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Adaptive and Maladaptive Coping Strategies Predict Post-trauma 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. As coping strategies have been implicated in adjusting to life challenges in other contexts, this study explored adaptive and/or maladaptive coping strategies in relation to work-related post-trauma outcomes. One hundred and 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 adaptive and maladaptive coping strategies were differentially associated with post-trauma 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

### Adaptive and Maladaptive Coping Strategies Predict Post-trauma Outcomes in Ambulance Personnel.

Attending critical and potentially dangerous incidents is inherent in the role of emergency service workers. The subsequent risk of developing Post-traumatic stress symptoms has received increasing attention by employers, the media, and psychological researchers (e.g., Bowman, 1997; Mitchell & Everly, 2001). 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 exploring the role of specific coping strategies in relation to post-trauma outcome in emergency ambulance personnel including both positive and negative measures of adaptation.

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 post-traumatic 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 (Helgeson, Reynolds, & Tomich, 2006; Linley & Joseph, 2004; Shakespeare-Finch & Copping, 2006; Calhoun & Tedeschi, 2006). While some studies endorse a small positive and linear relationship between positive and negative post

trauma 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).

#### *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, 1996). 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 PTG among ambulance officers, Shakespeare-Finch, Smith, Gow, Embelton, & Baird, (2003) found significantly higher levels of positive and negative post-trauma symptoms reported among paramedics who had experienced a trauma in their personal lives, as compared to those who had experienced trauma while in a professional capacity alone.

#### *Coping in Relation to Trauma*

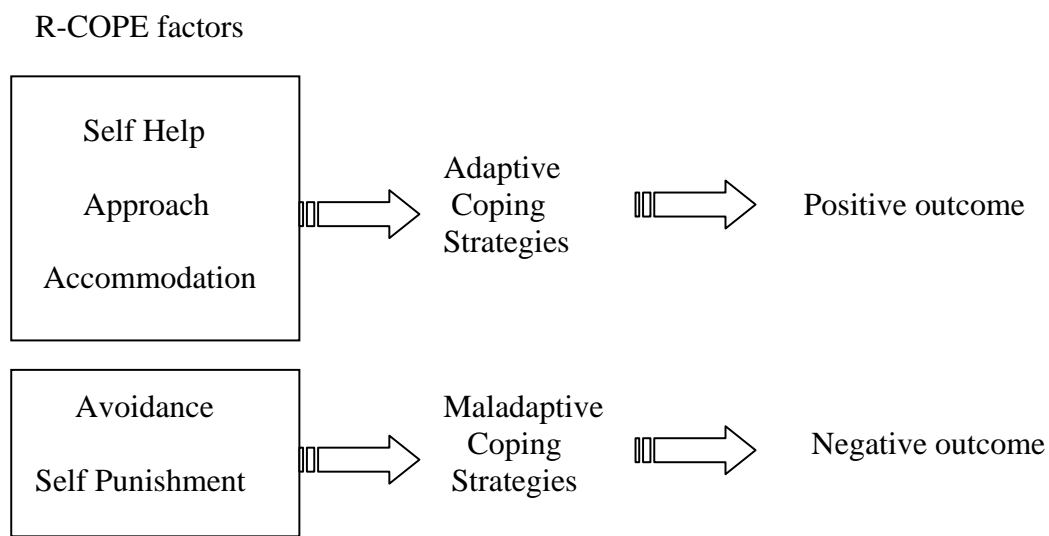
For a person surviving trauma, the ultimate aim is to make sense of the event, which involves a cognitive process of ascertaining meaning in relation to their experience. This concept is universally accepted in coping theories and is assumed to promote better adjustment in managing the trauma (Lazarus & Folkman, 1984; Regehr, Goldberg & Hughes, 2002; Tedeschi & Calhoun, 1996). 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 post-trauma 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 dependant 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. This poses an enduring challenge in coping assessment where some responses that are typically viewed as being maladaptive (e.g., avoidance or dissociation strategies), may actually be a successful approach in some critical situations (e.g., being held hostage or the role of paramedics at the time of response to the critical incident; Figley, 2008). The authors explore these concepts by examining the associations between adaptive and maladaptive coping strategies with post-trauma adjustment.

The coping measure employed in this study to assess the adaptive/maladaptive relationship, is the Zuckerman and Gagne (2003) Revised-COPE measure. The R-COPE comprises a novel five dimensions, which are defined as individual response tendencies in coping with stressors: 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). Figure 1 outlines the relationships between the factors and the proposed outcomes (Zuckerman & Gagne, 2003).



*Figure 1.*

Relationships between clusters of R-COPE scale with proposed outcomes. (Adapted from Zuckerman & Gagne, 2003).

### *The Role of Emergency Service Personnel*

On a daily basis, Ambulance officers encounter situations where individuals are in extreme states of distress, with last year's statistics for this particular service recording approximately 815, 000 emergency calls (equating to an average emergency call out every 66 seconds; 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 upon their families

and employing organisation (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. 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 humour, 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, non-work 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 adaptive and maladaptive coping strategies on post-trauma outcome (Linley & Joseph, 2004).

### *Hypotheses*

*Hypothesis One.* Literature has established a distinction between personal and vicarious trauma, with personal exposure found to evoke a greater intensity of post-trauma 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 post-trauma outcomes as a result of direct and/or vicarious traumatic experiences. Hypothesis one predicts that those who have experienced personal trauma will respond with higher scores on both the post-trauma measures of stress (IES-R) and growth (PTGI).



*Hypothesis Two.* 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. The research further seeks to explore the relationships between specific coping strategies and post-trauma outcome examining Janoff-Bulman's (2004) contention that disparate cognitive processes may be involved for different domains of PTG. Hypothesis two 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.

## Method

### *Participants*

Operational Paramedics ( $N=125$ ) participated in the study. Participants were recruited from various Ambulance positions and geographical locations to maintain a stratified representativeness. The sample composition included new recruits ( $n=26$ , 22%), seasoned officers with several years of 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 36.98 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).

As the study was interested in coping and post-trauma outcomes regarding trauma, participants needed to have experienced a traumatic event in order to be included in the study. The participants answered 3 questions regarding their experiences. First, having been provided with a definition of trauma (according to the Diagnostic and Statistics Manual-Fourth edition-Text Revision [DSM-IV-TR]; American Psychological Association, 2000), all of the ambulance personal 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%). A further 36 participants stated that they had endured a work-only 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 length of time since the incident ranged from one 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 categorised into one of five broad groups according to the nature of the trauma experience; a subjective severity rating on a likert 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 Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). Post-traumatic Stress symptoms of trauma were assessed with the Impact of Events Scale-Revised (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 six-point Likert scale ranging from zero, indicating “I did not experience this changes”, to 5 representing “I experienced this change to a very great degree”. The inventory has five factors identified as; 1) relating to others, 2) new possibilities, 3) personal strength, 4) spiritual changes, and 5) 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 co-efficient 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).

*Impact of Events Scale-Revised* (IES-R; Weiss & Marmar, 1997). 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 (2000) criteria for PTSD. The 22 item self-report scale comprises three independent subscales; 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 four-point scale in relation to the extent to which symptoms have caused distress in the last seven 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 .84 and Hyperarousal alpha .79). The IES-R also claims high retest reliability (Weiss & Marmar, 1997).

*Revised – COPE* (R-COPE; Zuckerman & Gagne, 2003). The Revised COPE scale was based on the COPE subscales of Carver, Scheier, & Weintraub, 1989). The 40 self-report

items assess five factors: 1) Self Help, 2) Approach, 3) Accommodation, 4) Avoidance, and 5) 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”.

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 that the subscales of Self Help, Approach and Accommodation correlate with adaptive forms of coping, and that Avoidance and Self Punishment represent maladaptive coping. 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 during routine 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 discrete 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 counselling 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 control measure to preserve the definition of trauma according to the DSMIV-TR criteria (APA, 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 qualitative data relating to the nature of the trauma was broadly categorized into 1 of 5 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 levels of total PTGI scores and total IES-R scores than the other groups  $F(4,113) = 3.77, p < .01$ . Trauma of this nature also produced the highest means of Maladaptive coping. In contrast, the “extensive injury” category demonstrated the lowest levels of both IES-R and PTGI scores, and the highest means of Adaptive coping strategies. Specifically, the ‘extensive injury’ category produced significantly lower levels of PTGI scores than the category “involving children” ( $p < .05$ ) or in those whose event comprised “knowing or indentifying with the victim” ( $p < .05$ ). 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 IES-R scores 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 et al., 1998).

Table 1

*Correlation Co-efficients signifying the clusters of Adaptive and Maladaptive Coping*

	Self Help	Approach	Accomm.	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

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

### *Hypothesis Testing*

*Hypothesis One.* 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 those experiencing both personal. The subsequent univariate tests suggests that the test

of between subjects effects shows that the groups significantly differ 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 both a personal and work related trauma, had significantly higher means on the PTGI ( $M = 52.81, SD = 2.38$ ) than those who had endured a trauma only at work ( $M = 39.47, SD = 3.59$ ). This trend was repeated with the IES-R also yielding higher means when trauma had been experienced in both personal and work domains ( $M = 1.85, SD = .19$ ) as opposed to only work related ( $M = 1.13, SD = .28$ ).

*Hypothesis Two.* To examine the capacity of adaptive and maladaptive coping to predict post-trauma 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 ( $\beta = .37, p < .001, R^2 = .12$ ), 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 ( $\beta = .35, p < .001, R^2 = .14$ ).

### Discussion

The results of this study yielded mixed support for the hypotheses and contributes 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 post-trauma outcome is a more prolific response than psychopathology in this sample with Paramedics having scored well below sub-clinical levels on the IES-R scales. This result is not unexpected, as 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 and may attest to the effectiveness of the training and support services available to paramedics which potentially ameliorate their stress and promote resilience. 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). For example, the Ambulance Service from which this study is sampled cites less than 2% of staff taking annual stress leave (this was the highest figure over 10 years), which emphasises a high level of functioning compared to other organizational groups and the general population (Scully, 2006).

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 were 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 utilized according to the situation/context (Schulz & Mohamed, 2004).

### *Hypothesis One*

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., work-related) (Shakespeare-Finch et al., 2003). Furthermore, those having a personal experience with the trauma, scored higher PTG and PTS than those who had “work-only” trauma exposure. These results support hypothesis one and replicate previous research, which found vicarious trauma evoked less intensity of symptoms as that of a personal or direct experience of trauma (Shakespeare-Finch et al., 2003).

### *Hypothesis Two*

The subscales of the R-COPE showed strong positive inter-correlations, 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. Also, greater use of maladaptive coping was related to higher scores on each of the scales measuring PTS; intrusion, hyperarousal and avoidance. This supports hypothesis two, 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 when, in practical terms, it is actually possible that “maladaptive” strategies may be beneficial in dealing with some situations (Zuckerman & Gagne, 2003). This view is also relevant when investigating coping in an emergency services work setting.

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). 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 domains of PTG. Examining such relationships has highlighted that utilizing adaptive coping strategies were related to positive change in relationships with others and in regard to spirituality. A trend was also identified which suggests that intrusive thoughts were alleviated by the use of adaptive coping strategies. The use of maladaptive coping strategies were predictably associated with more negative post trauma symptoms. Further study specifying the coping strategies that relate to each PTG domain may aid further understanding of the cognitive processes involved in producing trauma outcome and would be interesting to examine if this finding would be 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, e.g. 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), humour (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 fulfil 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). Additionally, 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 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 favourably with studies using samples of personal exposure to trauma. Another Australian study by Morris and colleagues (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). Additionally, 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 relation to psychological consequences of 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. Additionally, 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 and may also aid in clarifying the relationship between PTS and PTG (Linley & Joseph, 2004; Shakespeare-Finch & Enders, 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 specific coping strategies used in adjusting to life after a traumatic experience.

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