cognitive processes: The Event Related Rumination Inventory. *Anxiety, Stress, & Coping, 24*, 137–156.
- Cobb, A. R., Tedeschi, R. G., Calhoun, L. G., & Cann, A. (2006). Correlates of posttraumatic growth in survivors of intimate partner violence. *Journal of Traumatic Stress, 19*, 895–903.
- Currier, J. M., Mallot, J., Martinez, T. E., Sandy, C., & Neimeyer, R. A. (2012, March 26). Bereavement, religion, and posttraumatic growth: A matched control group investigation. *Psychology of Religion and Spirituality, 5*, 69–77.
- Dekel, S., Ein-Dor, T., & Solomon, Z. (2012). Posttraumatic growth and posttraumatic distress: A longitudinal study. *Psychological Trauma: Theory, Research, Practice, and Policy, 4*, 94–101.
- Feder, A., Southwick, S. M., Goetz, R. R., Wang, Y., Alonso, A., Smith, B. W., . . . Vythilingam, M. (2008). Posttraumatic growth in former Vietnam prisoners of war. *Psychiatry, 71*, 359–370.
- Frazier, P., Conlon, A., & Glaser, T. (2001). Positive and negative life changes following sexual assault. *Journal of Consulting and Clinical Psychology, 69*, 1048–1055.
- Holgersen, K. H., Boe, H. J., & Holen, A. (2010). Long-term perspectives on posttraumatic growth in disaster survivors. *Journal of Traumatic Stress, 23*, 413–436.
- Ickovics, J. R., Meade, C. S., Kershaw, T. S., Milan, S., Lewis, J. B., & Ethier, K. A. (2006). Urban teens: Trauma, posttraumatic growth, and emotional distress among female adolescents. *Journal of Consulting and Clinical Psychology, 74*, 841–850.
- Joseph, S. (2011). Religiosity and posttraumatic growth: A note concerning the problems of confounding in their measurement and the inclusion of religiosity within the definition of posttraumatic growth. *Mental Health, Religion & Culture, 14*, 843–845.

- Kamibeppu, K., Sato, I., Honda, M., Ozono, S., Sakamoto, N., Iwai, T., . . . Ishida, Y. (2010). Mental health among young adult survivors of childhood cancer and their siblings including posttraumatic growth. *Journal of Cancer Survivorship*, *4*, 303–312.
- Kleim, B., & Ehlers, A. (2009). Evidence for a curvilinear relationship between posttraumatic growth and posttraumatic depression and PTSD in assault survivors. *Journal of Traumatic Stress*, *22*, 45–52.
- Kunst, M. J. J. (2010). Peritraumatic distress, posttraumatic stress disorder symptoms, and posttraumatic growth in victims of violence. *Journal of Traumatic Stress*, *23*, 514–518.
- Lee, J. A., Luxton, D. D., Reger, G. M., & Gahm, G. A. (2010). Confirmatory factor analysis of the Posttraumatic Growth Inventory with a sample of soldiers previously deployed in support of the Iraq and Afghanistan wars. *Journal of Clinical Psychology*, *66*, 813–819.
- Leung, Y. W., Gravelywitte, S., Macpherson, A., Irvine, J., Stewart, D. E., & Grace, S. L. (2010). Post-traumatic growth among cardiac outpatients: Degree comparison with other chronic illness samples and correlates. *Journal of Health Psychology*, *15*, 1049–1063.
- Levine, S. Z., Laufer, A., Hamama-Raz, Y., Stein, E., & Solomon, Z. (2008). Posttraumatic growth in adolescence: Examining its components and relationship with PTSD. *Journal of Traumatic Stress*, *21*, 492–496.
- Levine, S. Z., Laufer, A., Stein, E., Hamama-Raz, Y., & Solomon, Z. (2009). Examining the relationship between resilience and posttraumatic growth. *Journal of Traumatic Stress*, *22*, 282–286.
- Linley, P. A., Andrews, L., & Joseph, S. (2007). Confirmatory factor analysis of the Posttraumatic Growth Inventory. *Journal of Loss & Trauma*, *12*, 321–332.
- McCaslin, S. E., de Zoysa, P., Butler, L. D., Hart, S., Marmar, C. R., Metzler, T. J., & Koopman, C. (2009). The relationship of posttraumatic growth to peritraumatic reactions and posttraumatic stress symptoms among Sri Lankan university students. *Journal of Traumatic Stress*, *22*, 334–339.
- McLean, C. P., Handa, S., Dickstein, B. D., Benson, T. A., Baker, M. T., Isler, W. C., & . . . Litz, B. T. (2013). Posttraumatic growth and posttraumatic stress among military medical personnel. *Psychological Trauma: Theory, Research, Practice, and Policy*, *5*, 62–68.
- Morris, B. A., Shakespeare-Finch, J., Rieck, M., & Newbery, J. (2005). Multidimensional nature of posttraumatic growth in an Australian population. *Journal of Traumatic Stress*, *18*, 575–585.
- Nightingale, V. R., Sher, T. G., & Hansen, N. B. (2010). The impact of receiving an HIV diagnosis and cognitive processing on psychological distress and posttraumatic growth. *Journal of Traumatic Stress*, *23*, 452–460.
- Nishi, D., Matsuoka, Y., & Kim, Y. (2010). Posttraumatic growth, posttraumatic stress disorder and resilience of motor vehicle accident survivors. *BioPsychoSocial Medicine*, *4*, 7.
- Park, C. L., & Lechner, S. (2006). Measurement issues in assessing growth following stressful life experiences. In L. G. Calhoun & R. G. Tedeschi, (Eds.), *Handbook of posttraumatic growth* (pp. 47–67). Mahwah, NJ: Erlbaum.

- Shakespeare-Finch, J., & Armstrong, D. (2010). Trauma type and posttrauma outcomes: Differences between survivors of motor vehicle accidents, sexual assault, and bereavement. *Journal of Loss & Trauma, 15*, 69–82.
- Shakespeare-Finch, J., & Barrington, A. J. (2012). Behavioural changes add validity to the construct of posttraumatic growth. *Journal of Traumatic Stress, 25*, 433–439.
- Shakespeare-Finch, J., & Enders, T. (2008). Corroborating evidence of posttraumatic growth. *Journal of Traumatic Stress, 21*, 421–424.
- Shigemoto, Y., & Poyrazli, S. (2011, December 19). Factors related to posttraumatic growth in U.S. and Japanese college students. *Psychological Trauma: Theory, Research, Practice, and Policy, 5*, 128–134.
- Splevins, K., Cohen, K., Bowley, J., & Joseph, S. (2010). Theories of posttraumatic growth: Cross-cultural perspectives. *Journal of Loss & Trauma, 15*, 259–277.
- Stockton, H., Hunt, N., & Joseph, S. (2011). Cognitive processing, rumination, and posttraumatic growth. *Journal of Traumatic Stress, 24*, 85–92.
- Taku, K. (2013). Posttraumatic growth in American and Japanese men: Comparing levels of growth and perceptions of indicators of growth. *Psychology of Men and Masculinity, 14*, 423–432.
- Taku, K., Calhoun, L. G., Tedeschi, R. G., Gil-Rivas, V., Kilmer, R. P., & Cann, A. (2007). Examining posttraumatic growth among Japanese university students. *Anxiety, Stress, & Coping, 20*, 353–367.
- Taku, K., Cann, A., Calhoun, L. G., & Tedeschi, R. G. (2008). The factor structure of the Posttraumatic Growth Inventory: A comparison of five models using confirmatory factor analysis. *Journal of Traumatic Stress, 21*, 158–264.
- Tedeschi, R. G., & Calhoun, L. G. (1996). The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress, 9*, 455–471.
- Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry, 15*, 1–18.
- Tomich, P. L., & Helgeson, V. S. (2012). Posttraumatic growth following cancer: Links to quality of life. *Journal of Traumatic Stress, 25*, 567–573.
- Weiss, D. S., & Marmar, C. R. (1997). The Impact of Event Scale–Revised. In J. P. Wilson & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 399–411). New York, NY: Guilford Press.
- Zoellner, T., & Maercker, A. (2006). Posttraumatic growth and psychotherapy. In L. G. Calhoun & R. G. Tedeschi (Eds.), *Handbook of posttraumatic growth: Research and practice* (pp. 334–354). Mahwah, NJ: Erlbaum.

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