

Supporting Close Others' Growth After Trauma: The Role of Responsiveness in Romantic Partners' Mutual Posttraumatic Growth

Amy Canevello
University of North Carolina at Charlotte

Vicki Michels
Minot State University

Nicole Hilaire
University of North Carolina at Charlotte

Objective: Following a major life crisis, people may simultaneously report both significant distress and positive change or posttraumatic growth (PTG; Calhoun & Tedeschi, 2006). Accumulating evidence has suggested that in close relationships, PTG can be mutual, wherein 1 person's PTG is positively correlated with others' PTG (e.g., Manne et al., 2004). However, the mechanism by which mutual growth occurs is unclear. We suggest that an interpersonal process mediates mutual PTG between partners, and we draw from the social psychology and relationship science literatures to suggest that the interpersonal process of responsiveness may explain people's correlated PTG following trauma. **Method:** Married couples (61 at Time 1; 48 at Time 2) whose homes had been severely damaged by flooding completed measures of PTG, responsiveness to partners, and perceptions of partners' responsiveness at 2 time points, 6 months apart. **Results:** Findings did not consistently replicate a direct link between actors' and partners' PTG. Results did support an interpersonal process by which actors' PTG predicted their greater responsiveness to partners; partners perceived actors' greater responsiveness, which predicted partners' greater PTG. Further, this interpersonal pathway was independent of known intrapsychic predictors of PTG, social support, and relationship quality. **Conclusion:** These results suggest that close relationships may play an important role in fostering PTG and are the first to outline an interpersonal process by which people experience mutual growth and personal growth can be passed from 1 person to another.

Keywords: posttraumatic growth, close others, mutual growth, responsiveness, interpersonal process

Supplemental materials: <http://dx.doi.org/10.1037/tra0000084.supp>

Married couples can experience a range of responses in the wake of natural disasters involving significant property loss (Bonnanno, Brewin, Kaniasty, & La Greca, 2010; Warchal & Graham, 2011). Relational functioning has been shown to deteriorate after these traumatic events, as evidenced by increased withdrawal from partners (Kaniasty, 2012), lower marital satisfaction (Drabek & Key, 1984), and increased divorce rates (Cohan & Cole, 2002). Other evidence has suggested an improvement in relationships following natural disasters, including increased marriage and birth rates (Cohan & Cole, 2002) and greater feelings of closeness toward loved ones (Kessler, Galea, Jones, & Parker, 2006). Thus,

the mutually experienced trauma associated with natural disasters can set the stage for both significant distress and positive change or growth. This investigation focuses on how married couples can promote personal growth in each other following a trauma.

Posttraumatic growth (PTG; Calhoun & Tedeschi, 2006) can come in the form of newfound appreciation for life and personal strength, seeing new opportunities in the world, and changes in relationships and spirituality. Accumulating evidence has suggested that PTG can be mutual in close relationships, wherein one person's PTG is positively correlated with close others' PTG (e.g., Manne et al., 2004). However, the process by which this mutual growth occurs is unclear. The purpose of this investigation is to outline an interpersonal process by which mutual growth occurs and may be contagious between married partners.

Relationships and PTG

Calhoun and Tedeschi (2006) suggested both intrapsychic and interpersonal pathways to PTG. Most empirical work has focused on the intrapsychic processes of PTG, wherein growth occurs when people reevaluate their beliefs, assumptions, and worldviews to incorporate the traumatic event (e.g., Calhoun & Tedeschi, 2006). A growing body of work has suggested that close relationships can support PTG. For example, relationship quality, self-disclosure, and support-seeking are all related to greater PTG (e.g.,

This article was published Online First September 21, 2015.

Amy Canevello, Department of Psychology, University of North Carolina at Charlotte; Vicki Michels, Department of Addiction Studies, Psychology, and Social Work, Minot State University; Nicole Hilaire, Department of Psychology, University of North Carolina at Charlotte.

This research was supported by a Faculty Research Grant from the University of North Carolina at Charlotte. We are grateful to Mary J. Redlinger, Teal Allard, Nicole Freeman, Deanna Morey, Katelyn Donald, and Josh Morey for their invaluable assistance with data collection.

Correspondence concerning this article should be addressed to Amy Canevello, 4018 Colvard, Department of Psychology, 9201 University City Boulevard, Charlotte, NC 28223. E-mail: acanevel@uncc.edu

Hungerbuehler, Vollrath, & Landolt, 2011; Lindstrom, Cann, Calhoun, & Tedeschi, 2013; Prati & Pietrantonio, 2009).

Recent findings have suggested that those who experience trauma together have correlated PTG. In a cross-sectional study of breast cancer patients and their husbands, patients' PTG positively predicted husbands' PTG (Weiss, 2004). In a sample of male and female oncology patients and their partners, patients' PTG was also correlated with partners' PTG, regardless of patients' gender (Zwahlen, Hagenbuch, Carley, Jenewein, & Buchi, 2010). Additionally, mutual PTG appears to continue over time: In a study of breast cancer patients and their husbands, wives' and husbands' PTG were positively correlated over an 18-month period (Manne et al., 2004). In a separate sample of cancer patients, patients' and partners' PTG were positively correlated at 6 and 12 months after diagnosis (Kunzler, Nussbeck, Moser, Bodenmann, & Kayser, 2014). Further, mutual growth between relationship partners is not limited to contexts in which trauma affects partners differently (e.g., cancer)—it also occurs when both partners experience a common traumatic event: After the death of a premature baby, husbands' and wives' PTG were positively correlated (Büchi et al., 2009).

Thus, the literature shows consistent evidence that marital partners' personal growth in the wake of traumatic events is positively correlated. Yet, the mechanism underlying mutual PTG is unclear. Although a growing body of literature has suggested that when relationship partners experience a traumatic event, their levels of PTG are related to each other (e.g., Manne et al., 2004; Weiss, 2004), none of this work addresses how mutual PTG occurs.

We suggest that an interpersonal process mediates mutual PTG in close relationships. PTG may be contagious, such that when people experience PTG, they promote partners' PTG through their behavior toward partners. To our knowledge, no work has identified an interpersonal process by which mutual PTG occurs or PTG is contagious. We draw from the relationship science literatures to suggest that interpersonal responsiveness processes may explain why relationship partners' PTG levels following trauma are positively correlated and why people's PTG may promote PTG in partners. Perceived partner responsiveness, or perceiving that partners understand, value, and support important aspects of the self, has been identified as a core relationship process (Reis, Clark, & Holmes, 2004). This study focuses on how interpersonal responsiveness processes between partners may foster mutual PTG and PTG contagion.

We hypothesized an interpersonal process by which responsiveness processes might foster mutual PTG and PTG contagion in traumatized couples. When certain persons (i.e., "actors") experience PTG, they become more responsive to close others (i.e., "partners"). Partners, in turn, perceive actors' responsiveness, leading to partners' own greater PTG. We provide rationale for each link in this hypothesized process.

First, we suggest that actors' PTG after a traumatic event leads them to become more responsive to partners. Experiencing trauma can lead to an appreciation for one's own existence and spark a need to create a sense of meaning, which may lead priorities to shift (Janoff-Bulman, 2004). This shift in priorities may lead actors to place increased importance on caring for, understanding, and validating partners. Thus, in order to create meaning in their lives, actors who experience growth after trauma may attend to partners by being responsive to them.

When actors are responsive, partners should perceive actors' responsiveness. Most relationship theories assume that actors' responsiveness to partners predicts partners' perceptions of actors' responsiveness (e.g., Bowlby, 1969; Kelley & Thibaut, 1978); this assumption is backed by empirical evidence (e.g., Canevello & Crocker, 2010). Thus, actors' responsiveness to partners should lead to partners' greater perceptions of actors' responsiveness.

Finally, partners' perceptions of actors' responsiveness should promote partners' PTG. Perceiving actors as caring, understanding, and validating may enable partners to disclose trauma-related thoughts and feelings, which may foster cognitive processing and allow partners to consider new perspectives and create a coherent worldview (Calhoun & Tedeschi, 2006). Perceiving actors' responsiveness may remind partners of their own positive coping, which may increase perceptions of personal strength and remind partners of the importance of relationships and the general kindness of people (McMillen, 2004). Perceiving actors' responsiveness may allow partners to perceive control over negative event-related emotions or enable them to replace negative emotions with positive or neutral emotions (Lepore, 2001). Further, traumatized actors' responsiveness may serve as a model for partners' own growth (e.g., McMillen, 2004). Thus, partners' perceptions of actors' responsiveness should foster partners' own PTG.

The primary goal of this investigation was to determine the plausibility that this process explains the association between actors' and partners' PTG. First, we attempted to replicate previous work suggesting a direct link between actors' and partners' PTG. Second, we tested whether our hypothesized interpersonal process links actors' and partners' PTG.

Alternative Explanations and Moderators

We examined several alternative explanations for and potential moderators of our hypothesized model. First, theorists have identified social support as the primary mechanism by which close others can promote people's PTG (e.g., Calhoun & Tedeschi, 2006; Lepore, 2001; McMillen, 2004). At the same time, received social support is often operationalized in ways that focus on specific behaviors, whereas perceived partners' responsiveness reflects perceptions of actors' intentions. Evidence linking social support to PTG is inconsistent: Sometimes support is beneficial, other times it is detrimental, and in other instances it is unrelated to PTG (e.g., Schmidt, Blank, Bellizzi, & Park, 2012; Sheikh, 2004). These mixed findings suggest that social support may be an unreliable precursor to PTG. On the other hand, because it emphasizes underlying messages of caring, understanding, and validation of others, perceived partner responsiveness may be a more reliable predictor of PTG. It is also possible that received social support and perceived partners' responsiveness are interchangeable in their associations with PTG. However, finding that perceived partner responsiveness predicts PTG independent of support received would suggest that perceptions of givers' underlying intentions are critical to how people foster close others' PTG.

Second, it was possible that our hypothesized interpersonal process of responsiveness is redundant with or could be explained by the intrapsychic process that promotes PTG. According to Calhoun and Tedeschi (2006), traumatic events challenge people's assumption about the world and their purpose or place in the world. When these core beliefs are challenged, people experience

intrusive and uncontrollable thoughts about the event. With time, as emotional distress decreases and rumination becomes more controllable, intrusive rumination about the event can evolve into deliberate thoughts or rumination, and eventually new schemas and meanings emerge. It is possible that the hypothesized responsiveness process simply fosters the intrapsychic process of intrusive and deliberate rumination that ultimately promotes PTG. This would suggest that responsiveness does not directly predict growth independent of the intrapsychic process of PTG. However, if the interpersonal responsiveness process is independent of the intrapsychic process, it would suggest that close relationship dynamics represent an independent interpersonal pathway to personal growth following trauma.

Third, it was possible that the responsiveness process that promotes mutual PTG and PTG contagion simply reflects relationship quality. When people are in relationships characterized by responsiveness, they also report being more satisfied with, close to, and committed to relationship partners (Canevello & Crocker, 2010). Further, people reporting higher relationship quality also report more PTG (Hungerbuehler et al., 2011). Thus, being in a relationship characterized by satisfaction, closeness, and commitment may promote mutual PTG and PTG contagion. If responsiveness processes predict mutual PTG and PTG contagion, independent of relationship quality, it would suggest that something unique about responsiveness promotes growth beyond being in a good relationship.

Finally, we tested several moderators of the pathways described in Figure 1. Because women are more relationally oriented (e.g., Spence, Helmreich, & Stapp, 1975) and they typically report higher PTG (Vishnevsky, Cann, Calhoun, Tedeschi, & Demakis, 2010), it was possible that each path in the hypothesized model is stronger for women, compared to men. It was also possible that mutual PTG and PTG contagion processes are stronger in higher quality relationships. Finally, it was possible that this interpersonal process is stronger in couples who experienced greater loss; at the same time, it was also possible that this process is stronger in

couples who experienced less loss. Thus, we tested whether gender, relationship quality, or amount of loss moderated any of the proposed pathways.

Method

Participants

Sixty-one heterosexual married couples ($N = 122$) from a small midwestern city in the United States were recruited approximately 8–20 months after their homes had been damaged by severe flooding; only couples who reported 50% or more loss of property in the flood were eligible to participate. All participants had floodwater on the first floor of their houses. A vast majority of homes in this community have basements; water on the first floor implies damage to at least two levels of a house and, thus, more extensive loss. Couples were recruited via flyers posted throughout the community, websites affiliated with the relief efforts, and door-to-door solicitation in neighborhoods that had been badly damaged.

Participants completed two identical surveys 6 months apart and were compensated \$8 for each survey. Sixty-one couples completed Time 1 (T1) measures. Forty-eight couples completed Time 2 (T2) measures: Five couples who completed T1 did not complete T2 measures, and for eight couples, only one member completed the T2 survey. Participants' ranged in age from 24 to 70 ($M = 46.44$, $SD = 12.13$); 93% were White/European American, 3% Black/African American, 1% Native Hawaiian/Pacific Islander, and 1% American Indian, and 2% did not report their race. Couples had been married between 5.7 months and 54 years ($M = 20.4$ years, $SD = 13.4$ years), and their household incomes ranged from less than \$20,000 to more than \$100,000, with 66% making \$80,000 and above. On average, couples had incurred 81% ($SD = 19\%$) property loss and were evacuated from their homes for between 3 weeks and 20 months ($M = 9.9$ months, $SD = 4.8$

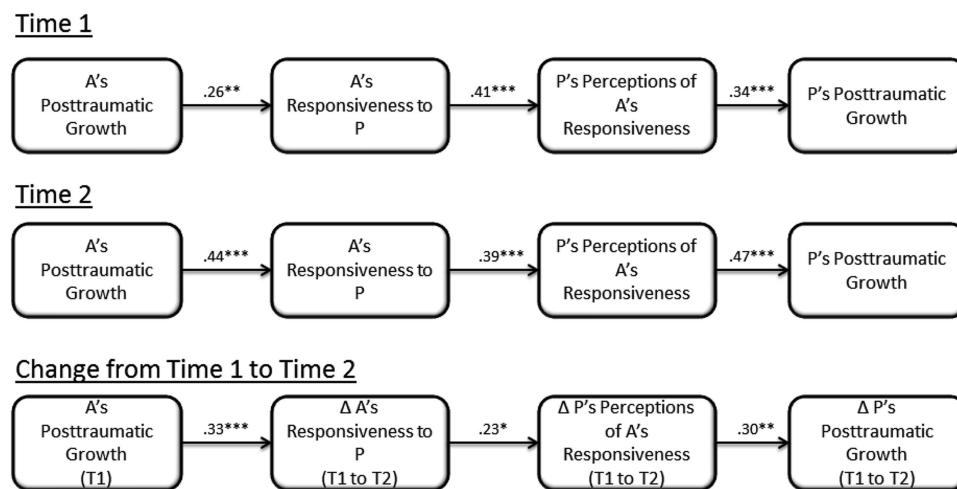


Figure 1. Path coefficients for the effects of actors' posttraumatic growth predicting actors' responsiveness to partners, which in turn predicts partners' perceptions of actors' responsiveness, which then predicts partners' posttraumatic growth. All estimates are partial correlations. A = Actor; P = Partner; T1 = Time 1; T2 = Time 2. * $p < .05$. ** $p < .01$. *** $p < .001$.

months). At T1, 64% were living in their homes; at T2, 84% were living in their homes.

An additional 28 people completed the T1 assessment without their partners. These participants did not complete T2 measures and were not included in this investigation, because the purpose of this study was to examine interpersonal associations. However, results did not change when these 28 people were included in analyses. Additionally, those who completed only T1 did not differ from those who completed the entire study on demographic or key study variables (details appear in the online supplemental materials).

Measures

At T1 and T2, participants reported their PTG, responsiveness to spouses, and perceptions of their spouse's responsiveness. Additionally, participants completed measures of relationship quality, received social support, disruption of core beliefs, and intrusive and deliberate rumination at both time points. At T1, they reported demographic information.

PTG was measured with the Posttraumatic Growth Inventory—Short Form (PTGI-SF; Cann, Calhoun, Tedeschi, Taku, et al., 2010). Participants rated 10 items with respect to the “degree to which this change occurred in your life as a result of the 2011 flood” on a scale from 1 (*not at all*) to 5 (*extremely*; T1: $\alpha = .91$; T2: $\alpha = .91$).

Responsiveness and perceptions of partners' responsiveness were measured with the scale from Maisel and Gable (2009). Three items began with the phrase “Over the past month, how much did you:” and were rated on a scale from 1 (*not at all*) to 5 (*extremely*). Responsiveness items included “show your spouse that you understood his/her concerns,” “make your spouse feel that you valued his/her opinions and abilities,” and “make your spouse feel cared for” (T1: $\alpha = .90$; T2: $\alpha = .91$). Three perceptions of partner's responsiveness items included “show you that he/she understood your concerns,” “make you feel that he/she valued your opinions and abilities,” and “make you feel cared for” (T1: $\alpha = .90$; T2: $\alpha = .94$).

Relationship quality was measured with three items written for this study. Items began with the stem “In the past month:” and included “How satisfied are you with your marriage?” “How committed are you to your spouse?” and “How close do you feel to your spouse?” (T1: $\alpha = .86$; T2: $\alpha = .88$) and were rated on a scale from 1 (*not at all*) to 5 (*completely/very much*).

Received social support was measured with the Special Other subscale of the Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet, & Farley, 1988). Four items began with the stem “In the past month:” and were rated on a scale from 1 (*not at all*) to 5 (*completely/very much*; T1: $\alpha = .90$; T2: $\alpha = .94$). Sample items included “My spouse really tried to help me” and “I could count on my spouse if things went wrong.”

Disruption of core beliefs was measured with the Core Beliefs Inventory (Cann, Calhoun, Tedeschi, Kilmer, et al., 2010). Participants reflected on how much the flood caused them to examine their beliefs about themselves, other people, and the world. Nine items began with the stem “I seriously examined:” and were rated on a scale from 1 (*not at all*) to 5 (*extremely*; T1: $\alpha = .86$; T2: $\alpha = .90$). Sample items included “the degrees to which I believe things

that happen to people are controllable” and “my beliefs about the meaning of my life.”

Intrusive rumination and deliberate rumination were measured with the Event Related Rumination Inventory (Cann et al., 2011). Participants rated their unintentional and intentional thinking about the flood in the past month on a scale from 1 (*not at all*) to 5 (*extremely*). Intrusive rumination was measured with 10 items (e.g., “I thought about the event when I did not mean to”; T1: $\alpha = .97$, T2: $\alpha = .98$). Deliberate rumination was measured with 10 items (e.g., “I thought about whether I have learned anything as a result of my experience”; T1: $\alpha = .91$, T2: $\alpha = .93$).

Results

Overview of Analyses

We conducted analyses in two phases. In Phase 1, we examined the direct associations between actors' (As') and partners' (Ps') PTG at T1 and T2 and whether As' T1 PTG directly predicted change in Ps' PTG from T1 to T2. We also tested whether these associations were moderated by gender, relationship quality, or property damage. In Phase 2, we tested path models in which As' PTG predicted their responsiveness, which in turn predicted partners' perceptions of As' responsiveness, which then predicted Ps' PTG. We tested this model within T1 and T2 and in terms of change from T1 to T2. Further, in Phase 2, we tested whether this interpersonal process occurred independent of the intrapsychic process of PTG, which includes disruption of core beliefs and intrusive and deliberate rumination. Additionally, we tested whether the link between Ps' perceptions of As' responsiveness and Ps' PTG could be explained by Ps' received social support or by Ps' relationship quality. Finally, we examined whether each path was moderated by gender, relationship quality, or property damage.

Analytic Strategy

In these data, individuals were nested within dyads. The data were structured such that each dyad was represented by two lines of data, allowing each participant within a dyad to represent both an actor and a partner. We accounted for the nonindependence in these data using the MIXED command in SPSS. Coefficients were derived from fixed-effects models using restricted maximum-likelihood estimation. Predictors were grand-mean-centered. We report partial correlations for all main effects and *pseudo* ΔR^2 for all product terms (Kenny, Kashy, & Cook, 2006). Because of attrition, not all members of all couples completed measures at both time points. T1 analyses were conducted on all 61 couples; analyses of T2 and change from T1 to T2 were conducted on the 48 couples who completed both surveys.

Table 1 shows the means, standard deviations, and intraclass correlations for primary study variables. Distributions for these variables were suitable for parametric analyses (all z s $< |1.52|$, all *ns*), with the exception that perceptions of partners' responsiveness at T1 and T2 were negatively skewed (T1: $z = -2.64$, $p < .01$; T2: $z = -2.68$, $p < .01$). To aid interpretation, we included the original variables in all analyses. Notably, findings remained unchanged when we conducted analyses including square-root transformations of these skewed variables.

Table 1
Descriptive Statistics and Intraclass Correlations for all Primary Variables

Variable	1	2	3	4	5	<i>M (SD)</i>
1. Posttraumatic growth (T1)						3.26 (.90)
2. Responsiveness to partners (T1)	.25**					3.80 (.75)
3. Perceptions of partners' responsiveness (T1)	.31**	.61***				3.78 (.79)
4. Posttraumatic growth (T2)	.72***	.28**	.37***			3.33 (.89)
5. Responsiveness to partners (T2)	.36***	.63***	.56***	.41***		3.89 (.74)
6. Perceptions of partners' responsiveness (T2)	.22*	.52***	.72***	.41***	.67***	3.70 (1.03)

Note. $N = 61$ couples at T1; $N = 48$ couples at T2. All measures were rated on scales from 1 (*not at all*) to 5 (*extremely*). T1 = Time 1; T2 = Time 2.

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

Phase 1: Does As' PTG Directly Predict Ps' PTG?

First, we tested whether As' PTG predicted Ps' PTG at T1 and T2. When we regressed Ps' T1 PTG on As' T1 PTG, results suggested that As' and Ps' PTG were unrelated, $t(106.74) = 0.87$, $pr = .08$, *ns*. When we regressed Ps' T2 PTG on As' T2 PTG, results suggested that As' and Ps' T2 PTG were positively related, $t(99.98) = 2.11$, $pr = .21$, $p < .05$. Next, we used a residual change strategy to examine whether As' T1 PTG predicted change in Ps' PTG from T1 to T2. When we regressed Ps' T2 PTG on As' T1 PTG, controlling for Ps' T1 PTG, As' T1 PTG did not directly predict change in Ps' PTG from T1 to T2, $t(101.69) = -0.34$, $pr = -.03$, *ns*.

Do these associations differ by gender, relationship quality, or amount of property loss? We also examined whether links between As' and Ps' PTG were moderated by gender, As' or Ps' relationship quality, or amount of property loss. We reran each analysis above, testing each moderator in a separate analysis by adding the main effect and relevant product term to the original MIXED models. Across the three types of analyses (i.e., predicting T1, T2, and change from T1 to T2), neither gender nor As' relationship quality moderated how As' PTG predicted Ps' PTG or change in PTG (all pseudo $\Delta R^2 \leq .01$, *ns*). Ps' relationship quality did not moderate this association in T1 and T2 analyses (both pseudo $\Delta R^2 \leq .02$, *ns*). Change in Ps' relationship quality did moderate how As' T1 PTG predicted change in Ps' PTG from T1 to T2, $t(92.48) = -2.31$, pseudo $\Delta R^2 = .03$, $p < .05$; this association was negative but nonsignificant at high levels of change in Ps' relationship quality, $t(99.20) = -1.92$, $pr = -.19$, *ns*, and positive but nonsignificant at low levels of change in Ps' relationship quality, $t(97.22) = 1.20$, $pr = .12$, *ns*. Amount of property loss did moderate the association between As' and Ps' PTG at T1, $t(100.19) = 2.40$, pseudo $\Delta R^2 = .04$, $p < .05$; this link was significant at higher, $t(106.42) = 2.44$, $pr = .23$, $p < .05$, but not lower, $t(95.73) = -1.48$, $pr = -.15$, *ns*, levels of loss. Property loss did not moderate these associations at T2 or in tests of change in Ps' PTG from T1 to T2 (both pseudo $\Delta R^2 = .00$, *ns*).

In sum, Phase 1 findings provide inconsistent support for a direct link between As' and Ps' PTG. As' PTG was positively associated with Ps' PTG at T2 but not at T1 or in tests of change in Ps' PTG from T1 to T2. These associations did not differ by gender, nor did they depend on As' relationship quality. We did find that this association was moderated by change in Ps' relationship quality when we examined how As' PTG predicted change in Ps' PTG. However, although simple slopes analyses suggested that

neither slope at higher or lower relationship quality was meaningfully different from zero, leaving the relevance of this interaction is questionable at best. Ps' relationship quality did not moderate the link between As' and Ps' PTG within T1 and T2. Finally, levels of property damage moderated the association between As' and Ps' PTG only at T1, suggesting that couple members' PTG was correlated with higher property loss. Otherwise, levels of property damage did not moderate links between As' and Ps' PTG.

Phase 2: Does As' PTG Indirectly Predict Ps' PTG Through Responsiveness?

In Phase 2, we tested a path model in which As' PTG predicted As' responsiveness, which in turn predicted Ps' perceptions of As' responsiveness, which then predicted Ps' PTG. All paths were tested sequentially, with a separate regression equation for each path. For each path, we regressed the criterion on the predictor(s), controlling for all variables preceding that path in the model. Results for all path analyses appear in Figure 1.

First, we tested this model within T1 and within T2. Results strongly supported our hypothesis. As shown at the top of Figure 1, As' T1 PTG predicted their greater T1 responsiveness to partners, $t(118) = 2.90$, $pr = .26$, $p < .01$, which predicted Ps' greater T1 perceptions of As' responsiveness, $t(114.65) = 4.76$, $pr = .41$, $p < .001$, which predicted Ps' greater T1 PTG, $t(97.20) = 3.52$, $pr = .34$, $p < .001$. As shown in the middle of Figure 1, As' T2 PTG predicted their greater T2 responsiveness to partners, $t(100.52) = 4.88$, $pr = .44$, $p < .001$, which predicted Ps' greater T2 perceptions of As' responsiveness, $t(98.99) = 4.22$, $pr = .39$, $p < .001$, which predicted Ps' greater T2 PTG, $t(78.46) = 4.68$, $pr = .47$, $p < .001$.

Next, we tested whether As' T1 PTG predicted change in As' responsiveness from T1 to T2, which in turn predicted simultaneous change in Ps' perceptions of As' responsiveness, which then predicted change in Ps' PTG from T1 to T2. Unlike examining path models within T1 and T2, examining the temporal sequence of effects across time points can shed light on the plausibility or implausibility of causal pathways. We tested change from T1 to T2 using a residual change strategy, regressing T2 outcomes on T1 predictors, controlling for T1 outcomes. Again, results strongly support our predictions (see the bottom section of Figure 1). As' T1 PTG predicted As' increased responsiveness from T1 to T2, $t(102.48) = 3.54$, $pr = .33$, $p < .001$, which predicted Ps' increased perceptions of As' responsiveness from T1 to T2,

$t(94.95) = 2.29, pr = .23, p < .05$, which then led to Ps' increased PTG from T1 to T2, $t(85.67) = 2.93, pr = .30, p < .01$.

Is this process independent of other predictors of PTG?

Because we wanted to determine whether the effects of this interpersonal process were independent of the intrapsychic process of disruption of core beliefs and resulting intrusive and deliberate rumination, we tested these three path models a second time, including disruption of core beliefs and intrusive and deliberate rumination as covariates in tests of each path. We included T1 covariates in tests of the model at T1, T2 covariates in tests of the model at T2, and T1 and T2 covariates in tests of the model predicting change from T1 to T2. In predicting As' responsiveness, we controlled for As' covariates; in predicting Ps' perceptions of As' responsiveness and Ps' PTG, we controlled for Ps' covariates. Across analyses, results for the three models remained relatively unchanged ($.23 \leq prs \leq .43$, all $ps < .05$) suggesting that this interpersonal process of mutual PTG is independent of the effects of disruption of core beliefs and rumination.

Do Ps' perceptions of As' responsiveness predict Ps' PTG, independent of Ps' received social support?

Next, we tested whether the effects of Ps' perceptions of As' responsiveness on Ps' PTG could be explained by partners' received social support by testing the final path of each model, controlling for Ps' T1 received social support in the T1 model, T2 received social support in the T2 model, and T1 and T2 received social support in the model predicting change. Across analyses, results for the link between Ps' perceptions of As' responsiveness and their PTG were largely unchanged: In T1 and T2 analyses, associations between Ps' perceptions of As' responsiveness and Ps' PTG remained significant, T1: $t(105.57) = 2.07, pr = .20, p < .05$; T2: $t(87.04) = 2.20, pr = .23, p < .05$; in analyses of change, this association dropped just below significance, $t(85.68) = 1.93, pr = .20, p = .056$. Additionally, across all three analyses, Ps' received social support did not predict their PTG ($prs \leq .05$, all ns). These findings suggest that Ps' perceptions of As' responsiveness and Ps' received social support are not interchangeable in their associations with Ps' PTG. Received social support did not account for associations between perceived responsiveness and PTG.

Is the link between Ps' perceptions of As' responsiveness and Ps' PTG due to relationship quality?

Next, we tested the possibility that the link between Ps' perceptions of As' responsiveness and Ps' resulting PTG could be due to Ps' relationship quality. Across analyses, the link between Ps' perceptions of As' responsiveness and Ps' PTG remained significant when we included Ps' relationship quality as a covariate, T1: $t(109.02) = 2.43, pr = .23, p < .05$; T2: $t(83.53) = 3.70, pr = .38, p < .001$; Change: $t(85.01) = 3.74, pr = .38, p < .001$. Additionally, in T1 and T2 analyses, Ps' relationship quality was unrelated to Ps' own PTG ($prs \leq .1051$, both ns); in change analyses, Ps' increased relationship quality was related to their own decreased PTG ($pr = -.24, p < .05$). Thus, these findings suggest that the part of Ps' perceptions of As' responsiveness that uniquely predicts PTG is unrelated to relationship quality. Further, Ps' relationship quality does not uniquely predict their PTG when perceived As' responsiveness is accounted for, and the part of Ps' increased relationship

quality that is distinct from change in perceptions of As' responsiveness predicts Ps' decreased PTG.

Do these processes differ depending on gender, relationship quality, or amount of property loss?

Because it was possible that our hypothesized interpersonal process of mutual PTG was stronger for women, couples in which either partner reported greater relationship quality, or couples who had experienced less property loss (i.e., experienced somewhat less trauma), we tested whether each path in the three models was moderated by gender, As' and Ps' relationship quality, and amount of property loss using the analytic strategy described in Phase 1. Thus, for each separate model, we tested four moderators of each path, resulting in 12 separate tests of moderation in each path model. In the T1 and change path models, no product terms were significant (all pseudo $\Delta R^2 \leq .03, ns$). In the T2 model, only two of the 12 product terms were significant (all other pseudo $\Delta R^2 = .00, ns$). The link between As' responsiveness and Ps' perceptions of As' responsiveness at T2 differed by As' relationship quality, $t(94.67) = 2.24$, pseudo $\Delta R^2 = .04, p < .05$. This association was significant when As' relationship quality was higher, $t(95.39) = 3.95, pr = .37, p < .001$, but not when it was lower, $t(89.90) = 1.00, pr = .10, ns$. Also, the link between Ps' perceptions of As' responsiveness and Ps' PTG at T2 differed by gender, $t(82.13) = 2.42$, pseudo $\Delta R^2 = .05, p < .05$: This association was significant for men, $t(52.84) = 5.22, pr = .58, p < .001$, but not women, $t(53.76) = .70, pr = .10, ns$.

Discussion

In addition to the distress that comes from experiencing major life trauma, people often report experiencing personal growth in coping with the aftermath of these events. Much of the PTG literature has focused on the intrapsychic processes that contribute to PTG, but less research has considered the interpersonal processes that promote PTG. Previous research has suggested that within close relationships, people's PTG correlates with that of close others, but no work that we know of has examined the interpersonal process by which this mutual PTG occurs. In this study, we (1) attempted to replicate the findings that marital partners' PTG are positively correlated and (2) tested whether the process of interpersonal responsiveness mediated mutual PTG.

Contrary to previous research, our study did not reveal a consistent direct association between actors' and partners' PTG. At T1, actors' and partners' PTG were unrelated; 6 months later there was a small to moderate association between actors' and partners' PTG, but actors' T1 PTG was unrelated to change in partners' PTG. Thus, in these data, actors' PTG was independent of partners' PTG after the event, and one person's PTG did not lead to change in the others' PTG over time. However, 6 months after the original survey, actors' and partners' PTG were positively correlated. This suggests that, at least in the aftermath of a natural disaster of this nature, it may take some time for married couples' PTG to become correlated.

The direct links between actors' and partners' PTG did not consistently differ by gender, relationship quality, or amount of property loss. Of the 12 interactions tested, only two were significant: Partners' relationship quality moderated how actors' T1 PTG predicted change in partners' PTG from T1 to T2. However, simple slopes analyses suggested that the simple slope at lower

quality was positive but nonsignificant, whereas the simple slope at higher quality was negative but also nonsignificant, leaving the relevance of this finding questionable at best. Additionally, at T1, the link between actors' and partners' PTG was stronger when couples suffered greater loss of property, suggesting that mutual growth is stronger with greater trauma. However, until this finding is replicated, we hesitate to overinterpret its meaning.

These data supported our hypothesis that responsiveness processes mediate links between actors' and partners' PTG. Within each time point, actors' PTG predicted their greater responsiveness to partners, which predicted partners' greater perceptions of actors' PTG, which in turn led to partners' greater PTG. These findings suggest that the interpersonal process of responsiveness mediates mutual PTG between relationship partners. Further, we also found evidence consistent with a temporal model in which actors' T1 PTG predicted their increased responsiveness across time points. Partners perceived actors' increased responsiveness, which then led to partners' increased PTG. Findings from this change model are particularly compelling because they provide support for the plausibility of causal pathways. These findings add to the literature in that they demonstrate a relational mechanism underlying mutual PTG, suggesting that PTG may be contagious between relationship partners because when one person experiences growth, he or she cares for, understands, and validates the partner; when partners feel cared for, understood, and validated, they experience personal growth following trauma.

It is important to note that received social support did not explain the link between partners' perceptions of actors' responsiveness and partners' PTG. Indeed, when partners' received support and perceptions of actors' responsiveness were included in the same model, received social support was unrelated to partners' PTG. These findings suggest that the underlying intentions of givers may be critical in fostering others' PTG: Received social support and perceived responsiveness are not interchangeable. Although these findings should be replicated, they suggest that instead of focusing on social support as the relational mechanism promoting PTG, PTG researchers might consider the role of responsiveness (i.e., caring for, understanding, and validating others).

The interpersonal process of responsiveness associated with partners' PTG appears to be distinct from the intrapsychic process of PTG, involving disruption of core beliefs and intrusive and deliberate rumination. The interpersonal responsiveness process did not foster disruption of core beliefs or intrusive and deliberate rumination, which promote PTG. Instead, perceiving responsiveness predicted PTG, independent of these intrapsychic variables. Thus, interpersonal responsiveness dynamics represent an independent pathway to growth following trauma.

The mediating interpersonal responsiveness process leading to partners' PTG was also not simply due to greater relationship quality. When we included perceived responsiveness and relationship quality in the same model predicting PTG, perceived responsiveness predicted PTG in all three models. Relationship quality was unrelated to PTG at T1 and T2. In change analyses, the piece of partners' *increased* relationship quality that is separate from improved responsiveness predicted partners' *decreased* PTG. It is unclear why improved relationship quality would be related to decreased PTG. Because it was not hypothesized or replicated in

T1 and T2 analyses, and is counter to the existing literature, we hesitate to interpret this finding.

The mediating interpersonal responsiveness process was not consistently moderated by gender, relationship quality, or amount of property loss. Of the 36 product terms tested, only two were significant: Gender moderated the association between partners' perceptions of actors' responsiveness and partners' PTG in T2 analyses, such that this link was present for men but not women; and in T2 analyses, the link between actors' responsiveness and partners' perceptions of actors' responsiveness was significant when actors had higher but not lower relationship quality. Because neither interaction replicated across analyses, it is difficult to interpret their meaning.

Previous research has examined associations between spouses' PTG primarily in contexts in which one partner has been diagnosed with cancer (e.g., Manne et al., 2004; Weiss, 2004; Zwahlen et al., 2010). To our knowledge only one other study has examined these associations outside of a cancer context: Buchi et al. (2009) found that husbands' and wives' PTG were positively correlated after the death of a child. Our findings add to this literature by suggesting that spouses' PTG correlate following a different type of trauma: significant property loss following a natural disaster, thus extending the generalizability of the finding that spouses' PTG are related. Yet, we are cautious about whether these findings generalize to other traumas. In our sample, both spouses were similarly affected by a trauma. It is possible that this responsiveness process may function differently in the context of other types of trauma (e.g., loss of a child) or in contexts in which each partner is affected differently by a trauma (e.g., cancer patients vs. spouses).

This work has some limitations. The first concerns our ability to draw causal conclusions. Experimental studies of traumatized samples are difficult to conduct and can pose ethical concerns. Analyses within T1 and T2 are cross-sectional and thus do not warrant causal conclusions. However, although analyses of change also do not allow for causal conclusions, they did allow us to conclude that our implied causal associations are plausible. That said, future research should attempt to incorporate experimental designs. Second, we were unable to examine why perceived responsiveness promotes growth. We suggested several potential mechanisms, for example, perceiving partners as caring, validating, and understanding may enable people to disclose to partners, which may result in improved cognitive processing, greater perceived personal strength, or increased perceived control over negative emotions. However, we were unable to test these mechanisms in these data. Third, it is likely that the lack of moderator effects was a function of limited power, particularly in our T2 sample of 48 couples. Also, we did not adjust our findings for multiple comparisons. Fourth, our covariate measures were imperfect—although our measure of relationship quality was reliable it has not been formally validated, our measure of received social support captured only a single dimension of support, and we included only a single indicator of trauma (i.e., property damage). Also, the racial homogeneity of our sample limits the generalizability of these findings to racially diverse populations. Finally, there exists in the literature some debate about whether PTG assesses perceived growth or veridical growth (Frazier et al., 2009). Thus, it is possible that the process we describe is simply perceived and does not reflect objective reality.

Despite these limitations, these findings may have important clinical implications. For example, by focusing on helping couples increase their responsiveness to each other, counselors and emergency response teams may foster PTG in traumatized couples. These findings also suggest that targeting PTG and/or responsiveness in one partner may have important benefits for the other partner. This may be particularly helpful in circumstances in which only one partner has access to or seeks assistance. Although this study offers intriguing findings suggesting that PTG may have consequences for intimate others, clinicians should be cautious about generalizing these findings to clients who are coping with different types of events or in different cultural contexts. However, again, clinicians might consider attending to these possibilities in trauma treatment.

Accumulating evidence has suggested that, after traumatic events, close relationship partners' personal growth is correlated (e.g., Manne et al., 2004; Weiss, 2004; Zwahlen et al., 2010). These results suggest that close relationships may play an important role in fostering growth between relationship partners and are the first to outline the interpersonal process by which people experience mutual growth and personal growth can be passed from one person to another. Thus, posttraumatic growth appears to be good not only for the self but also for others.

References

- Bonanno, G. A., Brewin, C. R., Kaniasty, K., & La Greca, A. M. (2010). Weighing the costs of disaster: Consequences, risks, and resilience in individuals, families, and communities. *Psychological Science in the Public Interest*, 11, 1–49. <http://dx.doi.org/10.1177/1529100610387086>
- Bowlby, J. (1969). *Attachment and loss: Vol. 1. Attachment*. New York, NY: Basic Books.
- Büchi, S., Mörgeli, H., Schnyder, U., Jenewein, J., Glaser, A., Fauchère, J. C., . . . Sensky, T. (2009). Shared or discordant grief in couples 2–6 years after the death of their premature baby: Effects on suffering and posttraumatic growth. *Psychosomatics*, 50, 123–130. <http://dx.doi.org/10.1176/appi.psy.50.2.123>
- Calhoun, L. G., & Tedeschi, R. G. (2006). *Handbook of posttraumatic growth: Research & practice*. Mahwah, NJ: Erlbaum.
- Canevello, A., & Crocker, J. (2010). Creating good relationships: Responsiveness, relationship quality, and interpersonal goals. *Journal of Personality and Social Psychology*, 99, 78–106. <http://dx.doi.org/10.1037/a0018186>
- 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, and Coping*, 23, 19–34. <http://dx.doi.org/10.1080/10615800802573013>
- Cann, A., Calhoun, L. G., Tedeschi, R. G., Taku, K., Vishnevsky, T., Triplett, K. N., & Danhauer, S. C. (2010). A short form of the Posttraumatic Growth Inventory. *Anxiety, Stress, and Coping*, 23, 127–137. <http://dx.doi.org/10.1080/10615800903094273>
- 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, and Coping*, 24, 137–156. <http://dx.doi.org/10.1080/10615806.2010.529901>
- Cohan, C. L., & Cole, S. W. (2002). Life course transitions and natural disaster: Marriage, birth, and divorce following Hurricane Hugo. *Journal of Family Psychology*, 16, 14–25. <http://dx.doi.org/10.1037/0893-3200.16.1.14>
- Drabek, T. E., & Key, W. M. (1984). *Conquering disaster: Family recovery and long-term consequences*. New York, NY: Irvington.
- Frazier, P., Tennen, H., Gavian, M., Park, C., Tomich, P., & Tashiro, T. (2009). Does self-reported posttraumatic growth reflect genuine positive change? *Psychological Science*, 20, 912–919. <http://dx.doi.org/10.1111/j.1467-9280.2009.02381.x>
- Hungerbuehler, I., Vollrath, M. E., & Landolt, M. A. (2011). Posttraumatic growth in mothers and fathers of children with severe illnesses. *Journal of Health Psychology*, 16, 1259–1267. <http://dx.doi.org/10.1177/1359105311405872>
- Janoff-Bulman, R. (2004). Posttraumatic growth: Three explanatory models. *Psychological Inquiry*, 15, 30–43.
- Kaniasty, K. (2012). Predicting social psychological well-being following trauma: The role of postdisaster social support. *Psychological Trauma: Theory, Research, Practice, and Policy*, 4, 22–33. <http://dx.doi.org/10.1037/a0021412>
- Kelley, H. H., & Thibaut, J. W. (1978). *Interpersonal relations: A theory of interdependence*. New York, NY: Wiley.
- Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic data analysis*. New York, NY: Guilford Press.
- Kessler, R. C., Galea, S., Jones, R. T., & Parker, H. A. (2006). Mental illness and suicidality after Hurricane Katrina. *Bulletin of the World Health Organization*, 84, 930–939. <http://dx.doi.org/10.2471/BLT.06.033019>
- Künzler, A., Nussbeck, F. W., Moser, M. T., Bodenmann, G., & Kayser, K. (2014). Individual and dyadic development of personal growth in couples coping with cancer. *Supportive Care in Cancer*, 22, 53–62. <http://dx.doi.org/10.1007/s00520-013-1949-6>
- Lepore, S. J. (2001). A social-cognitive processing model of emotional adjustment to cancer. In A. Baum & B. L. Andersen (Eds.), *Psychosocial interventions for cancer* (pp. 99–116). Washington, DC: American Psychological Association. <http://dx.doi.org/10.1037/10402-006>
- Lindstrom, C. M., Cann, A., Calhoun, L. G., & Tedeschi, R. G. (2013). The relationship of core belief challenge, rumination, disclosure, and socio-cultural elements to posttraumatic growth. *Psychological Trauma: Theory, Research, Practice, and Policy*, 5, 50–55. <http://dx.doi.org/10.1037/a0022030>
- Maisel, N. C., & Gable, S. L. (2009). The paradox of received social support: The importance of responsiveness. *Psychological Science*, 20, 928–932. <http://dx.doi.org/10.1111/j.1467-9280.2009.02388.x>
- Manne, S., Ostroff, J., Winkel, G., Goldstein, L., Fox, K., & Grana, G. (2004). Posttraumatic growth after breast cancer: Patient, partner, and couple perspectives. *Psychosomatic Medicine*, 66, 442–454.
- McMillen, J. C. (2004). Posttraumatic growth: What's it all about? *Psychological Inquiry*, 15, 48–52.
- Prati, G., & Pietrantonio, L. (2009). Optimism, social support, and coping strategies as factors contributing to posttraumatic growth: A meta-analysis. *Journal of Loss and Trauma*, 14, 364–388. <http://dx.doi.org/10.1080/15325020902724271>
- Reis, H. T., Clark, M. S., & Holmes, J. G. (2004). Perceived partner responsiveness as an organizing construct in the study of intimacy and closeness. In D. J. Mashek & A. P. Aron (Eds.), *Handbook of closeness and intimacy* (pp. 201–225). Mahwah, NJ: Erlbaum.
- Schmidt, S. D., Blank, T. O., Bellizzi, K. M., & Park, C. L. (2012). The relationship of coping strategies, social support, and attachment style with posttraumatic growth in cancer survivors. *Journal of Health Psychology*, 17, 1033–1040. <http://dx.doi.org/10.1177/1359105311429203>
- Sheikh, A. I. (2004). Posttraumatic growth in the context of heart disease. *Journal of Clinical Psychology in Medical Settings*, 11, 265–273. <http://dx.doi.org/10.1023/B:JOCS.0000045346.76242.73>
- Spence, J. T., Helmreich, R., & Stapp, J. (1975). Ratings of self and peers on sex role attributes and their relation to self-esteem and conceptions of masculinity and femininity. *Journal of Personality and Social Psychology*, 32, 29–39. <http://dx.doi.org/10.1037/h0076857>
- Vishnevsky, T., Cann, A., Calhoun, L. G., Tedeschi, R. G., & Demakis, G. J. (2010). Gender differences in self-reported posttraumatic growth:

- A meta-analysis. *Psychology of Women Quarterly*, 34, 110–120. <http://dx.doi.org/10.1111/j.1471-6402.2009.01546.x>
- Warchal, J. R., & Graham, L. B. (2011). Promoting positive adaptation in adult survivors of natural disasters. *Adultspan Journal*, 10, 34–51. <http://dx.doi.org/10.1002/j.2161-0029.2011.tb00005.x>
- Weiss, T. (2004). Correlates of posttraumatic growth in husbands of breast cancer survivors. *Psycho-Oncology*, 13, 260–268. <http://dx.doi.org/10.1002/pon.735>
- Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, 52, 30–41. http://dx.doi.org/10.1207/s15327752jpa5201_2
- Zwahlen, D., Hagenbuch, N., Carley, M. I., Jenewein, J., & Buchi, S. (2010). Posttraumatic growth in cancer patients and partners—Effects of role, gender and the dyad on couples' posttraumatic growth experience. *Psycho-Oncology*, 19, 12–20. <http://dx.doi.org/10.1002/pon.1486>

Received October 28, 2014

Revision received July 27, 2015

Accepted August 4, 2015 ■