# Compassionate Goals Predict Social Support and PTSD Symptoms Following a University Shooting: A Moderated Mediation Analysis

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## ABSTRACT

**Introduction**: Social support is known to buffer posttraumatic stress disorder (PTSD) symptoms, but the stress-buffering properties of striving to help and support others (compassionate goals) have received less attention. Recent research suggests that compassionate goals shape social support processes and dampen stress responses following social threat, but their relevance to trauma have not been examined. The present study tested whether, in the aftermath of a university mass shooting, compassionate goals concurrently and prospectively predicted lower PTSD symptoms indirectly via higher social support, and whether this mediation would be stronger with higher proximity to the trauma. **Method**: Participants ($N = 369$) completed measures four months post-shooting (Time 1), and a subset ($n = 85$) repeated outcome variables at eight months (Time 2). **Results**: As hypothesized, there was a significant moderated mediation, with trauma proximity moderating the indirect effect of compassionate goals on PTSD symptoms at Time 1 ($B = -0.88$, $SE = 0.28$, 95% CI [$-1.47$, $-0.37$]) and prospectively at Time 2 ($B = -1.12$, $SE = 0.77$, 95% CI [$-3.16$, $-0.03$]), although not when controlling for Time 1 symptoms. The indirect effects were greatest for those with higher trauma proximity, suggesting particular relevance for individuals most at risk for trauma-related difficulties. **Discussion**: These findings suggest the need for further research into compassionate goals and strategies for fostering them, particularly in the context of social or community traumas.

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Experiencing trauma may lead to adverse outcomes including posttraumatic stress disorder (PTSD). However, even those without full PTSD experience risk of subthreshold PTSD symptoms (Cukor, Wyka, Jayasinghe, & Difede, 2010; Mylle & Maes, 2004), other forms of emotional distress (Berger et al., 2007; Cukor et al., 2010), suicide attempts (Marshall et al., 2001; Zlotnick, Franklin, & Zimmerman, 2002), and impairment of social or work functioning (Cukor et al., 2010; Zlotnick et al., 2002). Individuals who are most directly proximal to a traumatic event (i.e., closer to ground zero) experience greater posttraumatic symptoms (for reviews, see Lowe & Galea, 2017; May & Wisco, 2016). Thus, identifying factors that may reduce risk of PTSD symptoms after trauma remains an important task.

Interpersonal or social factors may be particularly salient for predicting who develops PTSD symptoms. For instance, interpersonal traumas predict higher risk of PTSD symptoms relative to non-interpersonal traumas (Charuvastra & Cloitre, 2008; Littleton, Grills-Taquechel, Axsom, Bye, & Buck, 2011; López Martínez et al., 2016). Mass shootings on college campuses reflect a trauma to an entire social community (Hughes et al., 2011; Littleton, Kumpula, & Orcutt, 2011). Attributing harm to the deliberate intention of another human agent represents a relatively threatening meaning and may foster a view of the social world as malevolent.

## Social Support

Studies have implicated interpersonal processes not only in predicting risk for PTSD symptoms, but also in buffering against them. Perceived social support constitutes the most commonly studied interpersonal process thought to protect individuals from negative effects of trauma, and has consistently predicted mental health outcomes in general (Barrera, 1986; Cohen & Wills, 1985; Lakey & Orehek, 2011). More specifically, social support has been found to buffer against PTSD and related symptoms (Guay, Billette, & Marchand, 2006; Suomalainen, Haravuori, Berg, Kiviruusu, & Marttunen, 2011; Warner, Gutiérrez-Doña, Angulo, & Schwarzer, 2015), and a meta-analysis identified social support as the strongest predictor of lower PTSD symptoms following trauma (Brewin, Andrew, & Valentine, 2000).

## Compassionate Goals

Although research attests to the buffering role of social support, most studies have focused on the benefits of receiving social support without specifying or testing how individuals may elicit it. However, recent research suggests that adopting compassionate goals, characterized by actively striving to support and help others during social interactions, may play a role in creating social support (Crocker & Canevello, 2012; Crocker, Olivier, & Nuer, 2009). Compassionate goals involve having compassion for others' mistakes and weaknesses, providing support, being constructive in one's comments, and avoiding being selfish or self-centered; these processes may interpersonally invite social support and intrapersonally shift one's social perceptions. For instance, college students who regularly pursued high compassionate goals prospectively experienced increases in their perceptions of available social support over time as

well as in actual support provided by roommates (Crocker & Canevello, 2008). Furthermore, compassionate goals have predicted higher belief in cooperation (Canevello & Crocker, 2015; Crocker & Canevello, 2008; Erickson et al., 2018)—a potential antidote to the expectably negative social perceptions one might have about the social world after a mass shooting.

Compassionate goals have been shown to predict lower symptoms of distress as well, suggesting potential relevance to PTSD symptoms. They predicted decreased anxiety and dysphoria over time in college students, in part through lagged increases in social support processes, and these associations were not explained by other risk factors (Crocker, Canevello, Breines, & Flynn, 2010). Moreover, in clinically-depressed or anxious adults, compassionate goals in daily life predicted not only higher daily perceptions of others as supportive, but also lower anxiety and depression symptoms (Erickson et al., 2018). Relevant to biological stress responses during and after traumas, experimentally coaching participants to adopt compassionate goals during a social stress task dampened hypothalamic-pituitary-adrenal (HPA) responses and caused higher prosocial behavior, relative to other coping strategies (Abelson et al., 2014; Erickson et al., 2017), suggesting causal influences on social processes and stress responses. Therefore, these results imply that compassionate goals might predict higher social support and lower PTSD symptoms after a trauma. Although these goals have been shown to predict posttraumatic growth in a trauma context (Tingey, McGuire, Stebbins, & Erickson, 2017), no studies have examined their relevance to social support and PTSD symptoms after trauma.

**Trauma Proximity**
Increased trauma exposure intensity has been linked with more negative PTSD trajectories (Orcutt, Bonanno, Hannah, & Miron, 2014; Pine, Costello, & Masten, 2005). One way to conceptualize the severity or intensity of trauma exposure intensity is to assess physical and emotional proximity to the event (Hughes et al., 2011; Vieselmeyer, Holguin, & Mezulis, 2017). Physical proximity reflects the physical distance from the traumatic event (e.g., being at ground zero of an attack) and emotional proximity refers to the individual's closeness to the victim or perpetrator. Both types of proximity to trauma increase risk for negative psychological outcomes (Lowe & Galea, 2017), and are distinct from symptoms experienced (DSM-5; American Psychiatric Association, 2013). If individuals do not feel personally impacted by a trauma, there may be no need to cope by compassionate goals; in contrast, those at closest physical and emotional proximity to a trauma are most at risk for PTSD symptoms and therefore may be most apt to benefit from pursuing compassionate goals. Thus, indirect effects of compassionate goals on PTSD via social support may be stronger for those with the greatest proximity to trauma.
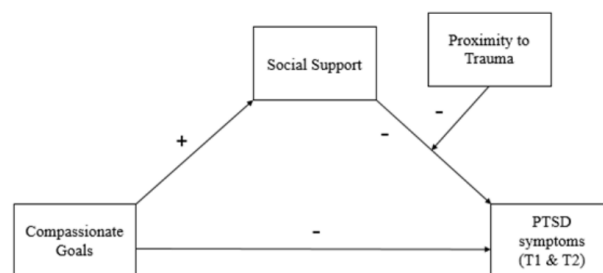


*Figure 1.* Hypothesized moderated mediation model with compassionate goals indirectly predicting lower PTSD symptoms at Time 1 and 2 via higher social support, and with this indirect effect stronger for those with greater trauma proximity. Time 1 is four months post-trauma; Time 2 is eight months posttrauma.

**Present Study**

The aim of this study was to test whether compassionate goals would predict lower PTSD symptoms via higher social support, following a traumatic mass shooting at a private university, as well as whether this effect would be strongest for participants with highest trauma proximity (see Figure 1). Specifically, we expected that compassionate goals would predict higher social support (H1), and social support would predict lower PTSD symptoms (H2). We also expected that proximity to trauma would predict higher PTSD symptoms (H3) but would amplify the effects of social support on PTSD symptoms (H4), consistent with past evidence of social support's buffering effects. Lastly, we hypothesized a moderated mediation (H5) such that the compassionate goals would indirectly predict lower PTSD symptoms via social support (given previous findings of indirect effects of compassionate goals on anxiety/depression symptoms via social support processes; Crocker et al., 2010), but with this indirect effect expected to be stronger for individuals with higher proximity to trauma. This expectation was based on the premise that those most impacted by this interpersonal-communal trauma might benefit most from striving to help others (compassionate goals) and concomitant social support.

We expected these relationships in several sets of analyses. First, we tested our predictions in concurrent analyses at Time 1 (four months post-shooting). Second, because posttraumatic symptoms often follow a declining course during the six months after a trauma but may linger for some individuals (Santiago et al., 2013), we tested our model predicting PTSD symptoms at Time 2 (eight months post-shooting) to examine whether goals might prospectively predict subsequent symptoms. Lastly, we tested whether goals at Time 1 predicted lagged residual decrease in symptoms at Time 2, to determine whether goals might predict not only subsequent levels of symptoms but also change in symptoms.

**Method**

**Participants And Procedure**

On June 5, 2014, a young man unaffiliated with a private university walked onto campus during school hours with a shotgun. He shot at several students outside and inside of a classroom building, resulting in a campus-wide lockdown in which all students, faculty, and staff were notified of a gunman on campus (via alarms, text messages, and email) without knowing the exact location. One student was killed at the scene, two were critically injured, and one received minor injuries. While the gunman stopped to reload his shotgun, a heroic student working as a safety monitor pepper-sprayed and tackled him to the ground, holding him down until police arrived. Other students and faculty rushed to help contain him. Students, staff, and faculty remained barricaded until the lockdown ended. Following this event, the university provided walk-in crisis counseling at a triage center for students, faculty, and staff to seek services, support, and outside referrals.

During the shooting, there were 3,197 undergraduate students, 870 graduate students, 339 faculty, and 455 staff enrolled or employed. Data were collected at two time points: four months (Time 1) and eight months (Time 2) post-trauma. Respondents included 369 participants (75% female; M age = 27.26, SD = 12.61, range 18–69) at Time 1. Of those, 83 participants completed Time 2 measures (79% female; M age = 28.20 SD = 12.98, range 18–64). The majority of the participants were on campus during the lockdown (n = 302). The sample consisted of graduate (Time 1: 4%; Time 2: 7%) and undergraduate students (68%; 66%), faculty (10%; 5%), and staff (17%; 23%). Participants identified as Caucasian (84%; 87%), Asian American (10%; 7%), African American (2%; 4%), and the remaining (3%; 1%) were Native American, Pacific

Islander, and mutiracial (5%/11% also reported Hispanic/Latinx ethnicity). Despite a much smaller sample for Time 2, McNemar tests to compare dependent proportions suggested that Time 1 and Time 2 samples did not significantly differ in gender (p = .38), racial majority/minority status (p = .21), and student versus faculty/staff status (p = .10).

Participants were recruited via emails, which contained a link to a consent form and surveys on an online survey tool (Qualtrics). At Time 1, to cue concrete memories from the period of the shooting, participants were prompted to describe in a sentence or two their whereabouts and experience during the shooting. Next, they completed measures inquiring about their goals and social support following the shooting. PTSD symptoms were assessed at both Time 1 and Time 2. The surveys took approximately 15 minutes to complete at each administration (other measures not relevant to this study were assessed). Participants who completed the survey were entered into a drawing to receive one of ten $50 gift cards. All procedures were approved by the university's IRB. Other data from this study are reported elsewhere (Tingey, McGuire, Stebbins, & Erickson, 2017; Vieselmeyer, Holguin, & Mezulis, 2017).

## Measures
### Compassionate Goals (Predictor)
The compassionate goals items (Crocker & Canevello, 2008) assessed wanting or trying to help and support others during social interactions. We modified the time frame to assess perceptions of pursuing these goals in relationships with others in the university community during the two weeks following the shooting. The mean of seven items on a 5-point Likert scale assessed both approach (e.g., have compassion for others' mistakes and weaknesses) and avoidance goals (e.g., avoid being selfish or self-centered), ranging from 0 (not at all) to 4 (extremely). All items have been shown to load on the same factor, and responses demonstrated reliability and construct validity (Crocker & Canevello, 2008). Responses to these items were internally consistent in our study (α = .90).
### Social Support (Mediator)
We utilized 18 of the 25 items from the Provisions of Social Relations Scale (Turner & Marino, 1994), a measure of perceived social support. For the purpose of this study, items were included if relevant to the largely student population our sample contained (e.g., support from friends, family, and faculty/staff). Participants rated social support during the 4 weeks following the shooting on a 5-point Likert scale from 1 (very much like my experience) to 5 (not applicable to me). Sample items include "I felt that my friends really cared about me" and "when I was with my family I felt completely able to relax and be myself." After reverse scoring and summing items, higher scores indicate higher social support (range: 18 to 90). The original measure has demonstrated construct validity (Turner, Frankel, & Levin, 1983) and responses were internally consistent in our study (α = .94).
### Posttraumatic Stress Symptoms (Outcome)
The PTSD Checklist for DSM-5-Civilian (PCL-5; Weathers et al., 2013) is a 20-item selfreport measure of PTSD symptoms in the past month. Respondents rated symptoms on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely). After summation of items, higher scores indicate greater symptom severity, with total scores ranging from 0 to 80. A meta-analysis including 51 studies with clinical and nonclinical samples reported a mean score of 25.28 with a standard deviation of 10.08 (Bressler, Erford, & Dean, 2018). The PCL-5 was created to map onto the PTSD symptom clusters in the DSM-5, and has demonstrated convergent validity with

established measures of PTSD and test-retest reliability (Ruggiero, Del Ben, Scotti, & Rabalais, 2003). A score of 33 is recommended as the optimal cutoff suggesting possible PTSD according to DSM-5 criteria (Wortmann et al., 2016), although lower cutoffs can be used for screening purposes (Weathers et al., 2014).

Although average PCL-5 scores at Time 1 ($M = 14.32$; see Table 1) fell well below clinical levels, participants varied substantially in their symptom level ($SD = 14.02$). Approximately 12.5% of the sample scored above the threshold (33), suggesting that a substantial number of participants remained at risk for clinical PTSD levels even four months after the trauma. Eight months post-trauma (Time 2), this number fell to 4.7% ($M = 10.36$, $SD = 13.50$), suggesting variability over time in the number of participants at elevated risk. Responses were internally consistent in past (e.g., Wilkins, Lang, & Norman, 2011) and present studies ($\alpha = .95$).

**TABLE 1. Bivariate Correlations and Descriptive Statistics for Main Study Variables (N = 369)**

| Variable | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. Compassionate goals | – | | | | | |
| 2. Social support | .34*** | – | | | | |
| 3. PTSD symptoms (T1) | .07 | −.19*** | – | | | |
| 4. PTSD symptoms (T2) | .02 | −.27*** | .74*** | – | | |
| 5. Trauma proximity | .09 | −.07 | .34*** | .33*** | – | |
| 6. Trauma history | .03 | −.11* | .09 | .09 | −.07 | – |
| *M* | 3.09 | 70.49 | 14.32 | 10.36 | 1.93 | 1.60 |
| *SD* | 0.70 | 14.03 | 14.02 | 13.50 | 1.07 | 1.71 |

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

### Trauma Proximity (Moderator)

Items were adapted from Hughes et al. (2011) to measure physical and emotional proximity to the trauma. Physical and emotional proximity were each measured on a scale of 0–3 then summed to attain a total score of trauma proximity. For physical proximity, participants were asked "Where were you at the time of the shooting on June 5, 2014?" (0 = off campus and not in Seattle, 1 = off campus and in Seattle, 2 = on campus but not in the building where the shooting occurred, and 3 = in the building). Emotional proximity was assessed as respondents' relationship to the victim(s) or shooter (0 = I did not know the victim(s), 1 = Acquaintance, 2 = Friend, 3 = Very close to me). Total scores ranged from 0 to 6, with higher scores indicating greater physical or emotional proximity to the traumatic event. For this sample, physical proximity scores were 0 = 10%, 1 = 26%, 2 = 58%, 3 = 6% at Time 1, and 11%, 29%, 53%, and 7%, respectively, at Time 2. Emotional proximity scores were 0 = 75%, 1 = 16%, 2 = 6%, 3 = 1% at Time 1 (i.e., 23% of the participants knew the victims as at least an acquaintance); 77%, 13%, 7%, and 3%, respectively, at Time 2. No participants reported personally knowing the shooter. Thus, a considerable portion of the sample (64%) was on the relatively small campus

during the shooting and/or knew the victim(s) (23%), suggesting substantial trauma proximity. The variability in trauma proximity also made it appropriate to test it as a continuous moderator.[1]

***Trauma History (Covariate)***

The Brief Trauma Questionnaire (BTQ; Schnurr, Spiro, Vielhauer, Findler, & Hamblen, 2002; Schnurr, Vielhauer, Weather, & Findler, 1999) is a 10-item self report measure of prior history of trauma exposure. Although other measures provide greater thoroughness, we incorporated this measure as a brief screener and because it explicitly follows the DSM-5 criterion A for exposure to trauma. Eight items assessed directly experiencing a traumatic event (e.g., "Have you ever been in a major natural or technological disaster?"; "Have you ever been attacked, beaten, or mugged by anyone including friends, family members, or strangers?"), and two assessed indirect trauma exposure (e.g., "Has a close family member or friend died violently?"). Endorsement of traumatic experiences included war zone or war-related casualties, serious accidents (car or other), natural/technological disasters, life-threatening illness, physical abuse/assault, sexual abuse/assault, situations with actual or threatened death/serious injury, and witnessing or learning of a close family member that experienced a traumatic event (e.g., actual threatened serious injury or death). Items were supplemented with examples to aid participant understanding. Items were rated dichotomously (0 = no, 1 = yes). Total scores range from 0 to 10 with higher scores indicating greater history of trauma exposure. The BTQ was used as a covariate to control for prior trauma history. Due to the nature of event measures, in which experiencing one event (or trauma) is independent from experiencing the other, internal consistency does not apply (Norris & Hamblen, 2004). Interrater reliability for the BTQ for meeting criterion A compared to a trauma interview was good, with Kappa coefficients of .74–1.00 for eight items and .60–.69 for two (Schnurr et al., 2002).

## Results

**Preliminary Analysis**

Composite scores for study variables showed no evidence of skewness or kurtosis. The skew and kurtosis for total trauma proximity were in acceptable ranges (<1). The emotional proximity variable was somewhat positively skewed, but the pattern of results for our hypothesis tests was similar for total proximity and when emotional proximity was excluded, so we retained the total proximity variable to provide a broader measure of trauma proximity. Descriptive statistics and a correlation matrix for study variables are provided in Table 1. The data were 90% complete for Time 1 and 94% complete for Time 2. The pattern of results was similar with and without multiple imputation, so we report the results without imputation.

**Primary Analyses**

We conducted analyses with SPSS 25 using the PROCESS macro (Hayes, 2013). We calculated direct effects of compassionate goals on social support, as well as the effects of social support, trauma proximity, and the support*proximity interaction on PTSD symptoms. Next, we calculated bias-corrected bootstrap (95%) confidence intervals to test significance of the indirect effect of compassionate goals on PTSD symptoms via social support (intervals not containing

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[1] Given that the trauma proximity variable may not reflect a true interval scale, we also repeated the analyses with a categorical trauma proximity variable (on campus versus not on campus at the time of the shooting). We note that the same pattern of results was evident with the categorical moderator.

zero indicate significance at p < .05). Lastly, to test moderated mediation, we calculated an index of moderated mediation (Hayes, 2015) and conditional indirect effects, examining the significance of the indirect effect at high (1 SD above the sample mean), average, and low (1 SD below the mean) levels of trauma proximity. Given higher rates of PTSD symptoms in women (Olff, Langeland, Draijer, & Gersons, 2007; Suomalainen et al., 2011), and women's greater contact with negative forms of social support (Andrews, Brewin, & Rose, 2003), we specified gender as a covariate. We also controlled for prior trauma history in an effort to isolate the effects of the shooting. Predictors (except gender) were grand-mean centered.

### Concurrent Effects

For Time 1, as expected (H1), higher compassionate goals pursued in social interactions in the wake of the shooting predicted higher perceived social support, even after controlling for the potentially negative effects of female gender and negative effects of trauma history (see Table 2 for parameter estimates). Predictors accounted for 17% of the variance in social support. As expected, higher perceived social support predicted lower PTSD symptoms (H2), whereas higher trauma proximity predicted higher PTSD symptoms (H3). The expected interaction was present (H4) such that the negative relationship between social support and PTSD symptoms was stronger for individuals with higher (+1 SD) proximity (B = −0.37, SE = 0.07, p < .001, bootstrapped 95% CI [−0.51, −0.22]), but non-significant for those at low (−1 SD) proximity (B = −0.07, SE = 0.07, p = .309, 95% CI [−0.20, 0.06]). These effects were present even despite controlling for female status and prior trauma, cumulatively accounting for 20% of the variance in PTSD scores.

**TABLE 2. Parameter Estimates for Multiple Regression and Conditional Indirect Effect Models (Time 1)**

| | B | SE | p | 95% CI Lower | 95% CI Upper |
|---|---|---|---|---|---|
| **Predicting Social Support** | | | | | |
| Female Gender | 4.14 | 1.57 | **.009** | **1.05** | **7.23** |
| Trauma History | −0.92 | 0.39 | **.020** | **−1.70** | **−0.15** |
| Compassionate Goals | 7.03 | 0.98 | **< .001** | **5.12** | **8.95** |
| **Predicting PTSD Symptoms (T1)** | | | | | |
| Female Gender | 6.18 | 1.59 | **< .001** | **3.05** | **9.32** |
| Trauma History | 0.76 | 0.40 | .059 | −0.03 | 1.54 |
| Compassionate Goals | 1.01 | 1.06 | .344 | −1.08 | 3.09 |
| Social Support | -0.22 | 0.05 | **< .001** | **−0.32** | **−0.11** |
| Trauma Proximity | 4.04 | 0.63 | **< .001** | **2.80** | **5.28** |
| Social Support x Proximity | -0.14 | 0.04 | **.001** | **−0.22** | **−0.05** |
| **Conditional Indirect Effects** | | | | | |
| Low (−1 SD) Proximity (−1.09) | −0.48 | 0.44 | | −1.41 | 0.34 |
| Average Proximity (.00) | −1.53 | 0.48 | | **−2.54** | **−0.69** |
| High (+1 SD) Proximity (1.09) | −2.59 | 0.69 | | **−4.06** | **−1.34** |

Note. SE = standard error. CI = confidence interval. Bolded font indicates significance at p < .05, two-tailed. The significance of the indirect effects was calculated with bias-corrected 95% confidence intervals bootstrap analysis.

Lastly for Time 1, we computed an index of moderated mediation (Hayes, 2015), testing our hypothesis (H5) that the indirect effect of compassionate goals on concurrent PTSD symptoms would depend on trauma proximity (index = −0.88, SE = 0.28, bootstrapped 95% CI [−1.47, -0.37]). As hypothesized, whereas compassionate goals had a significant negative indirect effect on PTSD symptoms at average levels of proximity, this indirect effect was more strongly negative and statistically significant at high (+1 SD) levels of trauma proximity, but lost significance at low (−1 SD) levels of proximity (see Table 2). Thus, the higher the level of trauma proximity reported by participants, the more that striving to help and support others predicted lower PTSD symptoms through perceived social support.

### Prospective Effects

We repeated the same analyses with PTSD symptoms at Time 2 (8 months post-trauma) as the outcome. Prior trauma history did not prospectively predict PTSD symptoms (although gender did), so we dropped trauma history from the model to conserve power, given the smaller sample size for Time 2. As expected, higher compassionate goals predicted social support (H1), although female gender did not (see Table 3 for estimates). These predictors accounted for 12% of the variance in social support.

**TABLE 3. Parameter Estimates for Multiple Regression and Conditional Indirect Effect Models (Time 2)**

|  | B | SE | p | 95% CI Lower | 95% CI Upper |
|---|---|---|---|---|---|
| **Predicting Social Support** |  |  |  |  |  |
| Female Gender | 2.18 | 2.96 | .465 | −3.71 | 8.07 |
| Compassionate Goals | 6.82 | 2.13 | **.002** | **2.59** | **11.05** |
| **Predicting PTSD Symptoms (T2)** |  |  |  |  |  |
| Female Gender | 6.22 | 2.75 | **.027** | **0.74** | **11.70** |
| Compassionate Goals | 0.07 | 2.06 | .975 | −4.03 | 4.17 |
| Social Support | −0.12 | 0.10 | .257 | −0.32 | 0.09 |
| Trauma Proximity | 1.68 | 1.07 | .120 | −0.45 | 3.81 |
| Social Support x Proximity | −0.16 | 0.09 | .079 | −0.35 | 0.02 |
| **Conditional Indirect Effects** |  |  |  |  |  |
| Low (−1 SD) Proximity (−1.15) | 0.49 | 1.10 |  | −1.81 | 2.69 |
| Average Proximity (.00) | −0.80 | 0.78 |  | −2.78 | 0.30 |
| High (+1 SD) Proximity (1.15) | −2.08 | 1.25 |  | **−5.04** | **−0.27** |

Note. SE = standard error. CI = confidence interval. Bolded font indicates significance at p <.05, two-tailed. The significance of the indirect effects was calculated with bias-corrected 95% confidence intervals bootstrap analysis.

For PTSD symptoms, only female gender was a significant predictor whereas compassionate goals, social support, and trauma proximity were not (contrary to H2, H3, H4). However, because the interaction between social support and trauma proximity (H4) was marginally significant (p = .079), we probed the interaction in order to examine if the pattern was consistent with that observed in Time 1. The relationship between social support and PTSD

symptoms was more negative when individuals experienced greater (+1 SD) trauma proximity (B = −0.31, SE = 0.15, p = .043, bootstrapped 95% CI [−0.60, −0.01]), but was non-significant for those at low (−1 SD) proximity (B = 0.07, SE = 0.15, p = .493, 95% CI [−0.22, 0.36]), consistent with H4. These effects explained 13% of the variance in PTSD scores.

For Time 2, the index of moderated mediation was significant, supporting our hypothesis (H5) that the indirect effect of compassionate goals on prospective PTSD symptoms would depend on trauma proximity levels (index = −1.12, SE = 0.77, bootstrapped 95% CI [−3.16, −0.03]). As expected, the indirect effect of compassionate goals prospectively predicting lower PTSD symptoms eight months post-trauma was more strongly negative and significant at high (+1 SD) trauma proximity levels, but lost significance at low (−1 SD) levels of proximity. Therefore, striving to help and support others appeared to be important for predicting lower PTSD symptoms in individuals with high trauma proximity, both concurrently and prospectively.

Lastly, we examined whether our model would prospectively predict not only subsequent levels of symptoms, but residual decrease in symptoms (i.e., controlling for Time 1 PTSD symptoms). A paired-samples t-test revealed a significant difference between Time 1 (M = 13.40, SD = 14.62) and Time 2 (M = 9.71, SD = 11.18) PTSD scores, t(81) = 3.69, p < .001, suggesting the presence of change in symptoms over time. Unsurprisingly, Time 1 PTSD levels predicted higher symptoms at Time 2 (B = 0.52, SE = 0.07, p < .001). Contrary to hypotheses, after controlling for Time 1 symptoms, neither trauma proximity (B = 0.28, SE = 1.40, 95% CI [−2.51, 3.10]), compassionate goals (B = −0.31, SE = 1.63, 95% CI [−3.57, 2.94]), social support (B = 0.05, SE = 0.08, 95% CI [−0.11, 0.22]), nor the compassionate goals*trauma proximity interaction (B = −0.12, SE = 0.11, 95%CI [−0.34, 0.11]) predicted residual change in PTSD symptoms. Moreover, the index of moderated mediation was not significant (index = −0.80, SE = 0.79, 95% CI [−2.64, 0.52]). Thus, although compassionate goals indirectly predicted lower downstream PTSD symptoms for high-proximity individuals, no variables predicted residual change in PTSD symptoms from 4 to 8 months.

**Discussion**

The present study investigated the relevance of compassionate goals to PTSD symptoms after a traumatic university mass shooting. We hypothesized that compassionate goals would predict lower PTSD symptoms concurrently and prospectively, through higher social support, and that higher trauma proximity would amplify this relationship. Our results generally supported expectations, though the effects were more consistent concurrently than prospectively.

First, supporting H1, endorsing striving to help others (compassionate goals) during the two weeks after the trauma predicted concurrent perceptions that social support was available at that time. These results are consistent with past findings that compassionate goals prospectively predicted perceived and actual social support in college students (Crocker & Canevello, 2008) and predicted same-day perceived social support and lagged next-day increases in belief in cooperation (Erickson et al., 2018); however, our results extend such findings into the novel context of the aftermath of trauma. Additionally, perceived social support predicted lower concurrent levels of PTSD symptoms (supporting H2), and also interacted with trauma proximity, supporting H4. The inverse relationship between social support and symptoms was higher for individuals endorsing higher proximity. Such effects are consistent with past findings of robust protective effects of social support for PTSD (e.g., Brewin et al., 2000; Warner et al., 2015). Moreover, these effects were present even with gender and trauma history controlled, although symptoms may be more indicative of cumulative trauma in campus shootings than

history of exposure (Boykin, Dunn, & Orcutt, 2017). However, in models testing prospective prediction of PTSD symptoms eight months later, the interaction of social support and trauma proximity was only marginally significant when not controlling for Time 1 PTSD, and non-significant with that covariate included. Similar to the benefit of knowing that standardized test scores predict subsequent academic performance without controlling for baseline academic scores, we think it is of interest that compassionate goals marginally indirectly predicted lower PTSD symptoms four months later for high-trauma-proximity participants, even without controlling for Time 1 symptoms. However, the prospective effects should be taken as suggestive rather than significant. Given that Time 2 results were in the expected direction and mirrored patterns from Time 1, it is possible that a larger sample size would have increased power to detect both prospective effects and residual change in PTSD symptoms. Further studies with larger samples and additional time points are warranted.

Consistent with previous findings on social support mediating the effects of compassionate goals on distress symptoms (Crocker et al., 2010), we detected the expected indirect effect of compassionate goals on concurrent lower PTSD symptoms through higher social support (i.e., at average levels of trauma proximity). Our study thus extends the goals-support-symptoms pathway to the novel context of a campus community that experienced a significant mass trauma. Social support was also associated with improved longitudinal depression and anxiety outcomes in a campus shooting (Mancini, Littleton, & Grills, 2016). Compassionate goals predicted PTSD symptoms only indirectly through social support, in contrast to studies in which compassionate goals directly predicted lower anxiety and dysphoria in students (Crocker et al., 2010) and clinically anxious/depressed patients (Erickson et al., 2018). It may be the nature of the external stressor of a campus shooting, as well as PTSD symptoms rather than other forms of distress, that made direct effects of compassionate goals on PTSD symptoms less likely. Our results are consistent with a model in which compassionate goals may help individuals cope with a trauma insofar as they facilitate the availability of perceived or actual social support, which may be especially relevant to school shootings in which the potential for higher support readily exists. For example, individuals who strive to help and support others may not only strengthen the support provided on campus, but also increase their perception of the support provided through campus resources, support groups, and social networks. To our knowledge, only one other study (i.e., Shakespeare-Finch, Rees, & Armstrong, 2015) examined effects of giving support (i.e., emotional and instrumental) on PTSD symptoms in the context of trauma, finding no association.

In addition, the moderated mediation findings provided evidence consistent with the hypothesis that compassionate goals buffered against PTSD symptoms, particularly for those with greater trauma proximity. Supporting H4, higher trauma proximity (i.e., being closer to ground zero and/or personally knowing victims) predicted higher PTSD symptoms, as would be expected (Lowe & Galea, 2017; May & Wisco, 2016). However, the indirect negative effect of compassionate goals on PTSD symptoms was highest for those with greater proximity to the trauma, both concurrently and prospectively, supporting H5. This implies that for those who are less physically or emotionally close to the victim(s) or perpetrator, and presumably less impacted by a traumatic event, the buffering effects of available social support and attempts to elicit it via supporting others (compassionate goals) may be less important. In our sample, roughly a quarter of the participants were acquaintances or friends of the victims, and over half were on campus during the shooting (6% were in the building). For individuals such as these who were closest to

the trauma, having or cultivating higher compassionate goals might provide a way to create social support and thereby reduce risk of PTSD symptoms.

Our results do not permit causal inference, but prospective effects in the present study and others (e.g., Crocker et al., 2010), as well as an experimental study showing that brief coaching increased self- and observer-rated compassionate goals caused affiliative behavior and lower HPA responses during a social 294 STEBBINS stressor (Abelson et al., 2014), warrant further research into compassionate goal interventions. Cultivating such goals toward others may be particularly important and protective for individuals at high levels of proximity to trauma, and future studies should examine this possibility directly in order to inform prevention and treatment of PTSD symptoms.

**Limitations**

Several limitations warrant mentioning. First, our sample size at Time 2 limited our statistical power for some analyses. No variables predicted Time 2 PTSD scores when the shared variance with Time 1 PTSD symptoms was accounted for. Given this strong autocorrelation and small Time 2 sample, our study was underpowered to detect hypothesized effects. Therefore, the ability of compassionate goals to prospectively predict decreases in PTSD symptoms is promising but remains a goal for future research to clarify. In line with a limited ability to draw conclusions, it is possible that social support preceded compassionate goals. Future studies should investigate these processes longitudinally with a larger sample at multiple time points to track temporal patterns, as well as manipulate compassionate goals to determine downstream buffering effects.

Second, we relied on retrospective accounts of compassionate goals and social support. Although the results fit well with expectations and research that used less retrospective methods (e.g., diary studies; Crocker & Canevello, 2012), memory biases are possible. Posttraumatic symptoms were less vulnerable to recall bias, given that participants reported current/recent symptoms at both time points.

Third, participants' average PTSD symptoms were relatively low, limiting the relevance of our findings to clinical PTSD. However, we note that we assessed symptoms first at four months after the shooting, by which time we would expect symptoms to have abated substantially. A systematic review showed that following a direct experience of intentionally-caused traumas (as opposed to nonintentional, e.g., natural disaster), the mean PTSD prevalence when grouped into 1, 3, and 6 months posttrauma was approximately 24%, 19%, and 18%, respectively, indicating an initial decline in symptoms within the first 6 months (Santiago et al., 2013). In our study, which included individuals ranging from being off-campus to those in the building during the shooting, approximately 13% and 5% were at clinical PTSD levels at 4 and 8 months posttrauma. Our 13% estimate at 4 months is slightly below the 3- and 6-month estimates in Santiago et al. (2013), which involved directly experiencing the trauma and therefore may support the idea that physical proximity increases risk for developing PTSD. Nonetheless, 64% of the sample was present at the relatively small and close-knit campus during the shooting, and 23% knew the victim(s), suggesting substantial trauma proximity. Nonetheless, the relevance of compassionate goals to more highly traumatized samples should be investigated further. Additionally, although supplemental analyses found similar results when we treated our trauma proximity variable as categorical rather than dimensional, we note that trauma proximity may not have fully represented an interval scale variable.

Lastly, the context of our sample and trauma type may limit generalizability. Our sample was predominantly white, and many participants may have possessed a religious identity involving intrinsically valuing compassionate behavior due to a higher prevalence of Christian identification on this campus and valuing service. Compassionate goals may behave differently for individuals whose values are less closely aligned with compassionate goals. Although compassionate goals predicted relevant outcomes in several cultures (Kuncewicz, Niiya, & Crocker, 2015), future research into their buffering role against stress and trauma should incorporate more religiously/spiritually and culturally diverse samples for enhanced generalizability. Further limiting generalizability is the type of trauma. Although interpersonal trauma may increase risk for PTSD, another moderating factor may be the communal nature of the trauma. For example, traumas experienced in community even when non-interpersonal (e.g., natural disaster) may result in a sense of shared community in which all were victimized, resulting in higher social support elicited and provided. On the other hand, the effect of compassionate goals may not generalize to interpersonal traumas where the victim feels isolated or stigmatized (e.g., rape). School shootings are not only interpersonal but also shared, communal traumas, which may have led to the protective effects we found. Therefore, research should elucidate the moderating roles of communal versus isolated traumas and interpersonal versus non-interpersonal traumas on the effects of compassionate goals for buffering PTSD.

**Conclusion**

The present study adds to the literature on compassionate goals as the first known study to examine these variables in the context of a large-scale, traumatic event. Moreover, many studies have demonstrated the relevance of social support to managing trauma, but few have elucidated processes by which individuals may build their own social support and buffer against symptoms. Our findings are consistent with a model in which compassionate goals may shape PTSD symptoms via social support, and that this process may be especially important for those with greater proximity to the trauma. We hope that future studies will elucidate the potential role of compassionate goals in reducing the risk of PTSD symptoms in at-risk individuals.

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