

Standing on Shaky Ground? Dyadic and Longitudinal Associations Between Posttraumatic Stress and Relationship Quality Postearthquake

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In the current study, we took a unique dyadic approach to examine how people's relationship quality following an earthquake was associated with their and their partner's posttraumatic stress symptoms (PTSS) and whether support exchanges in the relationship protected relationship quality in the face of this adversity. Ninety-nine heterosexual couples were studied over 4 time points for approximately 15 months following the Canterbury, New Zealand, earthquakes. The data were analyzed using moderated growth-curve modeling in an Actor–Partner Interdependence Model framework. In line with predictions, both partners' PTSS scores were associated with lower relationship quality at Time 1 (the first assessment postearthquake). These associations, however, were attenuated by more frequent provisions of support between relationship partners, especially for men, at least in the short term. The associations, however, changed across time, suggesting that coping in a relationship context post trauma is a dynamic, fluid process. These findings demonstrate the importance of adopting a dyadic perspective and examining effects across time. They also highlight the importance of examining resources within the relationship context to more fully understand how PTSS affects relationships.

Keywords: social support, posttraumatic stress disorder/symptoms, relationship quality, interdependence, marriage

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In 2010, a 7.1-magnitude earthquake struck the Canterbury region in New Zealand causing significant damage but, remarkably, no loss of life. Strong aftershocks continued, including a severe 6.3-magnitude one in 2011, which resulted in 185 deaths and thousands of injuries and caused significantly more damage and disruption to daily life (McCull & Burkle, 2012). Following major disasters, many individuals are vulnerable to experiencing at least subclinical posttraumatic stress symptoms (PTSS), which may include significant anxiety, fear, helplessness, or horror manifested by reexperiencing the traumatic event or avoiding event-related stimuli and arousal (American Psychiatric Association, 2000; see Bonanno, Brewin, Kaniasty, & Greca, 2010).

Recent research has revealed that PTSS can have adverse effects on romantic relationships (Lambert, Engh, Hasbun, & Holzer, 2012; Taft, Watkins, Stafford, Street, & Monson, 2011). However, most prior research investigating connections between PTSS and relationship outcomes has had methodological limitations, including a lack of longitudinal, dyadic designs that assess the long-term impact of traumatic events on both relationship partners. Prior research has also focused heavily on military couples, so little is known about PTSS effects on relationships in other trauma contexts. In the current study, we utilized a four-wave longitudinal dyadic design to examine the association between PTSS and relationship quality in couples (both partners) over a 15-month period following the Canterbury earthquakes. We also examined perceptions of received partner support as a possible resource available within the relationship, which might protect relationship quality in spite of PTSS.

Posttraumatic Stress Symptoms and Relationship Outcomes

Research examining the association between PTSS and relationship outcomes typically shows that people who report having more PTSS symptoms (Taft et al., 2011) or have a partner who reports more symptoms (Lambert et al., 2012) to have poorer relationship evaluations (e.g., lower relationship quality, more relationship discord). One significant limitation in this body of research is the heavy focus on one specific type of trauma—military or combat trauma. There is an important difference between natural disasters and military trauma. Whereas natural disasters impact entire communities, combat trauma typically affects the military member

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outside the family home. Consequently, both spouses directly experience the same (or similar) trauma in a natural disaster, unlike the typical combat trauma context. On the one hand, a shared experience may allow both partners to have a more accurate understanding of each other's trauma experience, which may protect the relationship from PTSS (Renshaw, Rodrigues, & Jones, 2008). However, on the other hand, the shared experience may result in a greater loss in resources or disagreement in the experience, which may strengthen the association between PTSS and relationship outcomes.

Only three quantitative studies have examined the link between PTSS and relationship outcomes following a major natural disaster (Fredman et al., 2010; Monson, Gradus, La Bash, Griffin, & Resick, 2009; Taft et al., 2009), and none examined the effect that a person's PTSS had on his or her partner's relationship quality. Thus, postdisaster research examining both partners' PTSS scores is needed to better understand the diverse ways in which PTSS can affect the relationship in a collective, dual-trauma context.

Rising Above the Rubble: The Role of Support

Bodenmann (1997, 2005) has argued that coping with stress within a relationship is a dyadic process in which partners attempt not only to alleviate their own stress, but also their partner's stress. Accordingly, romantic relationships can be an important resource that may facilitate effective coping and offset negative consequences that might otherwise result (Cutrona, 1996; Hobfoll, 1991). Although there are many ways in which partners can be a resource, we focus on support transactions. During such transactions, one partner shows his or her partner that he or she is cared for by validating his or her needs, wants, goals, and behaviors, or by helping him or her with a problem through the provision of valuable information or assistance (Bodenmann, 1997, 2005; Cutrona, 1996).

We have known for many years that support is vital in protecting people from experiencing PTSS symptoms (Brewin, Andrews, & Valentine, 2000). Less is known, however, about how support from a romantic partner can protect the relationship posttrauma. In stressful contexts, support transactions between partners should preserve relationship quality because they foster greater commitment, trust, felt security, or the perception that the partner is there and responsive to one's needs, wishes, and goals. These resources should protect the relationship from possible decline when one or both partners are experiencing high levels of stress (Bodenmann, 2005; Cutrona, 1996). As emphasized in Bodenmann's (2005) theory of dyadic coping, individuals engage in dyadic coping not only to alleviate their partners' stress, but to protect or enhance the relationship as well.

Consistent with this theory, research has shown that individuals' (e.g., Belcher et al., 2011; Knoll, Burkert, Kramer, Roigas, & Gralla, 2009; Regan et al., 2014) and their partners' (Knoll et al., 2009; Regan et al., 2014) reports of received spousal/partner support are positively associated with their relationship evaluations in a trauma context (typically health-related trauma, such as a cancer diagnosis). However, only one study has explored whether perceptions of received support protect relationships when a partner is experiencing high PTSS (i.e., examining support as a moderator of the PTSS–relationship quality association). Lambert, Hasbun, Engh, and Holzer (2015) examined the association be-

tween veterans' PTSS and their spouses' relationship quality and found that PTSS undermined relationship quality only when spouses perceived lower levels of support. Indeed, spouses' relationship quality was protected from veterans' PTSS when spouses perceived higher levels of partner support. Research, therefore, needs to test whether partner support buffers the negative effects of a person's and his or her partner's PTSS on a person's relationship quality within other trauma contexts.

Gender Differences

When considering posttrauma responses and coping processes, it is important to consider possible gender differences. Due to the focus on military couples in most prior trauma research (usually examining the effects of men's PTSS on their own or their wives' relationship evaluations), potential gender differences have received little attention. Taylor et al. (2000) suggested that women have a different biobehavioral response to stress than men do, whereby women typically engage in "tend and befriend" behaviors (e.g., caring for and seeking out support from others) in response to stress instead of the "fight and flight" behaviors in which men typically engage. Supporting this claim, women are (a) more effective support providers during trying times compared to men (e.g., Neff & Karney, 2005), (b) have larger support networks than men (e.g., Turner & Marino, 1994), and (c) utilize their networks more effectively to obtain support in response to stress compared to men. Tyler (2006), for example, found that women receive significantly more support from their support networks than men do from theirs after a major disaster. Because men have more limited social networks and engage in less support-seeking in response to stress than women do, men may be more reliant on spousal/partner support than women following natural disasters. Thus, in the context of romantic relationships, one might expect that partner support should not only be more effective, but also more important for men than for women posttrauma.

Considering Time

Both Taft et al. (2011) and Lambert et al. (2012) have emphasized the need for longitudinal research on the association between PTSS and relationship quality. Despite this call, the vast majority of studies have remained cross-sectional in design (see Campbell & Renshaw, 2013, Erbes, Meis, Polusny, & Compton, 2011, Gewirtz, Polusny, DeGarmo, Khaylis, & Erbes, 2010, and Meis, Erbes, Polusny, & Compton, 2010, for exceptions). Longitudinal designs are important not only because they allow researchers to make stronger causal inferences, but also because they allow researchers to better understand the complex processes at play. Although several theorists have argued that the family processes associated with coping with a stressful event are dynamic and fluid because the effectiveness of coping strategies may change over time (cf. McCubbin & Patterson, 1983), research has not systematically examined whether and how effects change over time. Doing so is advantageous because it allows one to determine whether these effects become weaker, stronger, or remain relatively stable across time. Since coping with a traumatic, stressful event is a dynamic process, it is possible—and even likely—that the impact that PTSS on relationship quality and the role of partner support changes systematically across time. For example, the

partners of individuals who suffer from chronically high PTSS may report declining relationship quality over time, especially if they perceive they are receiving lower levels of support from their PTSS partner.

The Current Study

The goal of the current study was to clarify and extend our knowledge of how PTSS impacts relationship quality following a major natural disaster (the Canterbury earthquakes) using a four-wave, postearthquake design that assessed both partners in each romantic relationship ($N = 99$ couples). We also explored an understudied posttrauma resource potentially available within each relationship—perceptions of received partner support—that were predicted to buffer (protect) partners' relationship evaluations across time. What makes this study unique is that it tests for dyadic PTSS–relationship quality associations longitudinally, using moderated growth-curve models in an Actor–Partner Interdependence Model framework (APIM; Kenny, Kashy, & Cook, 2006). The APIM model enables us to test whether the PTSS of the partner has a unique influence (i.e., partner effect) on relationship quality, above and beyond the person's own PTSS (i.e., actor effect; Kenny et al., 2006), which few studies to date have examined (see Blow et al., 2013, for an exception specific to relationship quality and Miller et al., 2013, for an exception specific to relationship interactions). In addition, moderated growth curves enable us to test whether the trajectories of relationship quality across time (i.e., time slopes) differ according to a person's or a partner's PTSS scores, and whether the strength of the associations between PTSS and relationship quality increase or diminish across time. Although all moderated slope effects were tested and are a central component of the study, we had no specific hypotheses regarding how PTSS and perceived partner support levels would predict trajectories of relationship quality, given that this is the first PTSS–relationship quality study to use this analytical technique. As a result, our hypotheses pertain only to mean-level scores.

Hypothesis 1: Higher self-reports and partner reports of PTSS will be associated with lower relationship quality.

Hypotheses 2 and 3: Partner support will moderate the associations between self-reports and partner reports of PTSS and relationship quality in such a way that: (a) Relationship quality will be lower when a distressed actor/partner with higher reported PTSS also reports receiving lower partner support. Indeed, relationship quality will be protected when the distressed actor/partner also has higher perceptions of received partner support (Hypothesis 2); (b) Relationship quality will be lower when the partner of a distressed individual (actor/partner) with higher reported PTSS also reports receiving lower partner support. Relationship quality will be protected when the partner of a distressed individual (actor/partner) reports receiving more frequent support (Hypothesis 3).

Given the possibility of gender differences, we also examined the role of gender. We tentatively anticipated that partner support would be more beneficial/important for men than for women. For example, compared to women, men may experi-

ence higher relationship quality if they perceive more frequent partner support when they (men) or their partner reports higher PTSS.

Method

Participants

Participants were heterosexual couples living in Canterbury, New Zealand. To be eligible to participate, partners in each relationship had to be living together since the first earthquake, be over 18 years of age, and be proficient in English. Participation involved both partners completing questionnaires (independently) at four time periods (T1–T4) over 15 months. In addition, one partner in each couple completed a short questionnaire on material losses due to the earthquakes that occurred before T1 (referred to as T0; not used in the current study). In total, 131 couples expressed an interest in the study and completed T0 measures. Of these, 99 couples and 13 individuals correctly completed the T1 measures. Over the entire course of the study, 22 couples and 17 individuals failed to complete one or more questionnaires, resulting in 82 couples (and 11 individuals) completing T2, 79 couples (and 5 individuals) completing T3, and 75 couples (and 9 individuals) completing T4. (All participants who had dropped out after T1 were given the opportunity to participate at T4.)

Women who did not complete one or more time points reported lower relationship quality at T1 ($p < .05$), were younger ($p < .05$), and had been in their current relationship for fewer years ($p < .05$) compared to women who provided complete data. Men who did not complete one or more time points reported higher PTSS scores at T1 ($p < .05$), were less educated ($p < .05$), and had been in their current relationship for fewer years ($p < .05$). No significant differences between completers and dropouts for either men or women were found for household income, and perceptions of received support.

Couples (both partners) who completed all of the T1 measures ($N = 99$) comprised the study sample. All of them were married or in de facto relationships and had been together for 15 years on average ($SD = 13$). All participants who completed T4 indicated that they were in the same relationship as at the start of the study. Participants were predominantly of New Zealand European descent (95% women, 98% men), educated beyond the high school level (9% women and 6% men had no formal qualification; 19% women and 31% men had a secondary/high school qualification; 72% women and 63% men had a post-high school qualification), and had a household income of NZ\$50,000 or higher (72%). Men were 42 years old on average ($SD = 13$) and women averaged 40 years old ($SD = 13$). Most of the sample had one or more children (78% for women, 76% for men). According to census figures for this region of New Zealand, the sample was better educated and had higher household income on average (Statistics New Zealand, 2013).

Procedure

Couples were recruited with (a) flyers describing the study that were posted in residential properties throughout Christchurch, (b) notices put on community bulletin boards (in public areas and on line), (c) advertisements placed in the local media, and (d) asking

people who were interested in the study to forward the information to other potentially interested people. Nine suburbs were selected that represented each combination of damage (high, moderate, and low) and neighborhood deprivation (high, moderate, and low) using the initial land zoning by the *Canterbury Earthquake Recovery Authority* (2011), the researchers' knowledge and surveying, and an index of socioeconomic neighborhood deprivation (White, Gunston, Salmond, Atkinson, & Crampton, 2008). The study was approved by the University of Canterbury's Human Ethics Committee.

All questionnaires (apart from T0) were completed by both partners independently. Most participants (95%) completed the questionnaires online. Couples were either e-mailed the link to each online questionnaire (with a separate link sent to the male and female partner) or questionnaires were mailed to each partner with two prepaid envelopes to return the materials (one for each partner) addressed to the researcher. Participants were instructed to complete the questionnaires privately (i.e., not in the company of their partner) and to not discuss the questionnaire until it had been completed and sent to the researcher. Participant consent was obtained before each questionnaire. Each participant received a \$10 voucher for each completed and returned questionnaire, and all couples who completed all of the questionnaires were entered into a drawing to win a \$500 voucher. Couples completed the questionnaires over a 15-month period, with each assessment being approximately 5 months apart at 14 months (T1), 19 months (T2), 24 months (T3), and 29 months (T4) following the first major earthquake in 2010.

Measures

All measures were completed by both partners at all time points.

Posttraumatic stress symptoms. PTSS were assessed using the Impact of Events Scale—Revised (Weiss & Marmar, 1997). This 22-item scale has three subscales: Intrusions (eight items; e.g., “any reminder brought back feelings about it [the event]”), hyperarousal (six items; e.g., “I was jumpy and easily startled”), and avoidance (eight items; e.g., “I stayed away from reminders about it [the event]”). Each partner was asked to what extent she or he had experienced the symptom during the past 7 days in relation to the Canterbury earthquakes (0 = *not at all*, 4 = *extremely*). These subscales correlated highly, ranging from .54 ($p < .0001$), between women's scores of intrusion and avoidance symptoms at T4, to .86 ($p < .0001$), between women's scores of hyperarousal and intrusion symptoms at T1. Thus, the subscales were averaged (possible range = 0–4; $\alpha = .93$ to .95 for women; $\alpha = .94$ to .95 for men).

Relationship quality. Relationship quality was measured using the six-item short-form version of the Perceived Relationship Quality Components Inventory (Fletcher, Simpson, & Thomas, 2000). The short form has items assessing relationship satisfaction, commitment, intimacy, trust, passion, and love (e.g., “how satisfied are you with your relationship?”; “how committed are you to your relationship?”). Each partner was asked to indicate what his or her current partner/relationship was like on each item using a 7-point Likert-type scale (1 = *not at all*, 7 = *extremely*). The six items were summed (possible range = 1–42; $\alpha = .80$ to .86 for women; $\alpha = .78$ to .89 for men).

Perceptions of received support. Perceptions of support received from the partner were assessed by seven items based on work by Bridges, Sanderman, and van Sonderen (2002) and Krause (1995). The items target three social support functions commonly distinguished in the literature: emotional/esteem support (“show that they loved and cared for you”; “listen to you when you wanted to talk about things that were on your mind”; show that they appreciated you”), instrumental support (“give you practical help”; “take over some of your chores/responsibilities in and around the house”), and companionship (“keep you company”; “spend time with you”). Participants were asked how often in the past week (1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*, 5 = *almost always*) their partner engaged in these behaviors. The items were summed (possible range = 1–35; $\alpha = .87$ to .91 for women; $\alpha = .86$ to .91 for men).

Data Analyses

To achieve the study aims, we ran two moderated growth-curve models: (1) a PTSS model, which examined the effects that actor and partner PTSS scores had on intercepts and slopes of relationship quality, and (2) a perceptions-of-received-support model, which examined whether actor and partner perceptions of received support moderated the effect that PTSS scores had on intercepts and slopes of relationship quality. Both models also explored possible gender differences.

The moderated dyadic growth-curve models were examined using multilevel modeling (mixed modeling) in SPSS 22 where within-person variability is represented at the lower level (Level 1) and between-persons and between-dyads variability are represented at the upper level (Level 2; Kashy & Donnellan, 2008, 2012). This method permits one to examine potential explanatory factors for between-persons variability in the initial levels (intercept) of each dependent variable, in addition to the time trajectories (slopes) by estimating the interaction between the time of measurement and each substantive independent variable. Because not all participants completed the questionnaires at exactly the same time at each assessment phase (the standard deviations of completion post-2010 earthquake ranged from 0.32 month at T1 to 0.70 month at T2), the time variable was rescaled to reflect the months that had passed since the average time of the first assessment. Consequently, time was centered on the average time of the first assessment, meaning that the intercept in each model reflects the predicted relationship quality for the average participant (given the other variables in the model) at the average time of T1 (i.e., approximately 14 months after the first major earthquake). The regression estimates of each of the predictors reflect their effects on relationship quality at that time. We examined only linear time effects because (a) preliminary analyses using a quadratic unconditional model yielded no significant fixed effects, (b) these analyses did not significantly improve model fit, and (c) we had no theoretical reasons to anticipate quadratic time effects. All continuous predictor variables were centered on the grand mean (Aiken & West, 1991). Gender was coded -1 for women and 1 for men.

The data were structured for analyses using the APIM framework (Kenny et al., 2006) to test for both actor and partner effects. Given the structure of a dyadic multilevel model, the overall fixed effects are weighted according to the number of time points each dyad member completed. The inclusion of both relationship part-

ners in the same model allows one to statistically control for variance shared by partners nested within the same relationship. Dyadic interdependence was modeled by estimating (a) the correlation between partners' intercepts, (b) the correlation between partners' slopes, and (c) the correlation between partners' time-specific residuals (see Kashy & Donnellan, 2008, 2012).

To examine the effects of PTSS on relationship quality, we first ran a model that included actor and partner PTSS values and their interactions with gender or time, culminating in two 3-way interactions among actor/partner PTSS, time, and gender. The mixed-model equation for the relationship quality of person i in couple j at time t for the PTSS moderated growth-curve model is

$$\begin{aligned}
 Y_{ijt} = & b_{00} + b_{01}Time_{ijt} + b_{02}Gender_{ij} + b_{03}Gender_{ij} \times Time_{ijt} \\
 & + b_{04}ActorPTSS_{ijt} + b_{05}ActorPTSS_{ijt} \times Gender_{ij} \\
 & + b_{06}ActorPTSS_{ijt} \times Time_{ijt} \\
 & + b_{07}ActorPTSS_{ijt} \times Gender_{ij} \times Time_{ijt} + b_{08}PartnerPTSS_{ijt} \\
 & + b_{09}PartnerPTSS_{ijt} \times Gender_{ij} \\
 & + b_{10}PartnerPTSS_{ijt} \times Time_{ijt} \\
 & + b_{11}PartnerPTSS_{ijt} \times Gender_{ij} \times Time_{ijt} + e_{ijt} \quad (1)
 \end{aligned}$$

where Gender is a time-invariant (Level 2) predictor, Time is a time-variant (Level 1) predictor, Actor PTSS is a time-variant (Level 1) predictor, and Partner PTSS is a time-variant (Level 1) predictor.

To test whether perceived support is a moderator, actor and partner support perceptions (time-variant Level 1 predictors) and the relevant interactions (involving actor and partner PTSS and support, time, and gender) were added to the PTSS model described above, culminating in four possible four-way interactions. For more information on how the analyses were conducted and additional analyses, refer to the online supplemental material.

Results

Descriptive Analyses

Table 1 presents the descriptive statistics for the variables reported by each partner at each time point in the study (including the correlation between dyads and differences between men and women), and it also presents the correlations between these variables at T1. Relationship quality and perceptions of received support were relatively high according to the possible scale ranges, whereas PTSS were relatively low on average, with very few reporting clinically significant symptomology. As expected, non-independence between dyad members was found (see the bivariate correlations). Matched-pairs t tests were also conducted to test for differences between men and women on the study variables. As shown in Table 1, women had significantly higher PTSS scores than men.

Main Analyses

In the PTSS model, we first examined how PTSS was associated with relationship quality at T1 (i.e., the intercept), followed by the extent to which the slope of relationship quality across time varied according to PTSS (Hypothesis 1). To interpret the effects of PTSS

on the slope of relationship quality we tested the conditional slopes of the significant interactions between PTSS, time, and/or gender. Given that an individual's PTSS scores could change between measurement points, relationship quality slopes could have changed for each individual across the study (i.e., discontinuous change; see Singer & Willett, 2003). For simplicity of presentation, the conditional slopes reported above are for individuals who score consistently high or low on PTSS (from T1–T4). We, then, in a perceptions of support moderation model, examined how these PTSS intercept and slope effects varied in relation to reports of support to determine whether actor or partner perceptions of received support ameliorated the negative effects that actor and partner PTSS had on relationship quality (Hypotheses 2 and 3).

Posttraumatic Stress Symptoms Model (Hypothesis 1)

Relationship quality at T1 as a function of PTSS. Testing Hypothesis 1, the results revealed that the intercept of relationship quality was significantly associated with actor, $b = -0.89$, $SE = 0.35$, $t(327) = -2.54$, $p = .011$, 95% confidence interval (CI) $[-1.58, -0.20]$, and partner PTSS scores, $b = -1.10$, $SE = 0.34$, $t(321) = -3.21$, $p = .001$, 95% CI $[-2.31, -0.59]$. Thus, higher actor and partner PTSS scores were significantly associated with lower relationship quality at T1.

The slope of relationship quality over time as a function of PTSS. The results also revealed that the slope of relationship quality varied as a function of PTSS scores. First, the slope varied as a function of the interaction between actor PTSS and gender, $b = 0.11$, $SE = 0.04$, $t(223) = 2.99$, $p = .003$, 95% CI $[0.04, 0.18]$. Women with higher PTSS scores (+1 SD) reported declining relationship quality over time, whereas women with lower PTSS scores (–1 SD) reported stable relationship quality over time. Conversely, men with higher PTSS scores had stable relationship quality across time, whereas men with lower PTSS scores reported declining relationship quality over time. Thus, the association between actor PTSS and relationship quality that was observed at T1 increased with time for women and decreased with time for men. By T4, high PTSS was significantly associated with lower relationship quality for women but not men (see Figure 1A for men and Figure 1B for women).

Second, the slope of relationship quality varied as a function of partner PTSS scores, $b = 0.14$, $SE = 0.04$, $t(238) = 3.94$, $p < .001$, 95% CI $[0.07, 0.21]$. As already mentioned, people with partners who experienced higher PTSS scores reported lower relationship quality at T1; however, the conditional slopes indicated that this negative association did not persist. This was because the relationship quality of actors whose partners experienced lower PTSS decreased significantly over time, catching up with the low relationship quality of actors with partners who experienced higher PTSS that did not change significantly. By T4, individuals with partners reporting higher PTSS had significantly higher relationship quality than those with partners reporting lower PTSS, opposite to T1 (see Figure 1C).

Overall, the results were consistent with Hypothesis 1, such that higher actor and partner PTSS were associated with lower relationship quality. These associations changed overtime, however. The overtime effects meant that actor PTSS was associated with relationship quality at different times for men and women: negatively associated with men's relationship quality at T1 but women's relationship quality at T4. Furthermore, and surprisingly, although partner PTSS was asso-

Table 1
Descriptive Statistics for Time 1–4 Variables and Correlations Between Variables at Time 1

Time	Sex	M/n (SD/%)	r^a	r^a	T1 PTSS ^b	T1 RS ^b
Relationship quality						
T1	Men	37.64 (5.18)	.45***	1.40	-.31**	.72***
	Women	38.32 (3.81)			-.27**	.44***
T2	Men	37.51 (4.15)	.53***	0.42		
	Women	37.81 (4.37)				
T3	Men	37.76 (3.74)	.57***	-1.16		
	Women	37.27 (4.55)				
T4	Men	37.18 (4.58)	.44***	0.93		
	Women	37.60 (4.00)				
Posttraumatic stress symptoms (PTSS)						
T1	Men	0.51 (0.59)	.16	2.85**		-.13
	≥cut-off ^c	8 (8.1)				-.31**
T2	Women	0.76 (0.70)		3.10**		
	≥cut-off	17 (17.5)				
T3	Men	0.40 (0.46)	.07	2.55*		
	≥cut-off	3 (3.7)				
T4	Women	0.69 (0.68)		2.22*		
	≥cut-off	10 (11.5)				
T1	Men	0.37 (0.46)	.23*	2.12*		
	≥cut-off	3 (3.8)				
T2	Women	0.56 (0.57)		2.12*		
	≥cut-off	8 (10.1)				
T3	Men	0.32 (0.50)	.22	2.12*		
	≥cut-off	3 (4.0)				
T4	Women	0.48 (0.53)		2.12*		
	≥cut-off	5 (6.4)				
Received support (RS)						
T1	Men	26.86 (5.18)	.24*	1.21		
	Women	27.73 (5.05)				
T2	Men	27.40 (5.42)	.28*	0.41		
	Women	27.81 (5.27)				
T3	Men	27.59 (4.53)	.32**	0.79		
	Women	28.08 (4.36)				
T4	Men	27.26 (5.24)	.29*	0.37		
	Women	27.51 (4.94)				

Note. T = time; PTSS = posttraumatic stress symptoms; RS = received support.

^a Within-dyad correlations and differences. ^b Correlations between variables at Time 1. ^c Number/percentage of individuals above Creamer's cut-off of 1.5 indicating clinically significant PTSS levels (Creamer et al., 2003).

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

ciated with lower relationship quality at T1 in line with our hypotheses, it was associated with better relationship quality at T4.

Perceptions of Support Moderation Model

Hypothesis 2. For Hypothesis 2 we expected that relationship quality would be protected when the distressed actor/partner (i.e., with high PTSS) had high perceptions of received partner support. The results revealed that the intercept and slopes of relationship quality varied according to the interaction among gender, actor PTSS, and actor perceptions of received support (see the Actor × Actor column in Table 2). To interpret the intercept and slope PTSS by support effects, we examined the conditional slopes of the highest order interaction (i.e., the four-way interaction: Actor PTSS × Actor support × Time × Gender). As shown in Figure 2, relationship quality at T1 was significantly lower for men who reported higher PTSS but only when perceived support was low (Figures 2C & 2D). In contrast, women's relationship quality at T1

was not associated with their PTSS levels irrespective of their reported support levels (Figures 2A & 2B). These associations changed overtime. Relationship quality for men and women who had resilient (-1 SD) PTSS scores and reported receiving more support across the study period ($+1$ SD) remained high and stable across time (Figures 2B & 2D). For men who reported more resilient PTSS scores and lower received support, however, relationship quality declined steeply over time (Figure 2C), whereas it remained stable for women with such experiences (Figure 2A). Relationship quality for men who reported higher chronic PTSS scores remained low and stable over time if they reported lower received support (Figure 2C) or high and stable across time if they reported higher received support (Figure 2D). In contrast, the relationship quality of women who reported higher chronic PTSS scores declined over time regardless of their received support (Figures 2A & 2B). Consequently, the T1 trends reversed at T4. Men's relationship quality was not associated with their PTSS

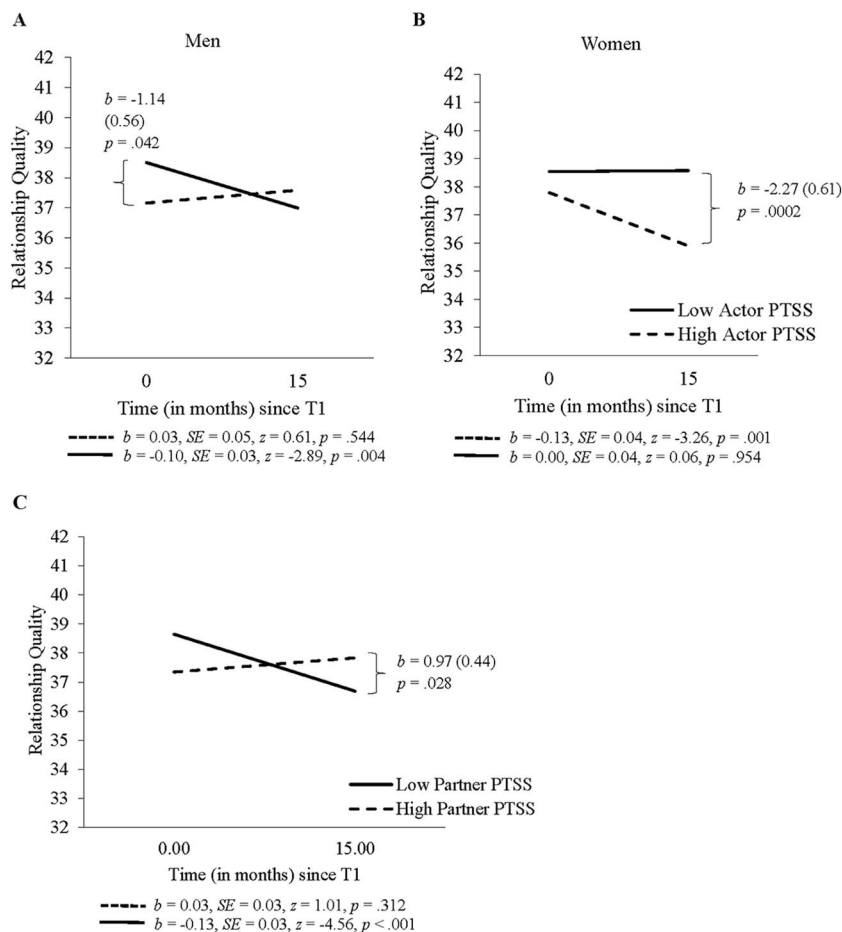


Figure 1. Conditional slopes pertaining to Hypothesis 1: Linear changes in relationship quality predicted by (A and B) actor and (C) partner posttraumatic stress over time. PTSS = posttraumatic stress symptoms; T1 = Time 1.

irrespective of received support (Figures 2C & 2D), whereas women's relationship quality was negatively associated with their PTSS, with this effect more than twice as large if they reported receiving lower support compared with higher support (Figures 2A & 2B). The existence of a negative PTSS–relationship quality association at T4 in women even in high-support conditions suggests that high support might not be very effective at buffering women's PTSS in the long run.

In addition, the slopes of relationship quality varied according to partner PTSS, partner support, and gender (see the Partner \times Partner column in Table 2). Overall, this effect did not consistently support Hypothesis 2. Although a slight buffering effect was found for men at Time 1, this did not occur overtime nor did it occur for women (refer to the online supplemental material for further detail).

Hypothesis 3. In Hypothesis 3, we expected that relationship quality would also be protected when the distressed (PTSS) individual's partner reported higher support. Specifically, the slope of relationship quality varied as a function of the interaction between actor PTSS and partner received support (see the marginal effect in the Actor \times Partner column in Table 2 and Figures 3A & 3B). Relationship quality remained stable across all time points for

actors reporting lower PTSS, regardless of their partner's reports of received support; relationship quality also remained stable for actors reporting higher PTSS with partners reporting high received support. In contrast, relationship quality declined significantly over time for actors who reported higher PTSS involved with partners who reported lower received support across the study. Consequently, at T4, individuals with higher PTSS and partners reporting low received support had significantly lower relationship quality than those with lower PTSS. This effect partially supports Hypothesis 3. Although greater partner reported received support did not buffer the negative effects of actor PTSS on actors' relationship quality at T1; it did so by T4.

As shown in the Partner \times Actor column in Table 2, the intercept of relationship quality also varied as a function of the interaction among partner PTSS, actor perceptions of received support, and gender. The relationship quality of both men and women who reported higher received support did not significantly differ as a function of their partners reported PTSS levels at T1 (though a marginal effect was found for women). There was also no association between partner PTSS and relationship quality for women who reported lower received support. There was, however, an effect for men, such that the relationship quality of men who

Table 2
Relationship Quality as a Function of Actors' and Partners' Posttraumatic Stress Symptoms and Perceptions of Received Support

Fixed effects	Actor				Partner			
	<i>b</i>	<i>SE</i>	<i>t</i>	95% CI	<i>b</i>	<i>SE</i>	<i>t</i>	95% CI
Intercept	38.19***	.29	127.86	[37.60, 38.77]				
Gender(G)	.09	.20	.47	[-.30, .49]				
Time (slope)(T)	-.07**	.02	-2.83	[-.12, -.02]				
G × T	-.02	.02	-.96	[-.05, .02]				
PTSS	-.64†	.33	-1.94	[-1.29, .01]	-.99**	.33	-3.01	[-1.64, -.34]
G × PTSS	-.41	.35	-1.18	[-1.09, .27]	-.22	.34	-.63	[-.89, .46]
T × PTSS	-.06	.04	-1.57	[-.13, .02]	.11**	.04	2.85	[.03, .18]
G × T × PTSS	.10*	.04	2.41	[.02, .18]	-.02	.04	-.53	[-.10, .06]
Support	.33***	.04	8.76	[.26, .40]	.07*	.04	1.98	[.00, .15]
G × Support	.04	.04	.94	[-.04, .11]	.00	.04	.06	[-.07, .08]
T × Support	.00	.00	.08	[-.01, .01]	.00	.00	.28	[-.01, .01]
G × T × Support	.00	.00	.49	[-.01, .01]	.00	.00	-.98	[-.01, .00]

	Actor × Actor				Partner × Partner				Actor × Partner			
	<i>b</i>	<i>SE</i>	<i>t</i>	95% CI	<i>b</i>	<i>SE</i>	<i>t</i>	95% CI	<i>b</i>	<i>SE</i>	<i>t</i>	95% CI
PTSS × Support	.21***	.05	3.94	[.11, .32]	.04	.05	.77	[-.06, .15]	-.10	.05	-1.76	[-.20, .01]
G × PTSS × Support	.15**	.05	2.86	[.05, .25]	.03	.05	.52	[-.08, .13]	-.09	.05	-1.76	[-.20, .01]
T × PTSS × Support	.00	.01	-.80	[-.02, .01]	-.01	.01	-1.39	[-.02, .00]	.01†	.01	1.95	[-.00, .03]
G × T × PTSS × Support	-.01*	.01	-1.97	[-.03, -.00]	-.02**	.01	-2.61	[-.03, .00]	.01	.01	1.00	[-.01, .02]

Note. The columns correspond to the order of the fixed effects. For example, for PTSS × Support, the Actor × Actor column refers to actor PTSS and actor received support, whereas the Actor × Partner column refers to actor PTSS and partner received support. Interactions with time represent the slope of relationship quality according to the moderator. The *df* range = 83–432. Gender: 1 = men, -1 = women. PTSS = posttraumatic stress symptoms; CI = confidence interval; G = gender; T = time.

† *p* = .06. * *p* < .05. ** *p* < .01. *** *p* < .001.

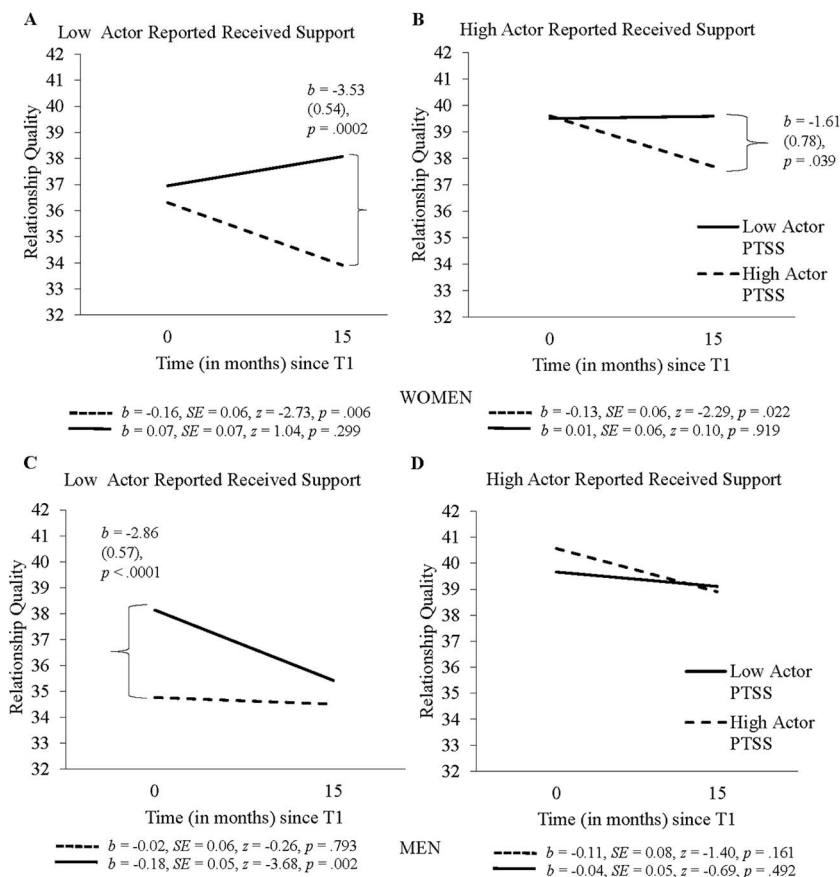


Figure 2. Conditional slopes pertaining to Hypothesis 2: Linear changes in relationship quality predicted by gender and time (in months) since Time 1 as moderated by actor-reported posttraumatic stress symptoms and actor-reported received support. PTSS = posttraumatic stress symptoms; T1 = Time 1.

reported lower received support was significantly lower at T1 if their partner had higher PTSS levels (see Figure 3C for men & Figure 3D for women). This is also consistent with Hypothesis 3 and the anticipated gender difference in that perceptions of greater received support from partners buffered men's relationship quality at T1 from their partner's higher PTSS scores.

Discussion

This unique, longitudinal study examined romantic partners in the aftermath of the Canterbury earthquakes to determine how the PTSS levels of both partners were associated with romantic relationship quality across 15 months. The findings reveal that the level of PTSS experienced by both partners was associated with worse relationship quality at T1 (14 months post-2010 earthquake and 8 months post-2011 earthquake). However, these negative associations were mitigated by the amount of perceived partner support in the relationship. Several findings revealed changes over time (from T1 to T4) and gender differences.

Posttraumatic Stress Symptoms and Relationship Quality

Supporting Hypothesis 1 and prior literature (e.g., Lambert et al., 2012; Taft et al., 2011), we found that people who reported

higher PTSS scores, or had partners who did, had lower relationship quality on average at the beginning of the study (at T1). This is the first study to rigorously examine how both partners' PTSS scores are associated with a person's relationship quality following a collective traumatic event—a series of major earthquakes. It is important to note that most individuals who had higher PTSS scores (i.e., those $+1$ *SD*) had subclinical symptoms and were likely experiencing moderate PTSS.

The results also reveal that the slopes of relationship quality across time differed according to both partners' PTSS scores. As far as we know, this is the first study to examine how trajectories of relationship quality differ according to PTSS. The fact that the slopes of relationship quality differed according to PTSS is consistent with prior theory claiming that coping with stress in a family context is a fluid, dynamic process (cf. McCubbin & Patterson, 1983). The results also reveal that the effects of PTSS scores on the slopes of relationship quality were different for men and women. Of particular interest, women who had chronically high PTSS reported declining relationship quality over time, whereas men with the same experiences reported stable relationship quality over time. Thus, only men's relationship quality was associated with higher levels of PTSS at T1 whereas women's relationship quality was associated at T4. Indeed, women may be able to better cope with their high PTSS initially not letting it spill over

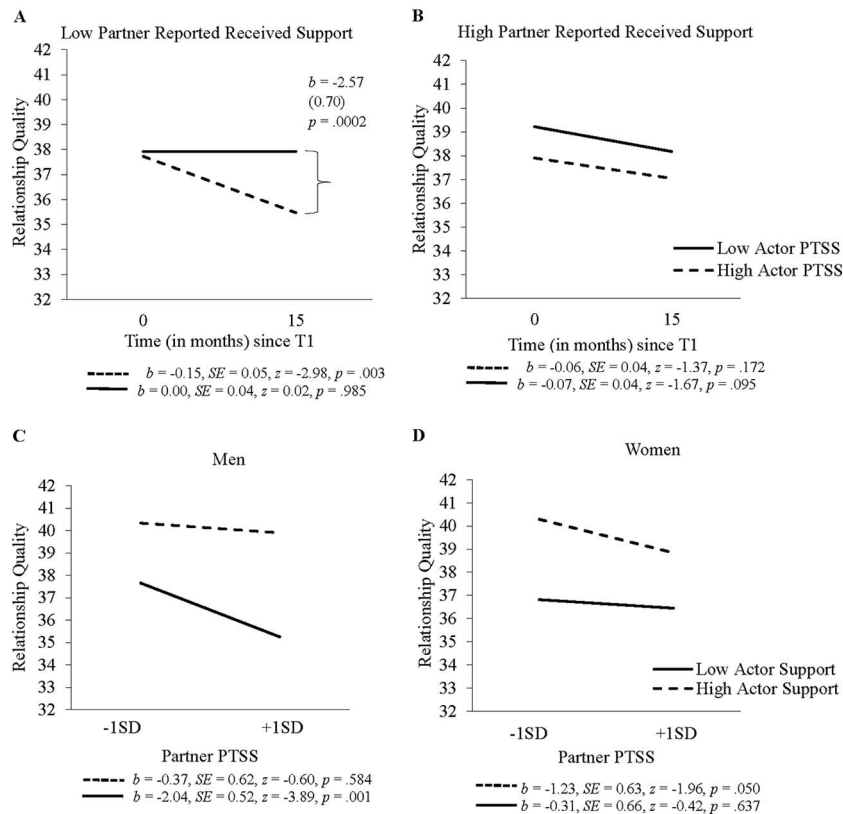


Figure 3. Conditional slopes pertaining to Hypothesis 3: (A & B) Linear changes in relationship quality predicted by time (in months) since Time 1 as moderated by actor-reported posttraumatic stress symptoms and partner-reported received support. (C & D) Linear changes in relationship quality at Time 1 predicted by partner posttraumatic stress symptoms as moderated by actor-reported received support and gender. PTSS = posttraumatic stress symptoms; T1 = Time 1.

into their relationship because they typically receive more support from outside the romantic relationship context postdisaster (Tyler, 2006). However, this resource may disintegrate overtime because of their high PTSS (cf. Kaniasty & Norris, 2008). Future research into this is warranted.

The results also reveal that even though partner PTSS was negatively associated with relationship quality at T1, this effect did not persist over time. Indeed, the relationship quality of people involved with partners who experienced lower levels of PTSS decreased significantly across the study, whereas it remained stable for actors involved with partners who experienced higher PTSS symptoms, such that the reverse was true at T4. We believe that people involved with partners who experience higher levels of PTSS (who may be experiencing moderate or slightly stronger PTSS symptoms) were probably aware of their partner's moderate stress and the impact it was having on their relationship and may have worked harder to maintain their relationship than individuals with partners who experienced lower levels of stress across the 15 months. Cast another way, these individuals may have been particularly motivated to be more mindful of both their relationship and their partner. Indeed, simply being aware of a partner's trauma experience and the impact it has can protect a person's relationship satisfaction from his or her partner's high PTSS (Renshaw et al., 2008; Renshaw, Allen, Carter, Markman, & Stanley, 2014).

Perceptions of Received Support as a Moderator

To better understand the coping process within the relationship, we investigated an available resource in many relationships—the amount of support that individuals perceived receiving from their partners—and how this buffered relationships from PTSS. We predicted, as part of Hypotheses 2 and 3, that the amount of perceived partner support would protect the relationship from the negative effects of higher levels of PTSS reported by one or both partners. Partial or full support was found for all hypotheses.

Consistent with Hypothesis 2, the negative association between individual's PTSS and their relationship quality was buffered when they reported receiving more support from their partners. This is the first study to our knowledge to document this effect in a disaster context and this result is consistent with theory (Cutrona, 1996; Bodenmann, 1997, 2005; Hobfoll, 1991). However, contrary to Hypothesis 2, partner-reported support did not consistently buffer the negative association between partner reported PTSS and relationship quality. Thus, receiving partner support when you are stressed protects your relationship quality but not your partner's. Future research into this is warranted.

With respect to Hypothesis 3, we predicted that individuals who experienced higher PTSS across the study would report better relationship quality when their partners reported receiving more

support compared to those with partners who reported receiving less support. Although this pattern was not witnessed at T1, it emerged at T4, such that individuals with higher PTSS scores who were involved with partners who reported lower support had declining relationship quality over time, whereas individuals with partners who reported higher support had fairly stable relationship quality. Given the important role that attributions assume in affecting assessments of relationship quality (cf. Bradbury & Fincham, 1990), we expect that individuals may initially make allowances when they receive lower levels of partner support, particularly when their partners experience high levels of PTSS. However, as time passes and the traumatic event becomes less impactful and less salient, individuals may find it more difficult to cope with partners who continue to experience high symptomology and remain less supportive, which may generate dysfunctional interactions.

In partial support of Hypothesis 3 and prior research (e.g., Lambert et al., 2015), we also found that receiving higher support buffered men's relationship quality at T1 when they were involved with partners with higher PTSS. Higher partner PTSS, however, had no impact on women's relationship quality when considering their level of received support, which we discuss in more detail below.

Gender Differences

We anticipated that support might have a stronger buffering effect on men than on women, given that partner support tends to be more effective for men (e.g., when females offer support to their spouses; Neff & Karney, 2005) and more beneficial to men (Tyler, 2006). This expectation was supported at T1 in several findings. First, women were able to cope more effectively with higher PTSS and lower partner support than men at T1. This effect, however, did not persist across time as indicated by their declining relationship quality, such that women and men were comparable at T4. This decline for women is consistent with research indicating that less support from a romantic partner cannot fully be compensated for by other support providers (Coyne & DeLongis, 1986). Also supporting the hypothesis that greater partner support should be more important for men than women, higher reports of support buffered men's T1 relationship quality, but not women, from higher partner PTSS. Indeed, it appeared as if women coped with their partner's PTSS than men were by not letting it affect their relationship quality. In addition, relationship quality tended to decline over time among women who experienced more PTSS symptoms and also reported greater partner support. This suggests that men's support may not be as effective over time at protecting the relationship from their spouse's PTSS. This is the first trauma study to document such associations.

Limitations

Despite the many strengths of this dyadic, longitudinal study, it has some limitations. For example, the generalizability of the results may be limited to the nature of this particular sample. Similar to most trauma studies, ethnic minorities and lower socioeconomic status participants were underrepresented. In addition, the couples who participated in this study had fairly high relationship quality, positive perceptions of received partner support, and

lower PTSS than may not be true of more at-risk samples and those who experienced greater trauma exposure. Future research should recruit these understudied persons. Furthermore, given the timing of the study, the results reflect experiences related to the time period that was captured. Future research should determine when PTSS is particularly harmful to relationships posttrauma and whether and when partner support is more versus less effective as a resource. Furthermore, our methods also relied on self-reports spaced months apart, which can be prone to bias. Future research should use other methodologies (e.g., observations or daily diaries). Finally, although the statistical analyses used in this study have many unique advantages, the results are correlational. Causality cannot be inferred, and potential confounding factors cannot be ruled out. For example, we cannot infer whether lower perceptions of support caused lower relationship quality or vice versa. An important avenue for future research will be to determine the causality of the effects and pin down the exact causal mechanisms (i.e., adaptive processes, attributions) that produce certain effects.

Clinical Implications and Conclusion

Developing and implementing effective psychosocial services postdisaster is of utmost importance to ensure that negative reactions in individuals are minimized (see Mooney et al., 2011, for a review applied to the Canterbury earthquakes). The current results suggest that prevention and intervention efforts should target people with high PTSS and their partner who also have a relationship characterized by low levels of support. Interventions might also benefit by strengthening effective support exchanges within couples. In addition, the gender differences we found suggest that future interventions and preventions should try to strengthen and expand the support networks of men in times of stress and aid men in providing effective (responsive) support when their partner is distressed.

In conclusion, this study highlights the many advantages of adopting a longitudinal, dyadic perspective, identifying the factors that characterize resiliency postdisaster, and documenting specific associations across time in order to truly understand how chronic traumatic events may affect romantic relationship quality. Coping with a major stressful event rarely occurs in a social vacuum as research often portrays by examining just isolated individuals. Future research needs to investigate people's wider environmental context—including the relationship context—to further our knowledge of posttrauma reactions and recovery.

References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. London, UK: Sage.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- Belcher, A. J., Laurenceau, J.-P., Graber, E. C., Cohen, L. H., Dasch, K. B., & Siegel, S. D. (2011). Daily support in couples coping with early stage breast cancer: Maintaining intimacy during adversity. *Health Psychology, 30*, 665–673. <http://dx.doi.org/10.1037/a0024705>
- Blow, A. J., Gorman, L., Ganoczy, D., Kees, M., Kashy, D. A., Valenstein, M., . . . Chermack, S. (2013). Hazardous drinking and family functioning in National Guard veterans and spouses postdeployment. *Journal of Family Psychology, 27*, 303–313. <http://dx.doi.org/10.1037/a0031881>

- Bodenmann, G. (1997). Dyadic coping: A systemic-transactional view of stress and coping among couples: Theory and empirical findings. *European Review of Applied Psychology, 47*, 137–141.
- Bodenmann, G. (2005). Dyadic coping and its significance for marital functioning. In T. A. Revenson, K. Kayser, & G. Bodenmann (Eds.), *Couples coping with stress: Emerging perspectives on dyadic coping. Decade of behavior* (pp. 33–49). Washington, DC: American Psychological Association. <http://dx.doi.org/10.1037/11031-002>
- Bonanno, G. A., Brewin, C. R., Kaniasty, K., & 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>
- Bradbury, T. N., & Fincham, F. D. (1990). Attributions in marriage: Review and critique. *Psychological Bulletin, 107*, 3–33. <http://dx.doi.org/10.1037/0033-2909.107.1.3>
- Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68*, 748–766. <http://dx.doi.org/10.1037/0022-006X.68.5.748>
- Bridges, K. R., Sanderman, R., & van Sonderen, E. (2002). An English language version of the social support list: Preliminary reliability. *Psychological Reports, 90*, 1055–1058. <http://dx.doi.org/10.2466/pr0.2002.90.3.1055>
- Campbell, S. B., & Renshaw, K. D. (2013). PTSD symptoms, disclosure, and relationship distress: Explorations of mediation and associations over time. *Journal of Anxiety Disorders, 27*, 494–502. <http://dx.doi.org/10.1016/j.janxdis.2013.06.007>
- Canterbury Earthquake Recovery Authority (CERA). (2011). *Latest Christchurch land information released*. Retrieved from <http://cera.govt.nz/news/latest-christchurch-land-information-released-23-june-2011>
- Coyne, J. C., & DeLongis, A. (1986). Going beyond social support: The role of social relationships in adaptation. *Journal of Consulting and Clinical Psychology, 54*, 454–460. <http://dx.doi.org/10.1037/0022-006X.54.4.454>
- Creamer, M., Bell, R., & Failla, S. (2003). Psychometric properties of the Impact of Event Scale—Revised. *Behaviour Research and Therapy, 41*, 1489–1496. <http://dx.doi.org/10.1016/j.brat.2003.07.010>
- Cutrona, C. E. (1996). *Social support in couples: Marriage as a resource in times of stress*. Thousand Oaks, CA: Sage. <http://dx.doi.org/10.4135/9781483327563>
- Erbes, C. R., Meis, L. A., Polusny, M. A., & Compton, J. S. (2011). Couple adjustment and posttraumatic stress disorder symptoms in National Guard veterans of the Iraq war. *Journal of Family Psychology, 25*, 479–487. <http://dx.doi.org/10.1037/a0024007>
- Fletcher, G. J. O., Simpson, J., & Thomas, G. (2000). The measurement of relationship quality components: A confirmatory factor analytic approach. *Personality and Social Psychology Bulletin, 26*, 340–354. <http://dx.doi.org/10.1177/0146167200265007>
- Fredman, S. J., Monson, C. M., Schumm, J. A., Adair, K. C., Taft, C. T., & Resick, P. A. (2010). Associations among disaster exposure, intimate relationship adjustment, and PTSD symptoms: Can disaster exposure enhance a relationship? *Journal of Traumatic Stress, 23*, 446–451. <http://dx.doi.org/10.1002/jts.20555>
- Gewirtz, A. H., Polusny, M. A., DeGarmo, D. S., Khaylis, A., & Erbes, C. R. (2010). Posttraumatic stress symptoms among National Guard soldiers deployed to Iraq: Associations with parenting behaviors and couple adjustment. *Journal of Consulting and Clinical Psychology, 78*, 599–610. <http://dx.doi.org/10.1037/a0020571>
- Hobfoll, S. E. (1991). Traumatic stress: A theory based on rapid loss of resources. *Anxiety Research, 4*, 187–197. <http://dx.doi.org/10.1080/08917779108248773>
- Kaniasty, K., & Norris, F. H. (2008). Longitudinal linkages between perceived social support and posttraumatic stress symptoms: Sequential roles of social causation and social selection. *Journal of Traumatic Stress, 21*, 274–281. <http://dx.doi.org/10.1002/jts.20334>
- Kashy, D. A., & Donnellan, M. B. (2008). Comparing MLM and SEM approaches to analyzing developmental dyadic data: Growth curve models of hostility in families. In N. A. Card, J. P. Selig, & T. D. Little (Eds.), *Modelling dyadic and interdependent data in the developmental and behavioral sciences* (pp. 165–190). New York, NY: Routledge.
- Kashy, D. A., & Donnellan, M. B. (2012). Conceptual methodology issues in the analysis of data from dyads and groups. In K. Deaux & M. Snyder (Eds.), *The Oxford handbook of personality and social psychology* (pp. 209–238). New York, NY: Cambridge University Press.
- Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic data analysis*. New York, NY: Guilford Press.
- Knoll, N., Burkert, S., Kramer, J., Roigas, J., & Gralla, O. (2009). Relationship satisfaction and erectile functions in men receiving laparoscopic radical prostatectomy: Effects of provision and receipt of spousal social support. *Journal of Sexual Medicine, 6*, 1438–1450. <http://dx.doi.org/10.1111/j.1743-6109.2009.01244.x>
- Krause, N. (1995). Negative interaction and satisfaction with social support among older adults. *Journals of Gerontology: Series B. Psychological Sciences and Social Sciences, 50*, 59–73. <http://dx.doi.org/10.1093/geronb/50B.2.P59>
- Lambert, J. E., Engh, R., Hasbun, A., & Holzer, J. (2012). Impact of posttraumatic stress disorder on the relationship quality and psychological distress of intimate partners: A meta-analytic review. *Journal of Family Psychology, 26*, 729–737. <http://dx.doi.org/10.1037/a0029341>
- Lambert, J. E., Hasbun, A., Engh, R., & Holzer, J. (2015). Veteran PTSS and spouse relationship quality: The importance of dyadic coping. *Psychological Trauma: Theory, Research, Practice, and Policy, 7*, 493–499. <http://dx.doi.org/10.1037/tra0000036>
- McCull, G. J., & Burkle, F. M., Jr. (2012). The new normal: Twelve months of resiliency and recovery in Christchurch. *Disaster Medicine and Public Health Preparedness, 6*, 33–43. <http://dx.doi.org/10.1001/dmp.2012.8>
- McCubbin, H. I., & Patterson, J. M. (1983). The family stress process. *Marriage & Family Review, 6*, 7–37. http://dx.doi.org/10.1300/J002v06n01_02
- Meis, L. A., Erbes, C. R., Polusny, M. A., & Compton, J. S. (2010). Intimate relationships among returning soldiers: The mediating and moderating roles of negative emotionality, PTSD symptoms, and alcohol problems. *Journal of Traumatic Stress, 23*, 564–572. <http://dx.doi.org/10.1002/jts.20560>
- Miller, M. W., Wolf, E. J., Reardon, A. F., Harrington, K. M., Ryabchenko, K., Castillo, D., . . . Heyman, R. E. (2013). PTSD and conflict behavior between veterans and their intimate partners. *Journal of Anxiety Disorders, 27*, 240–251. <http://dx.doi.org/10.1016/j.janxdis.2013.02.005>
- Monson, C. M., Gradus, J. L., La Bash, H. A. J., Griffin, M. G., & Resick, P. A. (2009). The role of couples' interacting world assumptions and relationship adjustment in women's postdisaster PTSD symptoms. *Journal of Traumatic Stress, 22*, 276–281. <http://dx.doi.org/10.1002/jts.20432>
- Mooney, M. F., Paton, D., de Terte, I., Johal, S., Karanci, A. N., Gardner, D., . . . Johnston, D. M. (2011). Psychosocial recovery from disasters: A framework informed by evidence. *New Zealand Journal of Psychology, 40*, 26–38.
- Neff, L. A., & Karney, B. R. (2005). Gender differences in social support: A question of skill or responsiveness? *Journal of Personality and Social Psychology, 88*, 79–90. <http://dx.doi.org/10.1037/0022-3514.88.1.79>
- Regan, T. W., Lambert, S. D., Kelly, B., McElduff, P., Girgis, A., Kayser, K., & Turner, J. (2014). Cross-sectional relationships between dyadic coping and anxiety, depression, and relationship satisfaction for patients with prostate cancer and their spouses. *Patient Education and Counseling, 96*, 120–127. <http://dx.doi.org/10.1016/j.pec.2014.04.010>

- Renshaw, K. D., Allen, E. S., Carter, S. P., Markman, H. J., & Stanley, S. M. (2014). Partners' attributions for service members' symptoms of combat-related posttraumatic stress disorder. *Behavior Therapy, 45*, 187–198. <http://dx.doi.org/10.1016/j.beth.2013.10.005>
- Renshaw, K. D., Rodrigues, C. S., & Jones, D. H. (2008). Psychological symptoms and marital satisfaction in spouses of Operation Iraqi Freedom veterans: Relationships with spouses' perceptions of veterans' experiences and symptoms. *Journal of Family Psychology, 22*, 586–594. <http://dx.doi.org/10.1037/0893-3200.22.3.586>
- Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis*. New York, NY: Oxford University Press. <http://dx.doi.org/10.1093/acprof:oso/9780195152968.001.0001>
- Statistics New Zealand. (2013). *2013 Census QuickStats about national highlights*. Retrieved from <http://www.ccc.govt.nz/cityleisure/statsfacts/census/agegenderethnicity.aspx>
- Taft, C. T., Monson, C. M., Schumm, J. A., Watkins, L. E., Panuzio, J., & Resick, P. A. (2009). Posttraumatic stress disorder symptoms, relationship adjustment, and relationship aggression in a sample of female flood victims. *Journal of Family Violence, 24*, 389–396. <http://dx.doi.org/10.1007/s10896-009-9241-8>
- Taft, C. T., Watkins, L. E., Stafford, J., Street, A. E., & Monson, C. M. (2011). Posttraumatic stress disorder and intimate relationship problems: A meta-analysis. *Journal of Consulting and Clinical Psychology, 79*, 22–33. <http://dx.doi.org/10.1037/a0022196>
- Taylor, S. E., Klein, L. C., Lewis, B. P., Gruenewald, T. L., Gurung, R. A., & Updegraff, J. A. (2000). Biobehavioral responses to stress in females: Tend-and-befriend, not fight-or-flight. *Psychological Review, 107*, 411–429. <http://dx.doi.org/10.1037/0033-295X.107.3.411>
- Turner, R. J., & Marino, F. (1994). Social support and social structure: A descriptive epidemiology. *Journal of Health and Social Behavior, 35*, 193–212. <http://dx.doi.org/10.2307/2137276>
- Tyler, K. A. (2006). The impact of support received and support provision on changes in perceived social support among older adults. *International Journal of Aging & Human Development, 62*, 21–38. <http://dx.doi.org/10.2190/5Y7P-WCL6-LE5A-F4U3>
- 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: A handbook for practitioners* (pp. 399–411). New York, NY: Guilford Press.
- White, P., Gunston, J., Salmund, C., Atkinson, J., & Crampton, P. (2008). *Atlas of socioeconomic deprivation in New Zealand NZDep2006*. Wellington, New Zealand: Ministry of Health.

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