


Adaptive and Maladaptive Coping Strategies Predict Posttrauma Outcomes in Ambulance Personnel

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Abstract

Attending potentially dangerous and traumatic incidents is inherent in the role of emergency workers, yet there is a paucity of literature aimed at examining variables that impact on the outcomes of such exposure. Coping has been implicated in adjusting to trauma in other contexts, and this study explored the effectiveness of coping strategies in relation to positive and negative posttrauma outcomes in the emergency services environment. One hundred twenty-five paramedics completed a survey battery including the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996), the Impact of Events Scale–Revised (IES-R; Weiss & Marmar, 1997), and the Revised-COPE (Zuckerman & Gagne, 2003). Results from the regression analysis demonstrated that specific coping strategies were differentially associated with positive and negative posttrauma outcomes. The research contributes to a more comprehensive understanding regarding the effectiveness of coping strategies employed by paramedics in managing trauma, with implications for their psychological well-being as well as the training and support services available.

Keywords

coping, posttraumatic growth, paramedics, trauma, vicarious trauma, adaptive, maladaptive

Attending critical and potentially dangerous incidents is inherent in the role of emergency service workers. The subsequent risk of developing posttraumatic stress symptoms has received increasing attention by clinicians, employers, the media, and psychological researchers (e.g., Clohessy & Ehlers, 1999; Mitchell & Everly, 2001; Whealin, Ruzek, & Southwick, 2008). Such studies have examined the consequences of exposure to trauma although gaps in research remain. One such gap addressed in the present study relates to including both positive and negative measures of adaptation. The purpose of this study is to explore the role of specific coping strategies in relation to positive and negative posttrauma outcome in emergency ambulance personnel.

Positive and Negative Posttrauma Outcomes

Traditionally, exposure to trauma was assumed to produce a distressing and overwhelming negative outcome. Even though an experience with trauma involves suffering and feelings of loss, the posttraumatic growth (PTG) model embraces the philosophy that there is potential for positive changes to result from the ordeal (Calhoun & Tedeschi, 2006). PTG is more than merely recovering, surviving, or adapting to the trauma but implies that the individual flourishes beyond their previous level of functioning (Calhoun & Tedeschi, 2006). A burgeoning body of research has established support for the

occurrence of PTG as a legacy of trauma for many people. Further, studies have consistently highlighted five domains in which change can occur—personal strength, new possibilities, relating to others, appreciation of life, and spiritual change (e.g., Morris, Shakespeare-Finch, Rieck, & Newbery, 2005; Tedeschi & Calhoun, 1996).

The relationship between posttraumatic distress and growth is yet to be conclusively explained. Research to date, including several meta-analyses, have been plagued with inconsistent findings, some of which may be due to cultural differences and others due to populations sampled or measures used (Calhoun & Tedeschi, 2006; Helgeson, Reynolds, & Tomich, 2006; Linley & Joseph, 2004; Shakespeare-Finch & Copping, 2006). While some studies endorse a small positive and linear relationship between positive and negative posttrauma symptoms (Morris et al., 2005; Shakespeare-Finch & Copping, 2006), others have found negative relationships (Kilic, 2005) and others, no relationship (e.g., Ho, Kwong-Lo, Mak, & Wong, 2005). Janoff-Bulman (2004)

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contends that disparate cognitive processes may be involved for different domains of PTG. In recognition of these complex relationships, this study incorporates measures for the potential of positive and negative posttrauma outcome.

Personal and Vicarious Exposure to Trauma

The majority of trauma literature depicts personal or “direct” trauma, most often involving serious illness, bereavement, or rape (e.g., Bowman, 1997; Tedeschi & Calhoun, 1995). Recently a distinction has been made between direct and “indirect” trauma, also referred to as vicarious (Saakvitne & Pearlman, 1996) or secondary trauma (Figley, 1995). This idea refers to the impact of a traumatic incident on people other than the immediate victim but in some way bear witness to the event; a role typical for ambulance officers (Figley, 1995; Mitchell & Everly, 2001; Saakvitne & Pearlman, 1996).

Research has revealed that people who experience “indirect” trauma may exhibit similar symptoms to the direct survivors of trauma, albeit often with a lesser intensity (Saakvitne & Pearlman, 1996). In relation to ambulance officers, Shakespeare-Finch, Smith, Gow, Embelton, and Baird, (2003) found significantly higher levels of positive and negative posttrauma symptoms reported among paramedics who had experienced a trauma in their personal lives, as compared with those who had experienced trauma while in a professional capacity alone. This affirms previous studies where direct trauma elicits stronger reactions for people (Saakvitne & Pearlman, 1996).

Coping in Relation to Trauma

Psychological research has long held an interest in identifying coping abilities that promote better adjustment in the aftermath of trauma. Many coping theories assume that survivors of trauma engage in a cognitive process of ascertaining meaning in relation to their experience in order to successfully cope with it (Folkman, 2008; Lazarus & Folkman, 1984; Regehr, Goldberg, & Hughes, 2002; Tedeschi & Calhoun, 1995). Although arguably culturally bias, this notion has been prevalent in the literature for some time. For a review of posttrauma outcomes across a variety of cultural contexts, please see Weiss and Berger (2010).

Some criticisms in coping research pertain to the lack of clear definitions and inconsistent terminology (Hobfoll, 1989). Coping is often referred to in terms of strategies, styles, resources, approaches, and skills. These terms may differ conceptually. Several studies using the term *coping style* presume that personality is a stable attribute and accounts for the predisposition for people to cope in certain ways. Support is provided by studies showing personality dispositions related to posttrauma outcomes mediated by

coping (Shakespeare-Finch, Gow, & Smith, 2005). Alternatively, other researchers use the term *strategy* and advocate a contextual response, whereby coping is viewed as being flexible across situations and over time (Skinner, Edge, Altman, & Sherwood, 2003; Suls & David, 1996).

Current coping theories contend that the effectiveness of any given strategy is dependent on the context of the traumatic incident (Schulz & Mohamed, 2004; Zuckerman & Gagne, 2003). According to this view, any particular strategy that the person employs to deal with the trauma can be either adaptive or maladaptive depending on the circumstance. For example, Whealin and colleagues (2008) reviewed a number of studies that have referred to adaptive and maladaptive coping influences, and other studies have differentiated coping strategies by using terms such as, functional or dysfunctional (Aldwin, 1994); transformation or regressive coping (Lazarus & Folkman, 1984), and Sharkansky et al. (2000) who examined the relationship between approach focused or avoidance focused coping strategies on the psychological ill-health in active military personnel.

Complications can arise from labeling the coping strategies in this manner. Some responses that are typically viewed as being maladaptive (e.g., avoidance or dissociation strategies) are generally recognized as being counterproductive to recovery, but may actually be a successful approach in some critical situations (e.g., the professional detachment reportedly used by many paramedics at the time of response to the critical incident; Figley, 2008). In addition, a meta-analysis by Tamres, Janicki, and Helgeson (2002), highlights a gender difference in coping between male and females, with females predominantly engaging in more adaptive or “expressive” types of coping strategies. The authors explore these concepts by examining the associations between adaptive and maladaptive coping strategies with posttrauma adjustment, and testing for potential gender differences within the sample.

The coping measure employed in this study to assess the adaptive/maladaptive relationship, is the Zuckerman and Gagne (2003) Revised-COPE (R-COPE) measure. The R-COPE comprises a novel five dimensions, which are defined as individual response tendencies in coping with stressors such as, self-help, approach, accommodation, avoidance, and self-punishment. Self-help coping incorporates efforts to seek support, and understand and express emotions in dealing with the incident. Approach coping relates to direct attempts at problem-solving activities to relieve the source of stress. Accommodation coping involves an acceptance that the problem cannot be resolved but may be relieved through positive reframing, and an optimistic outlook. Avoidance coping aims to direct the person away from the problem, and is commonly associated with disengagement, denial, and blaming external forces in attempts to cope with the situation. Alternatively, self-punishment coping is linked with blaming oneself, regardless of whether

they had contributed to the incident in reality, and also involves rumination, and a negative outlook (Zuckerman & Gagne, 2003).

Research has demonstrated that the subscales may be clustered into adaptive and maladaptive strategies, which subsequently correspond with the perception of the event as either positive or negative. It is proposed by Zukerman and Gagne (2003) that the subscales of Self-Help, Approach, and Accommodation correlate with adaptive forms of coping and that avoidance and self-punishment represent maladaptive coping.

The Role of Emergency Service Personnel

On a daily basis, ambulance officers encounter situations where individuals are in extreme states of distress. The statistics for the particular ambulance service from which this sample is drawn, is reported as being the fourth largest ambulance service in the world and record more than 815,000 emergency calls annually (equating to an average emergency call out every 66 s; Queensland Government, 2007). As such, it is generally acknowledged that Ambulance officers experience a high risk of trauma exposure which has associated consequences on psychological well-being, as well as the potential impact on their families and employing organization (Figley, 1995; Robinson, 2002; Shakespeare-Finch, Smith, & Obst, 2002). Given that the general community relies upon the ambulance service in times of crisis, research of trauma and coping among Ambulance officers becomes of paramount importance. Whealin et al. (2008) strongly recommend that research evaluating the factors for specific work groups exposed to trauma is valuable in preventing negative sequelae. They highlight the need for research to identify the differences between those who develop negative posttrauma outcomes and those who adapt. Yet there is a paucity of coping studies specifically involving emergency service workers.

A review of such literature outlines some common coping strategies used by emergency service personnel include the use of dark humor, cognitive strategies, social support, and the creation of meaning (Moran & Shakespeare-Finch, 2003; Paton & Violanti, 1996; Suls & David, 1996). A study conducted with emergency ambulance workers ($n = 526$) presented a mediating role of personality dispositions being linked with coping processes which included positive reframing, emotional support/expression, nonwork activities, and work-related cognitions (Shakespeare-Finch et al., 2005).

Despite the valuable contribution of such studies to the coping literature, some gaps in methodology arise. The current research is distinguished from previous studies of coping by including a measure of both PTG and PTS to permit a broader assessment of trauma reactions, and aims to examine

the impact of specific coping strategies on posttrauma outcome (Linley & Joseph, 2004; Whealin et al., 2008).

Hypotheses

Hypothesis 1. Literature has established a distinction between personal and vicarious trauma, with personal exposure found to evoke a greater intensity of posttrauma symptoms and also a greater opportunity for growth (Saakvitne & Pearlman, 1996; Shakespeare-Finch et al., 2003). The present study therefore will test for differences in posttrauma outcomes as a result of direct and/or vicarious traumatic experiences. Hypothesis 1 predicts that those who have experienced personal trauma will respond with higher scores on both the positive (PTGI) and negative (IES-R) posttrauma measures.

Hypothesis 2. Most literature infers that coping responses are effectively adaptive or maladaptive, and are linked with positive or negative trauma consequences respectively (Paton & Violanti, 1996; Shakespeare-Finch et al., 2002). In this study, the proposed relationship between the adaptive cluster of the R-COPE (self-help, approach, and accommodation), are expected to generate a positive trauma outcome, and the maladaptive cluster (avoidance and self-punishment) to relate to negative consequences. Hypothesis 2 expects that paramedics who use the adaptive coping strategies will obtain higher scores on the PTGI subscales, and those using maladaptive strategies will report higher scores on the each of the IES-R subscales indicating a greater degree of stress after trauma. The research seeks to further explore the relationships between specific coping strategies and posttrauma outcome.

Method

Participants

Participants were recruited from various ambulance positions (differing ranks and job titles) and geographical locations (including urban, regional, and rural) to maintain a stratified representativeness. The sample comprised a total of 125 paramedics who were employed in an operational role and composition included new recruits ($n = 26$, 22%), seasoned officers with a minimum of 4 years "on road" ambulance experience ($n = 33$, 28%), and paramedic peer support officers (PSO; $n = 59$, 50%), who typically have extensive operational experience and perform an additional role of providing support to colleagues (Scully, 2006). The ambulance service is a predominantly male population and in this sample 40 were female and 78 were male which is roughly representatively proportionate of the organizational demographic. The participant's age ranged from 18 to 61 years with a mean of 37 years ($SD = 10.49$ years). Duration of service ranged from 6 weeks to 39 years, and the mean duration was 10 years ($SD = 9.32$ years).

Inclusion criteria for the study were that participants needed to have experienced a traumatic event. The participants answered three questions regarding their experiences. First, having been provided with a definition of trauma (according to the *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed., text revision [DSM-IV-TR]; American Psychiatric Association, 2000), all of the participants described experiencing an event in the course of their profession that they perceived to be traumatic. Second, the sample was asked if they had experienced a trauma in their personal lives, and the majority reported having done so ($n = 82$, 69.7%). Therefore, 36 participants stated that they had endured a vicarious trauma (30.3%). That is, they reported experiencing an event at work which elicited a traumatic reaction in them, such as, attending to a case in which a child had died as the result of parental abuse, but had not experienced such events in their personal lives. Participants were then asked to describe the event that was most distressing for them and to complete the questionnaire with reflection upon that event. All individuals in this study cited the work-related event as the most distressing for them. The investigators allocated labels of "vicarious" for the group of participants who had endured a trauma while performing their work, and "both" for those who had also experienced trauma in their personal life. The length of time since the incident ranged from 1 month to 38 years, with an average of 6.25 years ($SD = 8.50$ years).

Materials

The survey contained participant consent, demographics questions, a qualitative question for participants to describe the trauma which was then categorized into one of five broad groups according to the nature of the trauma experience, a subjective severity rating on a Likert-type scale from mild to extremely severe as control measures to ensure consistency of trauma with DSM-IV-TR criteria, and three previously published test instruments. The positive changes that a person may experience in the wake of trauma were measured with the PTG Inventory (PTGI; Tedeschi & Calhoun, 1996). The negative symptoms of trauma were assessed with the Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997). Coping strategies were examined with R-COPE Inventory (Zuckerman & Gagne, 2003). The survey was compiled with questionnaires counterbalanced in order of presentation to address the potential for order effects and reduce the risk of response bias.

Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). The PTGI was designed to measure the positive changes that may happen for some people as a result of the struggle to adapt to life after experiencing a trauma. Responses are recorded on a 6-point Likert-type scale ranging from 0 = *I did not experience this changes*, to 5 = *I experienced this change to a very great degree*. The inventory

has five factors identified as (a) relating to others, (b) new possibilities, (c) personal strength, (d) spiritual changes, and (e) appreciation of life. The PTGI has been found to be a reliable and valid measure of positive changes in the wake of a traumatic event, with an alpha coefficient of .90 and test-retest reliability over 2 months at .71, and has been replicated across international samples (Morris et al., 2005; Tedeschi & Calhoun, 1996).

IES-R. The IES-R (Weiss & Marmar, 1997) has been widely used in disaster and trauma research to measure the negative symptoms associated with crisis, and parallels the DSM-IV-TR criteria for PTSD. The 22-item Self-Report Scale comprises three independent subscales such as Intrusion, Avoidance, and Hyperarousal, which are calculated as mean scores for each individual subscale and then summed to produce a total score. Responses are scored on a 4-point scale in relation to the extent to which symptoms have caused distress in the last 7 days (0 = *not at all*; 3 = *extremely*). The IES-R has reported strong reliability and internal consistency in the subscales (Intrusion alpha of .87, Avoidance alpha of .84, and Hyperarousal alpha of .79). The IES-R also claims high retest reliability (Weiss & Marmar, 1997).

R-COPE. The revised COPE scale was based on the COPE subscales of Carver, Scheier, and Weintraub (1989; Zuckerman & Gagne, 2003). The 40 self-report items assess five factors: (a) Self-Help, (b) Approach, (c) Accommodation, (d) Avoidance, and (e) Self-Punishment. Responses are reported on a 4-point scale, ranging in the amount with which the strategy has been used from *I usually don't do this at all* through to *I normally do this a lot*. This tool reports reliability ranging from .81 to .92 and comparison with other scales served to report high discriminant and convergent validity (Zuckerman & Gagne, 2003).

Procedure

Ethics approval was obtained from the university and the relevant ambulance authorities to conduct this study (Reference 600000759). The purposefully selected sample was recruited while attending group training sessions. The paramedics were advised of the projects aims, guidelines, and assured of confidentiality prior to their voluntary commitment to participate. The survey was administered with the discreet presence of the investigator to allow observation for any adverse emotional reactions and to address any questions raised. Contact details of the Staff Support Services and other counseling services were offered to all participants. Completed surveys were anonymously returned to an unmarked folder.

Results

The participants provided a qualitative description of the event they perceived as being their most traumatic experience and also completed a subjective severity rating as a

Table 1. Correlation Coefficients Signifying the Clusters of Adaptive and Maladaptive Coping

	Self-help	Approach	Accommodation	Avoidance	Self-punishment
Self-help	1				
Approach	.57**	1			
Accommodation	.32**	.40**	1		
Avoidance	-.06	-.01	-.01	1	
Self-punishment	.11	.07	-.04	.52**	1

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

control measure to preserve the definition of trauma according to the *DSM-IV-TR* criteria (American Psychiatric Association, 2000). The severity ratings determined the cases selected for the analyses, and subsequently seven cases with “mild” ratings of severity were excluded, leaving a total of 118 participants. The sample size was sufficient for all analyses performed in this study with an a priori G-power test conducted with a small effect size (.25), power of .95, and eight groups, estimating a required sample of 64.

The investigators reviewed the qualitative data relating to the nature of the trauma and broadly categorized these events into one of five types listed according to their frequency: involving children ($n = 43$), extensive injuries/gruesome death ($n = 32$), known to or identifying with victim (e.g., “he was my neighbour,” “she was the same age as my daughter”; $n = 19$), multiple victims ($n = 18$), and threat to own life ($n = 6$). Of these categories, the participants who attended an event in which they knew or identified with the victim, reported significantly higher scores on both PTG ($M = 58.57$, $SD = 24.38$) and PTS ($M = 2.12$, $SD = 1.19$) measures than the other groups $F(4, 113) = 3.77$, $p < .01$. Trauma of this nature also produced the highest means of maladaptive coping ($M = 7.52$, $SD = 5.01$). In contrast, the “extensive injury” category demonstrated the lowest levels of both PTS ($M = 1.00$, $SD = 0.80$) and PTG ($M = 40.56$, $SD = 18.41$) scores, and the highest means of adaptive coping strategies ($M = 44.06$, $SD = 11.29$). Specifically, the “extensive injury” category produced significantly lower levels of PTGI scores than the category “involving children” ($p < .05$, $M = 50.62$, $SD = 22.40$) or in those whose event comprised “knowing or identifying with the victim” ($p < .05$, $M = 58.57$, $SD = 24.38$). The latter two categories did not differ from each other ($p = .99$). When assessing post hoc analyses using Hochberg’s (to best accommodate unequal sample sizes), the total scores on the PTS measure did not significantly differ, $F(4, 113) = 1.99$, $p = .10$.

In relation to potential gender differences, a t test found that there were significant differences between males and females only on the R-COPE subscale of Self-Help, $t(116) = -2.78$, $p < .01$. Specifically, females reported higher means on this scale ($M = 14.97$, $SD = 5.04$), than their male counterparts ($M = 11.97$, $SD = 5.79$). No gender differences were noted on any other dependant variables.

Correlations and Reliabilities

Strong positive correlations between subscales ($p < .01$, as shown in Table 1) indicated that the five factors of the R-COPE could be reduced into adaptive and maladaptive strategies, which supports the relationships proposed by Zuckerman and Gagne (2003). The adaptive coping cluster comprised the Approach, Accommodation, and Self-Help scales, and yielded a Cronbach’s alpha of .91. Avoidance and self-punishment coping strategies were linked within the maladaptive cluster and produced a Cronbach’s alpha of .78. The PTGI yielded .95 and the total of the IES-R, .94. The reliability was therefore determined to be robust as all Cronbach’s alphas were above the suggested baseline of .70 (Hair, Anderson, Tatham, & Black, 1998).

Hypothesis Testing

Hypothesis 1. To investigate if personal experience of trauma in addition to work-related experiences had a differential impact on coping (PTS and PTG), a one-way MANOVA was performed. The initial multivariate test indicates that there was a significant difference among the groups, Pillai Trace = .11, $F(4, 113) = 3.33$, $p < .05$, $\eta^2 = .11$, power = .83, with subsequent univariate tests highlighting these differences on both the total PTGI $F(1, 116) = 9.58$, $p < .01$ and the total IES-R $F(1, 116) = 4.65$, $p < .03$, but not on either of the Coping Subscales—Adaptive, $F(1, 116) = .28$, $p = .28$; Maladaptive, $F(1, 116) = 1.27$, $p = .26$. Therefore, those participants who had experienced a trauma in both their personal lives and vicariously had significantly higher means on the PTGI ($M = 52.81$, $SD = 2.38$) than those who had endured a vicarious trauma only ($M = 39.47$, $SD = 3.59$). This trend was repeated with the IES-R also yielding higher means when trauma had been experienced in both personal and vicarious domains ($M = 1.85$, $SD = .19$) as opposed to only vicariously ($M = 1.13$, $SD = .28$).

Hypothesis 2. To examine the capacity of adaptive and maladaptive coping to predict posttrauma outcome, a series of regression analyses were conducted. A Bonferroni adjustment of $p < .006$ was used to correct for multiple analyses. Adaptive coping strategies were significantly predictive of higher scores on the PTGI subscales of Spiritual Change

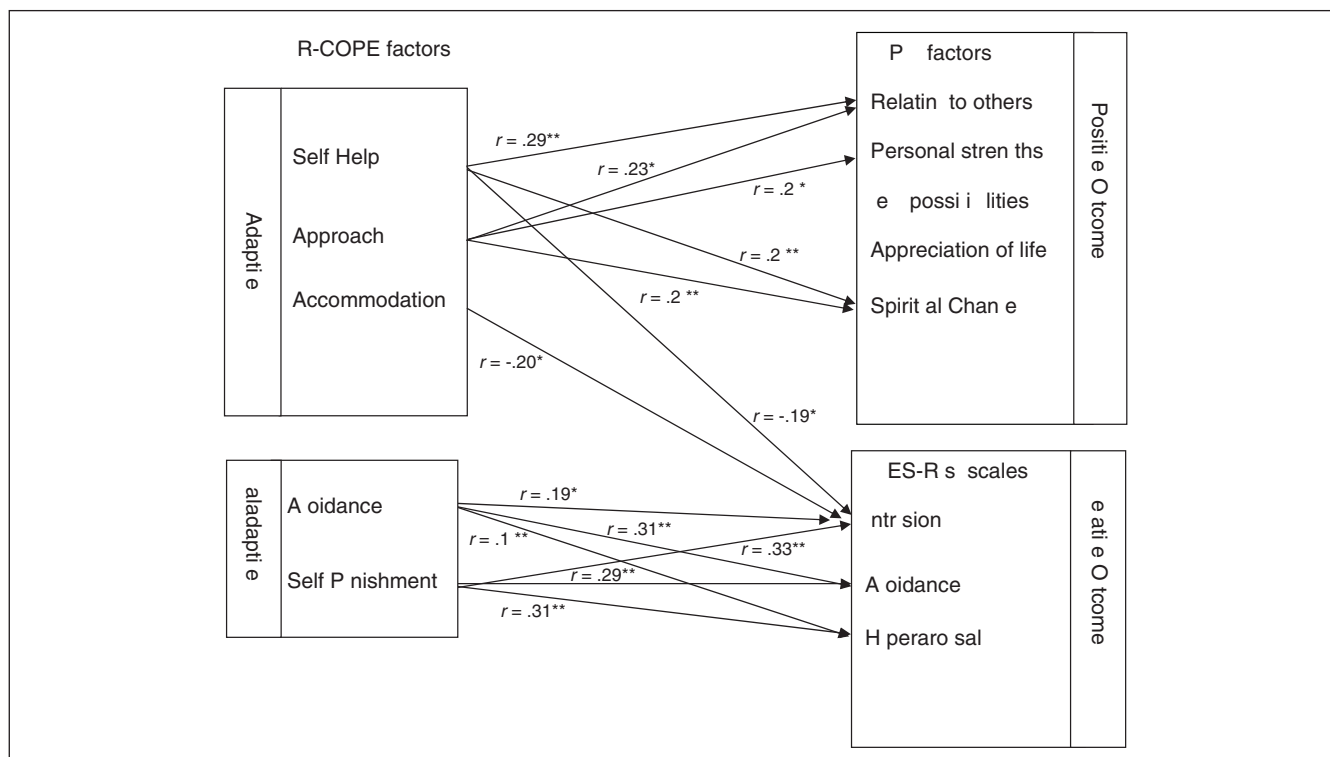


Figure 1. Results of correlational relationships between specific coping strategies and posttrauma outcomes
Adaptation of Zuckerman and Gagne's (2003) relationships between specific coping strategies and post-trauma outcomes with current coefficients (* $p < .05$; ** $p < .01$).

($\beta = .37, p < .001, R^2 = .12$), and Relating to Others ($\beta = .28, p < .006, R^2 = .08$). Adaptive Coping also showed a trend to be positively related to the PTGI subscale of Personal Strength ($\beta = .22, p = .03, R^2 = .05$) and also negatively linked with the IES-R subscale of Intrusion ($\beta = -.18, p = .06, R^2 = .14$), whereby higher adaptive coping scores were associated with lower scores on the Intrusion scale. Similar testing on the maladaptive coping cluster produced significant differences on all three of the IES-R subscales with higher use of maladaptive coping strategies equating with higher scores on Avoidance ($\beta = .37, p < .001, R^2 = .13$), Hyperarousal ($\beta = .36, p < .001, R^2 = .11$), and Intrusion ($\beta = .35, p < .001, R^2 = .14$).

Post hoc analysis assessing which specific coping factors were related to trauma outcome was achieved through Pearson correlation coefficients and are displayed in Figure 1. The self-help strategy showed strong positive correlation ($p < .01$) with the PTGI factors of relating to others ($r = .29$), and spiritual change ($r = .28$), and also a significant negative correlation ($p < .05$) with the stress related subscale of Intrusion ($r = -.19$). The coping strategy of approach produced positive correlations ($p < .05$) with the PTGI subscales of Relating to Others ($r = .23$), Personal Strength ($r = .25$) and Spiritual Change ($r = .26, p < .01$). Accommodation coping method correlated negatively ($p < .05, r = -.20$) with the IES-R Intrusion scale (clinicians generally believe that using

maladaptive strategies is linked to increased stress and is considered to be counterproductive to adjustment and well-being). Avoidant coping strongly positively correlated ($p < .01$) with each the IES-R scales of Avoidance ($r = .31$), Intrusion ($r = .19, p < .05$), and Hyperarousal ($r = .18$), as did the self-punishment coping factor ($p < .01$, Avoidance, $r = .29$; Intrusion, $r = .33$, and Hyperarousal, $r = .31$).

Discussion

The results of this study yielded support for the hypotheses and contribute original findings to the coping and trauma literature. This study highlights the specific adaptive and maladaptive coping strategies respectively linked to positive and negative symptoms after trauma, within the context of emergency medical response.

Descriptive Analyses

Paramedics are at increased risk of exposure to traumatic events, but the incidence of positive posttrauma outcome is a more prolific response than psychopathology in this sample with paramedics having scored well below subclinical levels on the IES-R scales. This result is not unexpected, as the ambulance officers continue to function despite their stressors and is reflective of previous studies with this population

(Shakespeare-Finch et al., 2003). Another influence may be that the average length of time since the event for the paramedics in this sample was 6 years, and therefore it could be suggested that those with high levels of PTSD symptoms may have selected out of the occupation.

The results reflect a positive current psychological well-being for the paramedics sampled; however contrasts with other emergency service occupations (police, firefighters, and soldiers) cited by Whealin et al., (2008) as ranging between 13% and 34% having met the screening criteria for PTSD. Results of the current study may attest to the effectiveness of the training and support services available to paramedics, as well as the networks in which they are embedded, which potentially ameliorate their stress and promote resilience (Whealin et al., 2008).

The organization's multifaceted Employee Assistance Program has received international acclaim (Scully, 2006) with such programs having been determined as an important factor in coping with stressful events (Kirk & Brown, 2003). Although not specifically addressed in this research, previous investigations of this particular organizations EAP has found very high levels of job satisfaction and very low levels of stress-related leave, for example, in the past 10 years the highest figure of staff taking annual stress leave is less than 2% which emphasizes a high level of functioning compared with other organizational groups and the general population (Shakespeare-Finch, & Scully, 2004).

The nature of the traumatic events described in this study, were relatively similar and within the scope of the expected role for emergency personnel, but contrast dramatically to other studies of coping using general population and student samples (e.g., Zuckerman & Gagne, 2003). Although the paramedics described the events that they most often felt traumatic were those that involved children, the results indicate that they were more affected by incidents in which they had a knowledge of the victim or were able to personally identify with them in some way. These cases recorded more intense levels of PTG and PTS, as well as a greater tendency to use maladaptive coping strategies. Results support a previous study by Regehr and colleagues (2002) that evidenced paramedics who formed an emotional connection with the victim, experienced greater vulnerability to stress. They also lend support to the "contextual" views of coping; that differential coping strategies are used according to the situation/context (Schulz & Mohamed, 2004).

Hypothesis 1: Consistent with previous studies involving emergency service personnel, the majority of participants reported having exposure to a personal trauma in addition to incidents which were attended to in the course of their employ (i.e., vicarious trauma; Shakespeare-Finch et al., 2003). Furthermore, those having a personal experience with the trauma, scored higher PTG and PTS than those who had vicarious trauma exposure. These results support Hypothesis 1 and replicate previous research, which found vicarious trauma evoked less

intensity of symptoms than that of a personal or direct experience of trauma (Shakespeare-Finch et al., 2003).

Hypothesis 2: The subscales of the R-COPE showed strong positive intercorrelations, which allowed the division into adaptive and maladaptive strategies as proposed by Zuckerman and Gagne (2003). More prolific use of adaptive coping strategies generally corresponded with higher PTG scores and lower intrusion scores which suggest that intrusive thoughts were alleviated when using adaptive coping. Also, greater use of maladaptive coping was predictably associated with higher scores on each of the scales measuring PTS such as, Intrusion, Hyperarousal, and Avoidance. This supports Hypothesis 2, whereby the use of adaptive strategies increases the likelihood of a positive trauma outcome and maladaptive coping is linked with greater risk of negative symptoms.

The authors again raise the caution that the terminology *maladaptive* implies negative connotations, with general belief that using maladaptive strategies is linked to increased stress and is considered to be counterproductive to adjustment and well-being. However, Stamm and Figley (2009) states that notions of avoidance which may comprise low levels of dissociation are common occurrences. Within the context of emergency medical response, these strategies traditionally referred to as maladaptive, may be viewed as a positive way of dealing with a highly charged scene *at the time of the event*, permitting the ambulance officer to focus on the task at hand. For example, the statement "I say to myself this isn't real" may be related to a form of professional detachment in viewing the situation as a "patient" and not a "person," which may foster positive adaptation to the incident (Zuckerman & Gagne, 2003).

Hence, within this work context, consciously engaging in this particular cognitive process can be beneficial for psychological health but importantly, reengaging with the reality of the challenging experience is essential. This assertion is supported by Sharkansky and colleagues (2000) in their finding that the use of approach-based coping in the active personnel in the Gulf war were significantly correlated with lower levels of psychological trauma symptoms as measured by Moos's Coping Responses Inventory.

The results of this study highlight the distinction that adaptive and maladaptive coping strategies have an influence on the posttrauma outcome, and utilizing the maladaptive strategies without "reengaging" with other more adaptive strategies may have negative effects over the long term. These results endorse the views of King, Vogt, and King (2004) who advocate that the adaptation to life after trauma relies on the choice and effectiveness of coping strategy. Furthermore, it has been acknowledged in several studies that employing a broad array of coping strategies has been linked to positive functioning and enhanced resilience in ambulance personnel (Robinson, 2002; Shakespeare-Finch et al., 2002).

An additional finding that adaptive coping reduces the level of intrusion a person experiences after trauma may be related to rumination, whereby constructive thoughts about the event assist in cognitive processing to comprehend meaning and promote adaptation to the trauma, which alleviates intrusive thoughts. Another explanation may be that the absence of intrusive thoughts may allow the person to access more preferred coping strategies to aid in trauma recovery (Calhoun & Tedeschi, 2006). This result needs to be further investigated with longitudinal studies to determine the direction of the relationship.

Janoff-Bulman (2004) contends that PTG should be measured as individual factors due to the potential for growth to occur in some domains but not necessarily across the broad spectrum. The present study supports this view, as differential coping strategies have been found to be associated with different trauma outcomes. Therefore, the analyses examining the relationship of specific coping strategies with post-trauma outcome has identified that self-help coping, which involves understanding and expressing emotion as well as attempts to seek support, was expectedly related to positive change in relationships with others and in regard to a sense of spirituality. Using an approach coping strategy involves direct problem solving activities and was found to assist people in recognizing personal strengths as well as relating to others and spiritual change. Intrusive thoughts were alleviated by the use of self-help and accommodation coping strategies, but accommodation was not related to PTGI factors, which is an unexpected finding because this strategy entails positive reframing and maintaining optimism, which are key elements of PTG. The strategies of avoidance and self-punishment predictably produced more negative symptoms of hyperarousal, intrusion, and avoidance.

These findings offer benefits for clinicians and trainers of emergency workers in promoting the awareness of specific coping strategies to better manage trauma through intervention and/or prevention programs. Further study specifying the coping strategies that relate to each domain may aid further understanding of the cognitive processes involved in producing trauma outcome and would be interesting to examine if this finding is replicated within a broader sample.

Further Strengths and Limitations of the Study With Recommendations for Future Research

It is acknowledged that other factors not included in this study, inevitably contribute to psychological well-being. Only a small percentage (maximum 11%) of the variance was explained by these present variables in the trauma outcome, therefore other factors also contribute to the phenomena of coping with trauma, for example variables identified in previous studies include personality and length of time since incident.

Other studies with an emergency service sample have documented the use of coping strategies involving substance

use (Regehr et al., 2002), humor (Moran & Shakespeare-Finch, 2003), and leisure activities (Iwasaki, Mannell, Smale, & Butcher, 2005). Several studies advocate that organizational stressors have greater influence than traumatic stressors on psychological well-being among emergency service workers (Kop, Euwema, & Schaufeli, 1999). Therefore, it would be beneficial to incorporate these variables in future studies to gain a holistic view of coping and psychological well-being of emergency service personnel.

In relation to methodological limitations, the cross-sectional design allows inferences regarding strength of relationships but has the usual faults associated with correlation; the inability to establish causation (Hair et al., 1998). This design also features attempts to overcome the limitations of potential cohort effects, which is addressed by the purposive sample selected to fulfill a broad range of age, roles, geographical locations, and experience.

Self-report measures are notably subject to the inherent limitations concerning retrospective distortion by participants due to fallibility of memory (Shipley & Gow, 2006), and the bias relating to social desirability whereby participants may strive to present themselves in a positive light (McMillen & Cook, 2003). However, due to the subjective nature of stress and trauma, this reporting style is the primary source of measurement in coping research (Lazarus & Folkman, 1984). In addition, research involving PTG has demonstrated that subjective ratings represent a more reliable measure than objective ratings by experts (Morris et al., 2005) and that self-reported growth is often corroborated by others (Shakespeare-Finch & Enders, 2008).

Although the sample size was sufficient and the participants are essentially representative of the greater emergency medical response population, they are a select group with arguably high levels of resilience and have access to a network of support services. Furthermore, emergency medical response is a self-selected occupation which means that the participants seek this type of employment, and if they feel that they are in high distress and unable to cope, they will then choose to leave which poses a limitation to the study in that those who are employing maladaptive coping strategies or potential high scorers on PTS have resigned from their position and consequently not included in this study. In such case the results are representative of this sample and may restrict generalization to the wider population.

In spite of this, the results compare favorably with studies using samples of personal exposure to trauma. Another Australian study by Morris, Shakespeare-Finch, and Scott (2007), suggests that the coping processes identified among a sample of cancer survivors (positive interpretation, social support, active coping, and venting emotions) is similar to findings from emergency service personnel, which may in fact enhance generalization (Morris et al., 2005). These studies employed a 24-item version of the PTGI which improved the stability of the Spiritual Change factor and, if incorporated in

this study, would allow better comparability with Australian literature (Morris et al., 2007).

A further consideration is related to the organizational culture within the emergency services whereby officers may be reluctant to acknowledge psychological distress or admit using perceived negative coping methods. In such cases, participant responses may be under reported and results biased (Regehr et al., 2002). In addition, research involving paramedics who have resigned or retired from operational service may also grant a more comprehensive understanding of these variables. With these limitations in mind, the results of this study should be interpreted with caution and generalization beyond the population in this study may be constrained.

Conclusion

In conclusion, this research has succeeded in exploring the effectiveness of coping strategies in relationship with psychological consequences of trauma. The type of coping strategy employed, has been shown to influence the person's ability to recover from trauma. The key relationships identified by this study are that adaptive coping strategies are associated with promoting specific positive changes after trauma and lower levels of intrusion, with maladaptive coping linked to greater risk of negative symptoms. Despite this finding, the authors suggest caution in implying that maladaptive strategies are less successful in managing to cope with trauma, as there may, in fact, be situations in which this is a beneficial response. In addition, Calhoun and Tedeschi, (1998) caution that reports of positive growth does not necessarily mean a better psychological adaptation to trauma. To evaluate the impact of these coping strategies on trauma outcome over time, a longitudinal study is recommended and would offer an opportunity to explore the effect of coping at various time frames (pre, peri, and posttrauma) and may also aid in clarifying the relationship between PTS and PTG (Linley & Joseph, 2004; Shakespeare-Finch & Enders, 2008; Whealin et al., 2008).

Ultimately, the effects of trauma are individually subjective (Morris et al., 2005), so it is important not to assume that trauma will inevitably be experienced in a negative context resulting in psychopathology, or imply that people should expect to benefit from trauma. This research has important implications in presenting a comprehensive view of the current psychological well-being of paramedics in the sample as well as for understanding the effectiveness of specific coping strategies used in adjusting to life after a traumatic experience. Clinicians and organizations may benefit by incorporating and promoting such coping strategies within preventative and intervention programs to potentially mitigate the negative effects of trauma.

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