# Social adjustment in New Zealand and Philippine emergency responders: A test of main and moderating effects of received social support

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## Abstract

*This study examined the influence of received social support on the social adjustment of emergency responders. Emergency responders (N = 223) from New Zealand and the Philippines answered an online questionnaire measuring demographic variables, duty-related traumatic exposure, social support received from different sources, and social adjustment (i.e., social and occupational impairment, posttraumatic growth in interpersonal relationships). Results of hierarchical regression analyses showed that a greater amount of received social support from supervisors and a greater amount of received emotional support were both associated with lower levels of social and occupational impairment. Additionally, higher amounts of support received from family and supervisors, as well as from all sources combined, predicted higher posttraumatic growth scores in the domain of interpersonal relationships. Received social support was not observed to moderate the effects of traumatic exposure on social adjustment. Findings were generally consistent with the main effect model of social support and underscored the differential effects of the various components of received social support on social adjustment dimensions.*

**Keywords:** *social adjustment, posttraumatic growth, social and occupational impairment, received social support, emergency responders*

The psychological consequences of being exposed to emergencies are widely documented in the literature (Bonanno, Brewin, Kaniasty, & La Greca, 2010; Norris et al., 2002). These adverse effects of exposure to potentially traumatic events (PTE) are observed both at the level of psychological symptomatology and the level of interpersonal domains. Some emergencies may disturb social structures (van Ommeren, Saxena, & Saraceno, 2005) and permeate the different layers of the social fabric (Fritz, 1961). This disturbance may include the disruption of the individuals' social adjustment, which traverses both psychological and sociological domains. Social adjustment refers to the performance of social roles, such as spousal functions, occupational roles, and satisfaction with social relationships (Larson, 1993). Norris et al. (2002) summarised extensive documentation of how these critical events affect the psychological and social functioning of victims/survivors; however, the same cannot be said about potentially traumatic experiences of emergency responders (Carmassi et al., 2016). Emergency responders are generally tasked to protect and preserve life, property, and the environment during and in the aftermath of critical events (Prati & Pietrantoni, 2010b). Although social adjustment studies on emergency responders are few (Carmassi et al., 2016), these studies suggest that having social support is positively associated with healthy social adjustment following exposure to traumatic events. Healthy social adjustment may be in the form of posttraumatic growth (PTG), which is the experience of positive change as a result of exposure to hardships such as PTEs (Tedeschi & Calhoun, 2004).

Social support has been consistently found to be related to positive psychological outcomes following exposure to emergencies and other traumatic events (Bonanno et al., 2010; Hobfoll et al., 2007; Kaniasty, de Terte, Guilaran, & Bennett, 2020). This umbrella

construct refers to social interactions that provide actual assistance and embed people in a network of social relationships that are perceived to be loving and caring (Hobfoll & Stokes, 1988). Highlighted in this definition are three distinctive facets (Kaniasty & Norris, 2009): *received social support*, referring to the actual support received; *perceived social support*, referring to the appraisal of availability and quality of support; and *social embeddedness*, referring to integration in a supportive network.

Originally, social support was expected to have stress-buffering effects (Cohen & Wills, 1985) as a resource that only benefits health under stressful conditions. As a stress buffer, it was found to dampen the negative effects of traumatic exposure on psychological outcomes. A key statistical indicator of buffering effects is when no difference in psychological distress is observed if social support level is high, while such difference is amplified in conditions where social support level is low (e.g., Pow, King, Stephenson, & DeLongis, 2017). Research on people in high-risk occupations, such as the military or fire service, showed that following exposure to work-related traumatic events, those with low social support were particularly vulnerable to posttraumatic stress disorder whereas those with more adequate levels of social support were shielded against harmful posttraumatic psychological reactions (de Terte & Stephens 2014; Kaspersen, Matthiesen, & Gunnar Götestam, 2003; Schwarzer, Bowler, & Cone, 2014). However, buffering effects were not always observed and the weight of evidence suggests that social support frequently contributes to psychological outcomes directly and independently of the level of exposure to stressors (Cohen, Gottlieb, & Underwood, 2000; Kawachi & Berkman, 2001; La Rocco & Jones, 1978).

Social support is usually associated with better adjustment after exposure to critical incidents (Hobfoll et al., 2007). However, this observation more often than not refers to the effect of perceived social support (Guner, Sevimli, Bulduk, & Orakci, 2014) or social support in general (Inoue, Funk, Wann, Yoshida, & Nakazawa, 2015). On the other hand, evidence for the ability of received social support to affect adjustment has been less consistent (Thoits, 2011). The received social support-positive outcome association is not always observed, which may be due to incompatibility between the stressor and the support received (Cutrona & Russell, 1990). This may manifest as a mismatch between the need of the recipient and the support provided in terms of quality, quantity, and form (Rini & Dunkel Schetter, 2010). The inconsistency of the effectiveness of received social support may also be attributed to the effects of other moderators, such as the source of received social support (French, Dumani, Allen, & Shockley, 2018). These factors are thought by researchers to influence the magnitude, or even the direction, of the effect of received social support on psychological outcomes.

Despite mixed findings about received social support, this facet is still thought to be more reflective of reality in terms of the level of social support (Haber, Cohen, & Baltes, 2007; Hobfoll, 2009). Received social support is usually measured by asking about the specific supportive behaviours received from others during a specific period of time. In contrast, perceived social support typically refers to peoples' appraisal of the ability and readiness of their interpersonal contacts to provide support. More importantly, in the aftermath of critical incidents, individuals and their social and professional networks mobilise actual social support to provide aid to those affected (e.g., Shang et al., 2019), which results in concrete intervention activities. Therefore, it is imperative to know the characteristics of received social support that contribute to positive social adjustment, including posttraumatic growth in interpersonal relationships and the absence of occupational impairment. Accordingly, the present study aimed to answer the following questions: (1) Does received social support predict social and occupational impairment (SOI) in emergency responders? (2) Does received social support predict posttraumatic growth in interpersonal relationships (PTG-IR) in emergency responders? (3) Does received social support moderate the association between duty-related traumatic exposure and SOI in emergency responders? and (4) Does received social support moderate the association between duty-related traumatic exposure and PTG-IR. Furthermore, this study tested the different effects of different sources (i.e., family, co-workers, supervisor) and types (i.e., emotional, tangible, informational) of support on social adjustment.

## Methods

### *Participants*

The study involved 223 emergency responders based in New Zealand (87%, *n* = 195) and in the Philippines (13%, *n* = 28) who were affiliated with emergency response organisations. Most participants were males

(77%, *n* = 171) and the mean age of the sample was 43.19 years (*SD* = 12.12). Sixty-eight percent identified themselves as New Zealanders of European ethnicity (*n* = 152), 13% identified as Asian (*n* = 29), and 10% considered themselves as New Zealanders of mixed or Māori ethnicities (*n* = 22). The remaining 9% reported their ethnic origin as Australia/Oceania or Europe/North America. The majority of the participants were affiliated with the fire service (70%, *n* = 157), followed by those working in the medical services (16%, *n* = 36), emergency/disaster management organisations (6%, *n* = 13), the police force (5%, *n* = 10), and in other emergency response groups (3%, *n* = 7).

### *Procedure*

Recruitment and data collection for this cross-sectional study were conducted for 7 months, beginning 1 May 2017. Participant recruitment was conducted primarily through social media platforms. Information about the study was also disseminated through communications within different emergency response organisations such as through announcements within the fire service. Due to this web-based data collection method, the response rate could not be computed. The completion rate (valid cases divided by the number of participants who gave consent) was 52%. *A priori* power analysis, $f^2$ =.15, $\alpha$ =.05, $\beta$ =.80, $k$ =10, suggested a minimum sample size of 118; the actual total sample size of 223 far exceeds that estimate. This power analysis treated the interaction term for the moderation analysis as one of the predictors, following the fixed effects model. The actual sample size ($N$ = 223) showed sensitivity to at least $f^2$ = .08 ($F_{crit}$ = 1.88).

### *Measures*

**Outcome variables.** Two dimensions of social adjustment were assessed: social and occupational impairment (SOI) and posttraumatic growth in interpersonal relationships (PTG-IR). The five-item Work and Social Adjustment Scale (WSAS; Mundt, Marks, Shear, & Greist, 2002) was used to measure social and occupational impairment and functioning. For this study, the items were anchored on "experiences at work": for example, "Because of my experiences at work, my ability to work is impaired". The items were answered using a nine-point scale (0 - 8), with a higher score indicating more severe impairment. The WSAS scale had a Cronbach's alpha of .88, above the threshold of .7 (Nunnaly, 1978).

The extent of positive interpersonal changes following exposure to traumatic job-related stressors was measured with the seven-item subscale from the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) labelled "Relating to Others" (Taku, Cann, Calhoun, & Tedeschi, 2008). Respondents answered these items (e.g., "I have a greater sense of closeness with others") using a six-point Likert-style rating system (0 = "I did not experience this as a result of my work;" 5 = "I experienced this change to a very

Table 1
*Frequency exposure to the different events in the LEC-5 that are duty-related, lifetime, and the duty-related event participants considered the worst*

| LEC-5 Event | Duty-related | | Lifetime | | Worst duty-related event | |
|---|---|---|---|---|---|---|
| | *n* | % | *n* | % | *n* | % |
| 1. Disaster caused by natural hazards | 193 | 86.55 | 144 | 64.57 | 42 | 18.83 |
| 2. Fire or explosion | 186 | 83.41 | 107 | 47.98 | 12 | 5.38 |
| 3. Transportation accident | 191 | 85.65 | 177 | 79.37 | 37 | 16.59 |
| 4. Serious accident at work, home, or during recreational activity | 157 | 70.40 | 107 | 47.98 | 3 | 1.35 |
| 5. Exposure to toxic substances | 154 | 69.06 | 38 | 17.04 | 2 | 0.90 |
| 6. Physical assault | 86 | 38.57 | 126 | 56.50 | 2 | 0.90 |
| 7. Assault with a weapon | 65 | 29.15 | 38 | 17.04 | 3 | 1.35 |
| 8. Sexual assault | 18 | 8.07 | 42 | 18.83 | 5 | 2.24 |
| 9. Other unwanted or uncomfortable sexual experience | 23 | 10.31 | 40 | 17.94 | 1 | 0.45 |
| 10. Combat or exposure to a war-zone | 8 | 3.59 | 27 | 12.11 | 1 | 0.45 |
| 11. Captivity | 7 | 3.14 | 2 | 0.008 | 0 | 0 |
| 12. Life-threatening illness or injury | 131 | 58.74 | 99 | 44.40 | 9 | 4.04 |
| 13. Severe human suffering | 80 | 35.87 | 37 | 16.59 | 7 | 3.14 |
| 14. Sudden violent death | 155 | 69.51 | 81 | 36.32 | 57 | 25.56 |
| 15. Sudden accidental death | 168 | 75.34 | 96 | 43.05 | 34 | 15.25 |
| 16. Serious injury, harm, or death you caused to someone else | 49 | 21.97 | 20 | 8.97 | 2 | 0.90 |

great degree as a result of my work"). This subscale had a Cronbach's alpha of .91.

**Predictor variables.** The study captured duty-related traumatic exposure (TE) using the Life Events Checklist for Diagnostic and Statistical Manual of Mental Disorders (DSM) fifth edition (LEC-5; Weathers et al., 2013). The measure lists traumatic events (16 specific events and one open-response item, see Table 1). For the purpose of the present research, the original scale delivery was modified. Participants indicated, in sequence, the events to which they have been exposed (1) in their lifetime (LEC-5 lifetime: "Which of these events were you exposed to outside of your work as an emergency/disaster responder?"), and (2) in their work as emergency responders (LEC-5 duty-related: "Which of these events were you exposed to as part of your work as an emergency/disaster responder?"). The LEC-5 lifetime index enumerated trauma exposure outside the participants' work in emergency response. The LEC-5 duty-related trauma exposure index was the main predictor variable in the study. The previous version of this instrument (based on DSM-IV) was reported to have an average kappa reliability coefficient of .61 and a test-retest reliability coefficient of .82, above the thresholds of .4 and .6, respectively (Gray, Litz, Hsu, & Lombardo, 2004).

Received social support was measured using the recipient version of the Berlin Social Support Scale (BSSS; Schwarzer & Schulz, 2000). The original agreement-disagreement continuum of the scale was modified in this study to reflect a frequency response continuum where 1 = "never" and 5 = "always". Receiving support from three sources was assessed, which included a close family member, co-workers, and immediate supervisor, each with 14 items such as "My close family member expressed concern over my condition". The total score of received social support was based on the average of family, co-workers, and supervisor support subscales. In addition, the BSSS items allowed for assessing three types of received social support for each source: emotional (9 items), informational (2 items), and tangible (3 items). Reliability coefficients for scores on all combinations of BSSS items in the present study were as follows: total received support (42 items, α = .95), family support (α = .94), peer support (α =.92), supervisor support (α = .94), emotional support (α = .92), instrumental support (α =.84), and informational support (α = .79).

Acknowledging the importance of a long research tradition of conceptualizing social support as appraisals of support availability, the present study also assessed perceived social support. Perceived social support was measured using the Interpersonal Support Evaluation List (ISEL-12; Cohen, Mermelstein, Karmarck, & Hoberman, 1985). This scale measures the perception of availability of support with statements such as "There is someone I can turn to for advice about handling problems with my family" and a four-point response scale where 1 is "definitely false" and 4 is "definitely true". Cronbach's alpha for the perceived social support scale in the current study was .88.

**Statistical control variables.** Statistical analyses controlled for the effects of gender, years of service, civil status, ethnicity, normative stressful events, and lifetime traumatic exposure (TE). Gender was coded "0" for male and "1" for female. Civil status was coded "1" for those with partners; otherwise, it was coded "0." Year of first entry to the profession was used as a proxy measure for the length of service in the emergency response sector. Participant ethnicity was coded "1" for those who identified themselves as New Zealanders of European decent, and "0" for those who identified with other ethnicities. Normative stressful life events such as moving/changing residence or a break up with a close friend, experienced in the past 12 months, were assessed with the Life Events List (LEL; Cohen, Tyrrell, & Smith 1991; Common Cold Project, n.d.).

### *Statistical Analyses*

The main and moderating effects of received social support on social adjustment of emergency responders were tested using hierarchical regression analyses. There are two outcome variables in the analyses: SOI and PTG-IR. These two outcome variables have the same set of predictors entered in the regression equation in a hierarchical fashion. All models included gender, age, civil status, and ethnicity. Model 2 added lifetime exposure to traumatic events and the number of normative stressful life events in the past 12 months. These general stressor-related measures were entered early in the model in order to isolate the effects of the emergency context trauma experiences. Hence, the LEC-5 duty-related trauma exposure was entered next, along with received social support, in Model 3. Model 4 included the interactions of these two variables. Finally, to assess the impact of received social support on the outcomes when perceived social support is accounted

for, the score of perceived social support was added in Model 5.

This hierarchy of analysis was performed for total received social support and the different sources and types of received social support. Regression analyses were also checked for multicollinearity using tolerance and variance inflation factors; no significant overlaps in variance explanation among predictors were found. All regression models were tested using SPSS Version 25. No outliers were found in the analyses, where casewise deletion (3 standard deviations) was implemented.

**Treatment of missing data.** Analysis of the missing data was performed by running missing values analysis (MVA). The missing data pattern was tested using Little's MCAR Chi-square through 400 iterations of the expectation-maximization (EM) algorithms, where no significant pattern was found. Missing data were treated using the multiple imputation-Markov chain Monte Carlo (MI-MCMC). To ensure the preservation of statistical power, five imputations were generated (Graham, Olchowski, & Gilreath, 2007). Imputation was performed at the scale level, and only cases with at least 95% completion were included in the dataset.

## Results

### *Correlations*

Means, standard deviations, and zero-order correlations between the study variables are shown in Tables 2 and 3. Neither lifetime TE nor duty-related TE were correlated with social and occupational impairment (SOI). However, duty-related TE was negatively correlated with posttraumatic growth in interpersonal relationships (PTG-IR). Whereas lifetime TE was not correlated with received nor perceived social support, duty-related TE was negatively correlated with total received social support and was negatively correlated with received social support variables, except received informational support. Furthermore, with the exception of informational support, received social support variables were significantly negatively correlated with SOI. Received social support variables were positively correlated with PTG-IR. Perceived social support was negatively correlated with SOI and positively related to PTG-IR. Correlations between received support subscales and perceived support ranged from .32 to .52.

### *Effects of Received Social Support on Social and Occupational Impairment (SOI)*

Tables 4a and 4b show the results of hierarchical regression models predicting SOI across the measures of received social support aggregated by sources and types. Results showed main effects of total score of received social support on SOI, when controlling for the effects of the demographic variables and traumatic exposure. Receiving more of different types of social support from all the sources was associated with lower SOI scores. The influence of the amount of the overall social support received on SOI remained statistically significant even with the addition of perceived social support in the last block of the hierarchical regression equation ($B$ = -1.05, $SE$ = 0.48, $p$ = .029).

Analyses of the different sources of received social support revealed that work-related sources (i.e., co-worker and supervisor) of social support predicted social and occupational impairment; higher amounts of received support from these sources were associated with better social and occupational functioning. However, when the effect of perceived social support was considered, only the $B$ coefficient for the supervisor received support remained significant, $B$ = -1.17, $SE$ = 0.46, $p$ = .011. Analyses by the different types of received social support showed that high amounts of

Table 2
*Means and standard deviations of demographic and study variables*

| Variable | *n* | *M* | *SD* |
|---|---|---|---|
| Gender[a] | 219 | 0.22 | 0.41 |
| Years of Service | 222 | 18.11 | 13.45 |
| Civil status[b] | 223 | 1.79 | 0.41 |
| Ethnicity[c] | 223 | 0.68 | 0.47 |
| Lifetime TE | 223 | 5.50 | 3.14 |
| Normative Stress | 223 | 4.65 | 3.15 |
| Duty-related TE | 223 | 7.58 | 3.32 |
| Global RSS | 222 | 3.30 | 0.68 |
| Family RSS | 221 | 3.53 | 0.89 |
| Co-worker RSS | 220 | 3.29 | 0.78 |
| Supervisor RSS | 219 | 3.08 | 0.89 |
| Emotional RSS | 223 | 3.50 | 0.68 |
| Tangible RSS | 223 | 3.06 | 0.79 |
| Informational RSS | 223 | 2.76 | 0.87 |
| Perceived SS | 223 | 3.15 | 0.53 |
| SOI | 222 | 5.51 | 6.64 |
| PTG-IR | 220 | 2.60 | 1.30 |

*Note.* TE = traumatic exposure; RSS = received social support; SS = social support; SOI = social and occupational impairment; PTG-IR = posttraumatic growth in interpersonal relationships;
[a] Female = 1; [b] with partner = 1; [c] NZ-European = 1.

Table 3
*Correlation matrix including demographic and study variables*

| | Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Gender[a] | | | | | | | | | | | | | | | | |
| 2. | Years of Service | -.34*** | | | | | | | | | | | | | | | |
| 3. | Civil status[b] | -.28*** | .29*** | | | | | | | | | | | | | | |
| 4. | Ethnicity[c] | -.15* | .25*** | .00 | | | | | | | | | | | | | |
| 5. | Lifetime TE | -.02 | .11 | .02 | .01 | | | | | | | | | | | | |
| 6. | Normative Stress | .14* | -.28*** | -.24*** | -.01 | .14* | | | | | | | | | | | |
| 7. | Duty-related TE | -.18** | .13 | .14* | .35*** | .40*** | .03 | | | | | | | | | | |
| 8. | Global RSS | .12 | -.22** | -.07 | -.21** | -.00 | .04 | -.22** | | | | | | | | | |
| 9. | Family RSS | .13 | -.20** | .01 | -.19** | -.03 | .00 | -.21** | .74*** | | | | | | | | |
| 10. | Co-worker RSS | .08 | -.04 | -.10 | -.16* | -.04 | .02 | -.16* | .82*** | .36*** | | | | | | | |
| 11. | Supervisor RSS | .11 | -.22** | -.12 | -.17* | .04 | .11 | -.16* | .84*** | .38*** | .63*** | | | | | | |
| 12. | Emotional RSS | .15* | -.22* | -.08 | -.23** | -.01 | .06 | -.25*** | .97*** | .72*** | .80*** | .82*** | | | | | |
| 13. | Tangible RSS | .05 | -.14* | -.04 | -.16* | .01 | -.01 | -.18** | .89*** | .68*** | .71*** | .74*** | .80*** | | | | |
| 14. | Informational RSS | .09 | -.20* | -.07 | -.13 | .01 | .06 | -.12 | .83*** | .62*** | .65*** | .71*** | .73*** | .71*** | | | |
| 15. | Perceived SS | .07 | -.08 | .17* | -.11 | -.04 | -.06 | -.08 | .49*** | .41*** | .47*** | .32*** | .52*** | .42*** | .32*** | | |
| 16. | SOI | .07 | -.03 | -.24*** | .07 | -.02 | .12 | .12 | -.30*** | -.19** | -.22** | -.27*** | -.34*** | -.23*** | -.11 | -.39*** | |
| 17. | PTG-IR | .14* | -.18** | -.18** | -.23** | -.09 | .10 | -.28*** | .51*** | .33*** | .51*** | .40*** | .46*** | .45*** | .48*** | .26*** | -.02 |

*Note.* * = $p < .05$, ** = $p < .01$, *** = $p < .001$; correlations were calculated using imputed dataset; TE = traumatic exposure; RSS = received social support; SS = social support; SOI = social and occupational impairment; PTG-IR = posttraumatic growth in interpersonal relationships; [a] Female = 1; [b] with partner = 1; [c] NZ-European = 1.

emotional and tangible supports were associated with fewer impairment symptoms. However, when perceived social support was added into the models, only received emotional support remained significantly associated with SOI scores. Received informational support did not significantly predict impairment levels. Expected interaction effects between duty-related TE and received social support on SOI scores were not observed.

### *Effects of Received Social Support on Posttraumatic Growth in Interpersonal Relationships (PTG-IR)*

Higher amounts of overall received social support positively predicted PTG-IR (Tables 5a and 5b). This effect remained statistically significant even when perceived social support was included in the final model ($B = 0.55$, $SE = 0.09$, $p < .001$). Regression analyses across different sources of received social support showed that both family and supervisor support were associated with reports of improvements in social relationships after traumatic exposure. These effects remained statistically significant after perceived social support was included in the models ($B = 0.22$, $SE = 0.10$, $p = .036$ and $B = 0.31$, $SE = 0.14$, $p = .048$, respectively). Received co-worker support was not found to predict PTG-IR scores. All three types of received social support, emotional, tangible, and informational, were also found to be associated with posttraumatic benefits in interpersonal relationships. Similarly, as in the analyses of SOI score, none of the received social support measures functioned as moderators of the relationship between with the duty-related TE and interpersonal posttraumatic growth of emergency responders.

## Discussion

The findings of this study provide evidence for beneficial direct effects of receiving social support on social adjustment outcomes among professionals routinely involved in potentially traumatic circumstances. The findings are consistent with the main effect model of social support (Cohen et al., 2000) where social support is ubiquitously beneficial to people who receive it, irrespective of the level of their exposure to stressors.

The examination of the different support sources revealed that higher amounts of co-worker and supervisor social support predicted better social and occupational functioning. Similar findings have been observed in other studies with samples of professionals in related fields such as traffic enforcement (Baruch-Feldman, Brondolo, Ben-Dayan, & Schwartz, 2002). In addition, results of the current study show higher amounts of emotional and

Table 4a
*Summary of hierarchical regression analyses of social and occupation impairment on received social support (N = 223)*

| Variable | Global RSS | | | | Family RSS | | | | Co-worker RSS | | | | Supervisor RSS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $r^2$ | *B (ΔF)* | *SE B* | *p* | $r^2$ | *B (ΔF)* | *SE B* | *p* | $r^2$ | *B (ΔF)* | *SE B* | *p* | $r^2$ | *B (ΔF))* | *SE B* | *p* |
| *Model 1* | .06 | (3.62) | | .007 | .06 | (3.62) | | .007 | .06 | (3.62) | | .007 | .06 | (3.62) | | .007 |
| Gender[a] | | 0.49 | 1.14 | .668 | | 0.49 | 1.14 | .668 | | 0.49 | 1.14 | .668 | | 0.49 | 1.14 | .668 |
| Years of Service | | 0.21 | 0.49 | .663 | | 0.21 | 0.49 | .663 | | 0.21 | 0.49 | .663 | | 0.21 | 0.49 | .663 |
| Civil Status[b] | | -3.87 | 1.14 | .001 | | -3.87 | 1.14 | .001 | | -3.87 | 1.14 | .001 | | -3.87 | 1.14 | .001 |
| Ethnicity[c] | | 0.91 | 0.97 | .347 | | 0.91 | 0.97 | .347 | | 0.91 | 0.97 | .347 | | 0.91 | 0.97 | .347 |
| *Model 2* | .07 | (0.69) | | .503 | .07 | (0.69) | | .503 | .07 | (0.69) | | .503 | .07 | (0.69) | | .503 |
| Lifetime TE | | -0.21 | 0.45 | .637 | | -0.21 | 0.45 | .637 | | -0.21 | 0.45 | .637 | | -0.21 | 0.45 | .637 |
| Normative stress | | 0.53 | 0.47 | .256 | | 0.53 | 0.47 | .256 | | 0.53 | 0.47 | .256 | | 0.53 | 0.47 | .256 |
| *Model 3* | .17 | (13.67) | | <.001 | .11 | (5.17) | | .006 | .14 | (9.11) | | <.001 | .16 | (12.33) | | <.001 |
| Duty-related TE | | 0.95 | 0.50 | .060 | | 1.23 | 0.54 | .023 | | 0.97 | 0.52 | .060 | | 1.05 | 0.52 | .043 |
| RSS | | -1.96 | 0.43 | <.001 | | -0.74 | 0.57 | .221 | | -1.24 | 0.51 | .027 | | -1.77 | 0.47 | <.001 |
| *Model 4* | .17 | (0.22) | | .649 | .11 | (0.17) | | .696 | .14 | (0.06) | | .974 | .17 | (1.19) | | .290 |
| Duty-related TE X RSS | | 0.21 | 0.46 | .649 | | 0.18 | 0.46 | .696 | | -0.01 | 0.43 | .974 | | 0.46 | 0.43 | .290 |
| *Model 5* | .23 | (14.95) | | <.001 | .21 | (27.31) | | <.001 | .22 | (22.01) | | <.001 | .24 | (19.76) | | <.001 |
| Perceived SS | | -1.83 | 0.48 | <.001 | | -2.29 | 0.44 | <.001 | | -2.11 | 0.47 | <.001 | | -1.94 | 0.44 | <.001 |

*Note:* $r^2$ = total variance explained; *ΔF = F* for change in $r^2$; Unstandardized betas (*B*) in succeeding blocks include the effects of variables in the previous blocks; *SE B* = standard error of the beta; NZ-Euro = New Zealanders of European ethnicity; TE = traumatic exposure; RSS = received social support; SS =social support; [a] Female = 1; [b] with partner = 1; [c] NZ-European = 1.

Table 4b
*Summary of hierarchical regression analyses of social and occupation impairment on received social support (N = 223)*

| Variable | Emotional RSS | | | | Tangible RSS | | | | Informational RSS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $r^2$ | *B (ΔF)* | *SE B* | *p* | $r^2$ | *B (ΔF)* | *SE B* | *p* | $r^2$ | *B (ΔF)* | *SE B* | *p* |
| *Model 1* | .06 | (3.62) | | .007 | .06 | (3.62) | | .007 | .06 | (3.62) | | .007 |
| Gender[a] | | 0.49 | 1.14 | .668 | | 0.49 | 1.14 | .668 | | 0.49 | 1.14 | .668 |
| Years of Service | | 0.21 | 0.49 | .663 | | 0.21 | 0.49 | .663 | | 0.21 | 0.49 | .663 |
| Civil Status[b] | | -3.87 | 1.14 | .001 | | -3.87 | 1.14 | .001 | | -3.87 | 1.14 | .001 |
| Ethnicity[c] | | 0.91 | 0.97 | .347 | | 0.91 | 0.97 | .347 | | 0.91 | 0.97 | .347 |
| *Model 2* | .07 | (0.69) | | .503 | .07 | (0.69) | | .503 | .07 | (0.69) | | .503 |
| Lifetime TE | | -0.21 | 0.45 | .637 | | -0.21 | 0.45 | .637 | | -0.21 | 0.45 | .637 |
| Normative stress | | 0.53 | 0.47 | .256 | | 0.53 | 0.47 | .256 | | 0.53 | 0.47 | .256 |
| *Model 3* | .21 | (18.42) | | <.001 | .14 | (8.59) | | <.001 | .11 | (4.40) | | .013 |
| Duty-related TE | | 0.77 | 0.50 | .119 | | 1.05 | 0.51 | .041 | | 1.23 | 0.52 | .018 |
| RSS | | -2.35 | 0.43 | <.001 | | -1.41 | 0.44 | .001 | | -0.69 | 0.44 | .119 |
| *Model 4* | .21 | (0.54) | | .465 | .14 | (0.28) | | .777 | .11 | (0.22) | | .642 |
| Duty-related TE X RSS | | 0.33 | 0.45 | .465 | | -0.13 | 0.44 | .777 | | 0.23 | 0.50 | .642 |
| *Model 5* | .25 | (10.80) | | .001 | .22 | (21.40) | | <.001 | .22 | (28.40) | | <.001 |
| Perceived SS | | -1.57 | 0.48 | .001 | | -2.12 | 0.46 | <.001 | | -2.36 | 0.44 | <.001 |

*Note*. $r^2$ = total variance explained; *ΔF = F* for change in $r^2$; Betas in succeeding blocks include the effects of variables in the previous blocks; *SE B* = standard error of the beta; NZ-Euro = New Zealanders of European ethnicity; TE = traumatic exposure; RSS = received social support; SS = social support; [a] Female = 1; [b] with partner = 1; [c] NZ-European = 1.

tangible support were associated with fewer functioning deficits in the social and occupational domains. Cutrona and Russell (1990) have argued that the type of social support is a crucial aspect of its effectiveness. They suggested that receiving emotional support helps an individual to sustain stressors that are beyond one's control, whereas receiving tangible support can assist an individual in dealing with stressors that one can control. It follows that emergency responders who receive assistance from work-related sources function

Table 5a
*Summary of hierarchical regression analyses of posttraumatic growth in interpersonal relationships on received social support (N=223)*

| Variable | Global RSS | | | | Family RSS | | | | Co-worker RSS | | | | Supervisor RSS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $r^2$ | *B (ΔF)* | *SE B* | *p* | $r^2$ | *B (ΔF)* | *SE B* | *p* | $r^2$ | *B (ΔF)* | *SE B* | *p* | $r^2$ | *B (ΔF)* | *SE B* | *p* |
| *Model 1* | .09 | (5.56) | | <.001 | .09 | (5.56) | | <.001 | .09 | (5.56) | | <.001 | .09 | (5.56) | | <.001 |
| Gender[a] | | 0.14 | 0.23 | .545 | | 0.14 | 0.23 | .545 | | 0.14 | 0.23 | .545 | | 0.14 | 0.23 | .545 |
| Years of Service | | -0.09 | 0.09 | .338 | | -0.09 | 0.09 | .338 | | -0.09 | 0.09 | .338 | | -0.09 | 0.09 | .338 |
| Civil Status[b] | | -0.46 | 0.22 | .036 | | -0.46 | 0.22 | .036 | | -0.46 | 0.22 | .036 | | -0.46 | 0.22 | .036 |
| Ethnicity[c] | | -0.57 | 0.19 | .002 | | -0.57 | 0.19 | .002 | | -0.57 | 0.19 | .002 | | -0.57 | 0.19 | .002 |
| *Model 2* | .10 | (1.12) | | .328 | .10 | (1.12) | | .328 | .10 | (1.12) | | .328 | .10 | (1.12) | | .328 |
| Lifetime TE | | -0.12 | 0.09 | .172 | | -0.12 | 0.09 | .172 | | -0.12 | 0.09 | .172 | | -0.12 | 0.09 | .172 |
| Normative stress | | 0.07 | 0.09 | .406 | | 0.07 | 0.09 | .406 | | 0.07 | 0.09 | .406 | | 0.07 | 0.09 | .406 |
| *Model 3* | .32 | (33.61) | | <.001 | .20 | (12.44) | | <.001 | .25 | (21.61) | | <.001 | .22 | (15.79) | | <.001 |
| Duty-related TE | | -0.15 | 0.09 | .097 | | -0.24 | 0.12 | .042 | | -0.16 | 0.10 | .101 | | -0.21 | 0.10 | .031 |
| RSS | | 0.59 | 0.08 | <.001 | | 0.28 | 0.12 | .038 | | 0.39 | 0.18 | .078 | | 0.38 | 0.14 | .021 |
| *Model 4* | .32 | (1.97) | | .173 | .20 | (1.66) | | .223 | .25 | (0.34) | | .711 | .23 | (3.51) | | .071 |
| Duty-related TE X RSS | | -0.11 | 0.08 | .173 | | -0.11 | 0.09 | .223 | | -0.03 | 0.09 | .711 | | -0.15 | 0.08 | .071 |
| *Model 5* | .32 | (0.67) | | .420 | .24 | (10.29) | | .002 | .27 | (4.40) | | .105 | .26 | (7.40) | | .008 |
| Perceived SS | | 0.07 | 0.09 | .420 | | 0.27 | 0.09 | .002 | | 0.18 | 0.11 | .105 | | 0.23 | 0.09 | .008 |

*Note:* $r^2$ = total variance explained; *ΔF = F* for change in $r^2$; Betas in succeeding blocks include the effects of variables in the previous blocks; *SE B* = standard error of the beta; NZ-Euro = New Zealanders of European ethnicity; TE = traumatic exposure; RSS = received social support; SS = social support; [a] Female = 1; [b] with partner = 1; [c] NZ-European = 1.

Table 5b
*Summary of hierarchical regression analyses of posttraumatic growth in interpersonal relationships on received social support (N=223)*

| Variable | Emotional RSS | | | | Tangible RSS | | | | Informational RSS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $r^2$ | *B (ΔF)* | *SE B* | *p* | $r^2$ | *B (ΔF)* | *SE B* | *p* | $r^2$ | *B (ΔF)* | *SE B* | *p* |
| *Model 1* | .09 | (5.56) | | <.001 | .09 | (5.56) | | <.001 | .09 | (5.56) | | <.001 |
| Gender[a] | | 0.14 | 0.23 | .545 | | 0.14 | 0.23 | .545 | | 0.14 | 0.23 | .545 |
| Years of Service | | -0.09 | 0.09 | .338 | | -0.09 | 0.09 | .338 | | -0.09 | 0.09 | .338 |
| Civil Status[b] | | -0.46 | 0.22 | .036 | | -0.46 | 0.22 | .036 | | -0.46 | 0.22 | .036 |
| Ethnicity[c] | | -0.57 | 0.19 | .002 | | -0.57 | 0.19 | .002 | | -0.57 | 0.19 | .002 |
| *Model 2* | .10 | (1.12) | | .328 | .10 | (1.12) | | .328 | .10 | (1.12) | | .328 |
| Lifetime TE | | -0.12 | 0.09 | .172 | | -0.12 | 0.09 | .172 | | -0.12 | 0.09 | .172 |
| Normative stress | | 0.07 | 0.09 | .406 | | 0.07 | 0.09 | .406 | | 0.07 | 0.09 | .406 |
| *Model 3* | .27 | (24.56) | | <.001 | .28 | (27.21) | | <.001 | .31 | (32.40) | | <.001 |
| Duty-related TE | | -0.14 | 0.09 | .130 | | -0.16 | 0.09 | .073 | | -0.20 | 0.09 | .028 |
| RSS | | 0.52 | 0.08 | <.001 | | 0.53 | 0.08 | <.001 | | 0.57 | 0.08 | <.001 |
| *Model 4* | .28 | (2.45) | | .134 | .29 | (0.98) | | .341 | .31 | (0.46) | | .512 |
| Duty-related TE X RSS | | -0.13 | 0.09 | .134 | | -0.08 | 0.08 | .341 | | 0.06 | 0.09 | .512 |
| *Model 5* | .28 | (1.26) | | .266 | .30 | (2.98) | | .090 | .33 | (5.56) | | .020 |
| Perceived SS | | 0.10 | 0.09 | .266 | | 0.15 | 0.09 | .090 | | 0.19 | 0.08 | .020 |

*Note:* $r^2$ = total variance explained; *ΔF = F* for change in $r^2$; Betas in succeeding blocks include the effects of variables in the previous blocks; *SE B* = standard error of the beta; NZ-Euro = New Zealanders of European ethnicity; TE = traumatic exposure; RSS = received social support; SS = social support; [a] Female = 1; [b] with partner = 1; [c] NZ-European = 1.

better at work than those who do not receive enough support. Furthermore, receiving emotional support such as words of comfort, non-judgemental interactions, and acceptance provides capacity to endure the potentially traumatising nature of their profession, whereas receiving tangible support such as assistance with tasks, money, and practical forms of aid may actually lighten the workload, strengthen the sense of camaraderie, and, in effect, improve social and occupational functioning.

The findings of this study also show that received social support directly influenced positive changes in interpersonal/social relationships after traumatic exposure. Previous research has shown that receiving social support from family influenced positive perceptions of meaning in life (Luszczynska, Pawlowska, Cieslak, Knoll, & Scholz, 2013; Schroevers, Helgeson, Sanderman, & Ranchor 2010), thereby strengthening social ties and improving relationships. Furthermore, studies in other trauma-exposed populations, such as earthquake survivors, have shown that the combination of high quality and high quantity of received social support resulted in high levels of posttraumatic growth in survivors of natural hazards (Shang et al., 2020).

The findings in this study contribute novel information regarding emergency responder groups; however, the association of received social support on posttraumatic growth has been observed in other populations. For example, a longitudinal study showed that cancer patients who received more emotional support, but did not perceive more emotional support, reported higher levels of posttraumatic growth (Schroevers et al., 2010). A positive correlation was also found between received social support and the PTG-IR subscale, but not with other PTGI indices, among Hurricane Katrina survivors living with HIV (Cieslak et al., 2009). Both studies pointed out that in terms of growth outcomes, receiving actual support matches the requirements of the stressor, similar to the social support effectiveness mechanism proposed by Cutrona and Russell (1990).

It is noteworthy that correlational analyses showed that high levels of duty-related traumatic exposure were associated with lower amounts of received social support. This is an unusual pattern of stress-support relationship because it is common to observe a positive correlation between the severity of stressful exposures and the amount of support received (Hobfoll, 2002; Kaniasty, 2020) This inverse correlation between duty-related traumatic exposure and received social support is interesting but also concerning. Duty-related traumatic exposure and, consequently, experience of distress, may deter emergency responders from seeking support, therefore receiving less support, from fear of being perceived as weak or vulnerable (Prati & Pietrantoni, 2010a). Troublingly, disclosures of psychological distress and help seeking are not valued in emergency response organisations and may even have negative consequences in terms of career advancement such as being promoted (Haugen, McCrillis, Smid, & Nijdam, 2017).

This social support disequilibrium—in this case, a state of shortage where high need for support is met with low amounts of provided support—may also be a case of social erosion (Shallcross, Arbisi, Polusny, Kramer, & Erbes, 2016). Social support shortage happens when experience of distress negatively affects the quality and/or quantity of social support. For example, experience of distress by emergency responders may contribute to relationship strain (Alvarez & Hunt, 2005). In the same manner, distress brought about by the increase of duty-related traumatic exposure may lead to the deterioration of social support. This shortage may also explain the negative correlation between duty-related traumatic exposure and PTG-IR scores found in this study. The erosion of relationship quality brought about by the increase in duty-related traumatic exposure may result in lost opportunity to develop posttraumatic growth in interpersonal relationships. These bivariate findings are consistent with some reports documenting a potential for relationship deterioration following exposure to traumatic events, particularly those affecting larger communities such as disasters (Bonanno et al. 2010; Kaniasty, 2020).

The current study is not without limitations. There are disproportionately more participants based in New Zealand than in the Philippines. There are also more firefighters than other types of emergency responders among the participants. This imbalance in the representations of the different subgroups of responders means the variable relationships observed in this study may reflect the psychological characteristics of these dominant groups in the sample. The cross-sectional design of the study also prevented us from making causal inferences. The mode of data gathering may also have introduced the possibility of selection bias. Without the response rate, the percent of nonresponse cannot be ascertained. Furthermore, the study was not sensitive enough to detect marginal effects due to sample size limitations. Shieh (2009) suggested employing random- instead of fixed-effects

models when performing moderated multiple regression analysis in order to detect interaction effects, especially when analysing continuous variables. The random effects model requires a larger sample size, which increases statistical power and produces more accurate results (Kelley & Maxwell, 2003). Notwithstanding these limitations, the study was able to examine associations of received social support with social adjustment outcomes, associations which are most often investigated by studies with emergency responders. On a practical note, results of this study may be useful for organisations when designing and implementing social support intervention programmes for emergency responders.

This study has shown that although receiving support is generally beneficial to emergency responders, there are certain types and certain sources of support that are linked to better outcomes. This research has also illustrated that while emergency response work is psychologically and socially taxing, emergency responders may gain psychological and social benefit from their work if they receive the right kind of support from the right kind of people. Future studies could explore the different dimensions and characteristics of received social support which lead to socio-psychological outcomes in the context of emergency responders and other similar professionals.

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