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Trauma in Emergency Services:

**A Systematic Review of Posttraumatic Growth in Firefighters and an Investigation into
Post-Traumatic Stress Symptoms in Ambulance Clinicians: Severity and Associations with
Self Compassion, Psychological Inflexibility and Wellbeing**

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Doctorate in Clinical Psychology

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May 2017



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Thesis Abstract

This research portfolio examines the impact of trauma exposure in the emergency services. Emergency services represent a unique population in that they are frequently and repeatedly exposed to distressing and potentially traumatic situations.

Firstly, a systematic review was conducted looking at factors that may potentially predict positive outcomes following trauma exposure in firefighters, namely the concept of posttraumatic growth (PTG). A review of the existing evidence was conducted across five databases. Studies were assessed against inclusion criteria and 12 studies were included. Results suggested that PTG was generally either not significantly or weakly related to other factors. Variables that were associated with PTG were aspects of the trauma exposure, post-traumatic stress severity and organisational and operational factors; however results were limited by methodological quality. Overall, the current evidence base has not identified strong predictors of PTG and associations appear multifactorial. Results indicate that PTG appears to have limited clinical utility in firefighters and that future research should improve upon the methodological limitations of the existing evidence base.

The second part of the portfolio consists of an empirical study exploring the levels of post-traumatic stress symptom (PTSS) severity in ambulance clinicians and a cross-sectional analysis of factors relating to PTSS severity and psychological wellbeing in this population. A total of 508 ambulance clinicians (Paramedics and Ambulance Technicians) were recruited across Scotland. The relationships between PTSS severity, psychological wellbeing, self-compassion and psychological inflexibility were analysed using structural equation modelling. Results showed approximately 50% demonstrate clinically concerning levels of PTSS in the ambulance service and a strong positive relationship between psychological inflexibility and PTSS severity as well as with psychological wellbeing. Self-compassion had a small association with psychological wellbeing but was not significantly associated with PTSS severity. The potential impact of relying on post-traumatic stress disorder criteria of symptoms lasting for four weeks or more may mask the extent of PTSS experienced in this population. Findings indicate concerning levels of trauma symptomology within a representative ambulance service sample, and suggest the need for further

investigation into potential causal relationships between psychological flexibility and PTSS in order to deliver effective interventions to reduce PTSS severity in this population.

Chapter 1

Predictors of Posttraumatic Growth in Firefighters:

A Systematic Review

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Prepared in accordance with the author guidelines (See Appendix A) for the **Journal of Clinical Psychology**

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1.1 Abstract

Objective

Firefighters are routinely confronted with distressing incidents and there is an expanding area of research into positive post-trauma outcomes such as Posttraumatic growth. Findings thus far have been inconsistent as to what might predict this. This review aimed to identify predictors of PTG in firefighters.

Method

A systematic review of the existing evidence was conducted across five databases. Studies were assessed against inclusion and exclusion criteria and 12 studies were included.

Results

Findings were either generally non-significant or yielded small effect sizes. The majority of studies demonstrated notable methodological limitations. Overall, factors associated with PTG were aspects of the trauma exposure, post-traumatic stress severity and organisational and operational factors.

Conclusion

Current research has not identified strong predictors of PTG and associations appear multifactorial in nature. Evidence indicates the clinical utility of PTG in firefighters is limited and that further research needs to evolve past the methodological constraints of the current evidence base.

1.2 Introduction

Exposure to highly distressing situations is a common occurrence amongst emergency service personnel including firefighters (Armstrong, Shakespeare-Finch, & Shochet, 2016). Faced with incidents such as house fires, motor vehicle incidents, and handling deceased victims they are at risk for finding aspects of their job traumatic (Armstrong et al., 2016). Exposure to a traumatic incident has been strongly related to reduced quality of life, poorer psychological wellbeing, and a myriad of mental health issues (Afifi et al., 2007; Herrenkohl, Klika, Herrenkohl, Russo, & Dee, 2012). Evidence suggests an increased risk for anxiety, depression, substance dependence and most notably post-traumatic stress disorder (PTSD; Dedert et al., 2009). Indeed, emergency service personnel in particular have demonstrated significantly higher levels of PTSD than the general population (Berger et al., 2012). Whilst it is important to recognise the negative sequela of trauma exposure it is also useful to better understand positive reactions, particularly in populations such as the emergency services where exposure to trauma is inevitable.

There is a growing body of research exploring potential positive psychological outcomes following a trauma, specifically the concept of posttraumatic growth (PTG). PTG is defined as a positive change following exposure to a traumatic event, where development in at least some areas has exceeded what was present prior to the trauma. In this respect the person has not just survived the incident but has perceived important positive change from the experience, that is over and above returning to beliefs held before the incident (Tedeschi & Calhoun, 2004). Tedeschi and Calhoun (2004) described PTG as different to other concepts such as resilience, hardiness and sense of coherence. They argued that these constructs allowed people to cope well with adversity but PTG is more than an ability to survive trauma, it represents a subjective change in schemas borne from the challenge of the distress after a trauma.

One of the predominant models of PTG is Tedeschi and Calhoun's (1996; 2004) model which conceptualises PTG as experiencing a trauma which results in a direct challenge to people's previous worldview and beliefs, leading to a change in the ability to cope with emotional distress. This distress leads to perpetual rumination

and efforts to commit to behaviours that will reduce it. Once achieved, this allows for more premeditated and purposeful cognitions of the trauma as opposed to the initial more intrusive automatic thoughts, effectively allowing for adaptive cognitive re-structuring; making of a new meaning to events and life thereafter alongside re-appraisal of the trauma leading to the development of PTG. PTG is proposed to be multidimensional encompassing changes in behaviours, goals, beliefs and one's identity (Zoellner & Maercker, 2006).

There are several lines of argument as to the conceptualisation of PTG and whether it occurs as an outcome of the distress incurred by experiencing a traumatic event as described by Tedeschi & Calhoun (2004), or as a coping strategy in of itself. PTG as a coping strategy has been categorised as a way of making meaning of a traumatic incident (Davis, Nolen-Hoeksema, & Larson, 1998), or as an interpretive process whereby people move through several stages of attempts to cope with the trauma (Filipp, 1999) or as a form of coping by creating positive appraisals of the trauma (Taylor, 1983). PTG in this context is viewed as an adaptive psychological adjustment to threat. This is an important distinction as these different conceptualisations appear to theoretically distinguish between PTG as a positive change in cognitive and emotional appraisals and not necessarily an adaptation to trauma (PTG as outcome) versus PTG as a specific coping strategy to reduce distress (psychological adaptation).

In accordance with the predominant Tedeschi and Calhoun (2004) model PTG is suggested to occur across five domains; greater appreciation of life and an altered perception of priorities, closer relationships with other people, a greater impression of personal strength, recognition of new potential paths one has in life, and finally perceived spiritual development. Zoellner and Maercker (2006) highlight that PTG domains should be conceptualised as independent to general emotional adjustment following a trauma and therefore can theoretically exist alongside emotional distress and PTSD. This points to an intriguing argument in that if PTG can exist alongside distress and distress leads to fatigue, burnout and a reduced ability to cope with future traumatic incidences in emergency services (van der Ploeg et al., 2003; van der Ploeg & Kleber, 2001), what then is the intrinsic value of demonstrating PTG?

To date, studies investigating the relationship between PTG and mental health issues report equivocal findings in the general population. In a review of the evidence, Zoellner and Maercker (2006) found that in general PTG and PTSD were not significantly related, with the correlations ranging from $\pm.2$, however longitudinal studies demonstrated that greater initial PTG predicted fewer post-traumatic stress symptoms (PTSS) at a later period (Frazier, Conlon, & Glaser, 2001; McMillen, Smith, & Fisher, 1997). Further, cross-sectional studies tended not to show a significant relationship between PTG and depression (Zoellner & Maercker, 2006), with the exception of Frazier et al. (2001) which found a moderate association between PTG and depression in sexual assault survivors and that greater initial PTG resulted in fewer symptoms of depression at follow up. In later studies, Salsman, Segerstrom, Brechting, Carlson and Andrykowski (2009) found in a group of cancer survivors that at 12 months post diagnosis there was no relationship between PTG and PTSD, depression or anxiety, whilst Morrill et al. (2008) found in breast cancer survivors that PTG moderated the relationship between PTSS and depression as well as PTSS and perceived quality of life.

From their review, Zoellner and Maercker (2006) concluded that null findings did not appear to depend on severity of trauma, population or measures used. This review further suggested that the inconsistent findings make it difficult to assess the psychological benefit of PTG. Tedeschi and Calhoun (2004) proposed that several pre-exposure variables affect PTG such as personal characteristics, social support, and severity of enduring distress and argued that those who possessed characteristics that allowed a capacity to cope and to find distress following exposure less imposing would likely show little PTG in the wake of a trauma. However, existing evidence not only makes the significance of the presence of PTG questionable but does not strongly allude to any particular factors that might predict it. Further, studies tend to adopt a wide variety of outcome measures used to assess PTG based on different theoretical models, across a variety of populations with different types, severity and duration of trauma exposure. It is therefore important to systematically review the available evidence to develop a better understanding of PTG and variables that are associated with its development. Moreover, a review needs to be specific to a population given the mixed findings across studies of varying populations. Given the

questionable evidence of the clinical utility of PTG a review will also enable a better assessment of the relevance of PTG to other factors typically of interest in trauma exposed populations.

Trauma exposure is highly prevalent in firefighters (Berger et al., 2012), it is therefore of interest to know what factors might predict PTG given this pervasiveness. Evidence has shown higher levels of PTSD, depression, substance abuse and low psychological wellbeing in firefighters compared to the general population (Carey, Al-Zaiti, Dean, Sessanna, & Finnell, 2011; Chen et al., 2007; Wagner, Heinrichs, & Ehler, 1998). Thus it is clear that there is a notable negative impact of the job on individuals, but it would also be of benefit to know what might predict more positive post-trauma reactions. To date no review has been conducted on the evidence of PTG and what variables might predict this in firefighters and the current paper aims to address this gap in the literature. Current evidence generally demonstrates no definitive significant relationship between PTG and other factors, thus it is of interest to know if the presence of PTG is associated with factors generally considered clinically useful such as coping strategies, psychological wellbeing, etc. If PTG does not demonstrate predictability from other factors it may indicate that PTG in its current conceptualisation is in effect limited in clinical utility.

Given the most prevalent model of PTG is that of Tedeschi and Calhoun (1996; 2004; Zoellner & Maercker, 2006), the current review will only look at studies that measure PTG as specified by the model. The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) and the Posttraumatic Growth Inventory- Short Form (PTGI-SF; Cann et al., 2010) were designed to reflect Tedeschi and Calhoun's (2004) domains of PTG. Moreover, they specifically measure growth due to trauma exposure and not from other stressors, which other measures do not differentiate between (for a review of PTG measures see Zoellner and Maercker (2006)). Therefore, studies included are those that have used the PTGI or PTGI-SF in order to ensure consistency of what is being measured.

The aim of this review was to systematically explore the available evidence regarding predictors of PTG in firefighters. In addition, this review aimed to

establish if there is sufficient reliable evidence to indicate PTG as a concept of clinical importance in this population.

1.3 Method

The protocol for the current study was registered on Prospero International prospective register of systematic reviews (<https://www.crd.york.ac.uk/PROSPERO>), record CRD42016039115.

Inclusion Criteria

Studies included were quantitative research, available in English that reported predictive factors of PTG in firefighters, using the PTGI (Tedeschi & Calhoun, 1996) and the PTGI-SF (Cann et al., 2010). Participants had to be employed as a Firefighter at time of study in either a voluntary or paid capacity.

Measures

The PTGI is a 21-item measure where participants are asked to rate each item on a scale from 0 (not at all) to 5 (very great degree) of how they perceive that specific changes have arose post-trauma across Tedeschi and Calhoun's (2004) domains of PTG. The PTGI has demonstrated an internal consistency of .95 in emergency services (Kirby, Shakespeare-Finch, & Palk, 2011). The PTGI-SF is a shortened version of the PTG including 10 items from the original PTGI and has demonstrated good internal reliability in emergency services of .91 (Leykin, Lahad, & Bonneh, 2013).

Search strategy

In January, 2017 a systematic search of EMBASE (1980-December, 2016), MEDLINE (1966-December, 2016), PsychINFO (1806-December, 2016), PILOTS (1871- December, 2016) and CINAHL Plus (1937-December, 2016) was conducted using the following search terms: emergency service*, emergency responder*, fire*, rescue worker*, first responder*, posttrauma* growth, PTG, post trauma* growth, benefit finding, post-trauma* growth, and positive personal growth. The asterisks denoting that all terms beginning with the root were included in the search.

Results from the databases were downloaded to Mendeley© Version 1.17.6 where duplicated citations were removed and the remaining results were examined. The first author (KD) screened the titles to remove irrelevant citations and abstracts were evaluated for the inclusion criteria. Full papers were retrieved for the remaining citations and were excluded if they did not meet inclusion criteria. References of articles that met inclusion criteria were searched for further relevant papers. See Figure 1.1 for a flow diagram of how results were filtered.

Data Extraction and Risk of Bias Assessment

Details from relevant studies included year of publication, design of study, number of participants, demographic data of participants (mean age and percentage male), type of measure used to assess PTG, associated factors and form of measurement, statistical analysis used, key results, and conclusions were extracted (Effective Practice and Organisation of Care (EPOC), 2013; see Appendix B).

Overall risk of bias across the papers was assessed using the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (National Heart, Lung, and Blood Institute, 2014). Studies were assessed on 14 factors on clarity of the following: statement of study objective, population clearly specified and defined, participation rate, recruitment selection process, power of study, measures used prior to trauma exposure, sufficient timeframe to reasonably expect an association to occur between exposure and outcome of interest, different levels of exposure as related to the outcome, validity and reliability of both dependent and independent variables, exposures assessed more than once, assessors blind to exposure status, loss to follow-up, and finally statistical control for confounds (see Appendix C). Studies were then rated as 'good', 'fair' or 'poor'. A second rater assessed risk of bias in 25% of the included studies and any inconsistencies were discussed and remedied, inter-rater reliability was 83% (Cohen's Kappa =.712).

1.4 Results

The search returned a total of 84 results and two more were identified through screening relevant papers, giving an overall total of 86 papers. After removal of duplications the remaining titles were screened for eligibility and further papers were

excluded. Abstracts were screened for relevancy resulting in the exclusion of additional papers. Of the remaining papers one was not available in English and another was excluded due to being a review that did not focus on firefighters. Twelve studies met the inclusion criteria and were accepted into the current review. Figure 1.1 presents details of the systematic process of exclusion and inclusion.

Participants Characteristics

All 12 studies recruited firefighters employed at time of the respective study. Three studies recruited other emergency service personnel alongside firefighters. Specifically, Gray (2004) recruited 79% firefighters and Oginska-Bulik (2013) recruited 37.1% firefighters in the sample, the same sample was used for Oginska-Bulik (2015). The same sample was used for Armstrong, Shakespeare-Finch, & Shochet (2014) and Armstrong et al. (2016), and the same sample was used for Kehl, Knuth, Holubova, Hulse and Schmidt (2014) and Kehl, Knuth, Hulse and Schmidt (2014, 2015).

In total, 3354 participants were recruited, of that 3228 were firefighters (96%). The population was 96% male, with an overall mean age of 35.6 years with a pooled standard deviation of 9.16, Armstrong et al. (2014; 2016) and Gray (2004) did not state the mean age of participants.

Characteristics of Studies

All studies included in the review were cross-sectional and reported a variety of hypothesised predictive factors rather than focusing on one specific construct: three of the studies looked at trauma exposure events (Armstrong et al., 2014; Gray, 2004; Kehl et al., 2015) and four investigated operational factors (Armstrong et al., 2014, 2016; Gray, 2004; Kehl et al., 2015; Sattler, Boyd, & Kirsch, 2014). Four papers examined social support (Armstrong et al., 2014; Moran, 2012; Oginska-Bulik, 2013, 2015; Sattler et al., 2014), two looked at coping strategies (Armstrong et al., 2014; Sattler et al., 2014), three investigated organisational factors (Armstrong et al., 2014, 2016; Gray, 2004; Sattler et al., 2014), four looked at post-traumatic stress symptoms (PTSS; Gray, 2004; Kehl, Knuth, Holubova, et al., 2014; Leykin et al., 2013; Oginska-Bulik, 2015), and three studies looked at time since trauma exposure

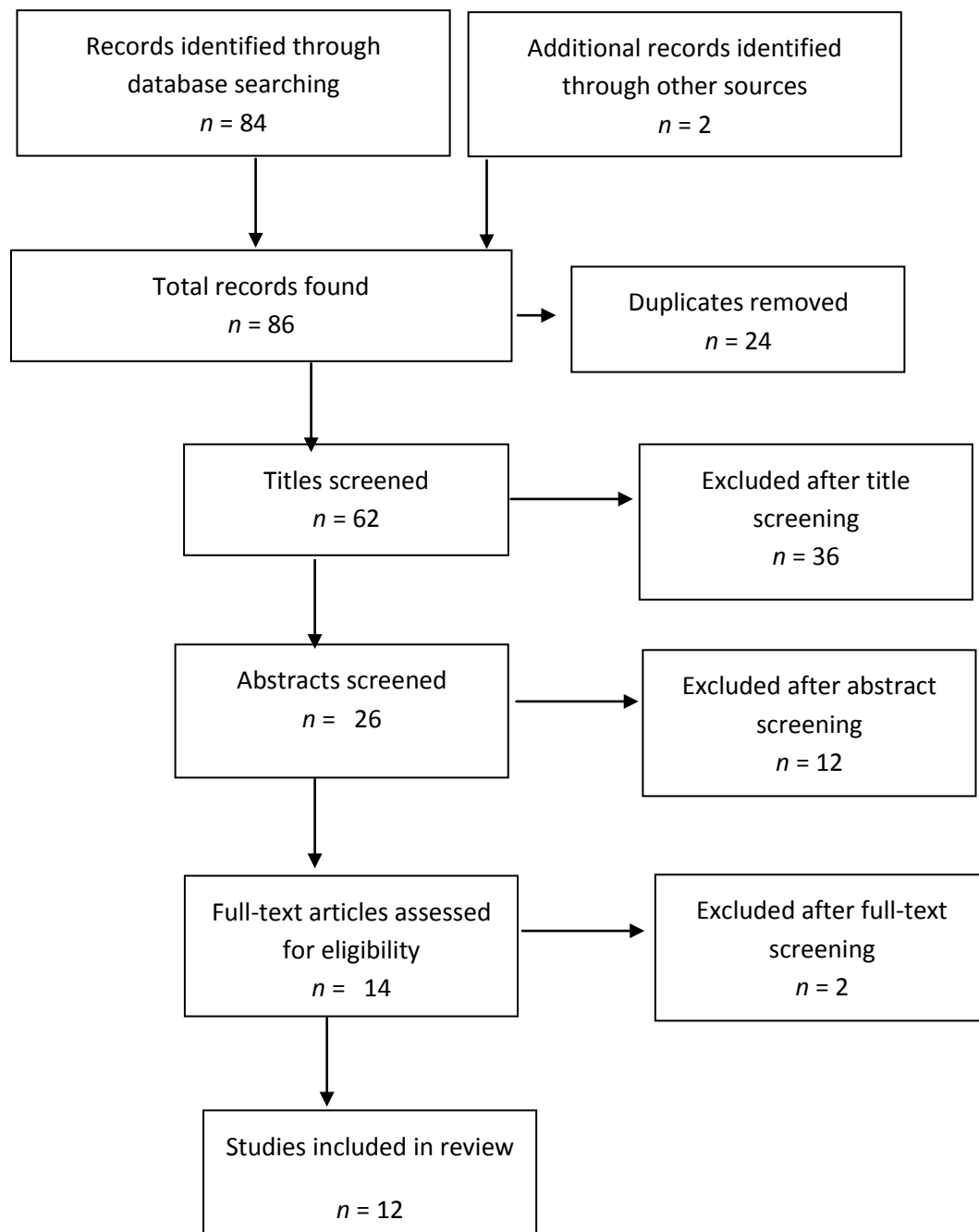


Figure 1.1. Flowchart of Systematic Search Process

(Kehl, Knuth, Holubova, et al., 2014; Kehl et al., 2015; Kehl, Knuth, Hulse, et al., 2014), note that these three studies drew from the same population. Four examined specific effect of demographics (Kehl, Knuth, Holubova, et al., 2014; Kehl et al., 2015; Leykin et al., 2013; Sattler et al., 2014), finally, two studies looked at participant traits (Oginska-Bulik & Kobylarczyk, 2016; Oginska-Bulik, 2013).

Synthesis of Results

See Table 1.1 for a summary of the key results of the included studies. Results are discussed in terms of themes of factors across the studies that were hypothesised to predict PTG. In general predictors across all the studies produced small effect sizes as specified by Nieminen, Lehtiniemi, Vähäkangas, Huusko, and Rautio (2013).

Trauma Event Exposure

Armstrong et al. (2014) found that the trauma source; that is whether participants had personal experience of trauma over and above witnessing it in work was positively related to PTG (small effect size). Kehl et al. (2015) found features of the traumatic event significantly related to PTG; specifically if the event was a natural disaster, emotion distress at time of event and perceived life-threat all showed a small positive relationship with PTG. Knowing the deceased had a small negative relationship to PTG. This study found a non-significant relationship between PTG and other common trauma events (with the exception of natural disaster), as well as overall number of life threatening incidents and other subjective incident features, such as victim characteristics and perceived lack of control. Gray (2004) found that severity of exposure to trauma was positively related to PTG (small effect size) and this relationship was mediated and moderated (two separate analyses) by organisational support. Overall, three studies showed a small relationship between PTG and specifics of the trauma exposure however, studies tended to measure different aspects of the exposure and thus no clear predictor is shown across the studies. Armstrong et al. (2014) and Grey (2004) demonstrated good methodological rigor however did not adequately control for confounds, whilst Kehl et al. (2015) controlled for confounds.

Table 1.1 Overview of included studies

	Design	Variables	Outcome Measures of interest	Sample Size	Sample Age Mean (SD)	Gender % Male	Statistical Analysis	Key Findings Sig and non-Sig predictors	Effect Size (β) and p -value of sig. predictors
Armstrong, Shakespeare-Finch, & Shochet (2014)	Cross-Sectional	PTG Trauma source Social Support Coping Work factors	PTGI Operational Police Stress Questionnaire Organisational Police Stress Questionnaire 2-Way Social Support Scale The Coping Response in Rescue Workers	218	Not Stated	96.80%	Hierarchical Regression	Sig. Trauma Source Coping (self-care domain) Non-Sig Social Support Work factors Other forms of coping style	Trauma Source $\beta=.21, p=.000$ Self-Care $\beta=.27, p=.000$
Armstrong, Shakespeare-Finch, & Shochet (2016)	Cross-Sectional	PTG Operational Factors Organisational Factors	PTGI Operational Police Stress Questionnaire Organisational Police Stress Questionnaire 2-Way Social Support Scale The Coping Response in Rescue Workers	250	Not Stated	97%	Structural Equation Model	Sig. Organisational Belongingness mediates relationship between Organisational Stressors and PTG Non-Sig Operational Stress Organisational Stress	Indirect pathway $\beta=.18, p<.001$

Gray (2004)	Cross-Sectional	PTG PTSS Severity of exposure Organisational Stress Role Clarity Utilization of Skills Autonomy Workload Perceived Organisational Support Team Cohesion Organisational Commitment Absenteeism	Impact of Events Scale-revised PTGI Job Stress Questionnaire The Psychological Climate Questionnaire The Affective, Continuance and Normative Commitment Scales-Revised The Survey of Perceived Organisational Support The Organisational Citizen Behaviour Scale Revised Substitutes for Leadership Scale Trauma Exposure and Distress ratings Option of open-ended questions	Total <i>n</i> =251 Firefighters <i>n</i> =198	Not stated	85%	Moderated and Mediated Multiple Regression	Sig. Traumatic stress Severity of trauma exposure Organisational support Organisational support moderated and mediated relationship between PTG and severity of trauma exposure Autonomy Normative commitment mediated between PTSS and PTG Perceived organisational support had direct relationships with PTG Non-sig. Organisational variables (except for organisational support) Absenteeism	Exposure $\beta = .18, p < .01$ Traumatic stress $\beta = .41, p < .01$ Organisational support $\beta = .14, p < .05$ Organisation support moderation $\beta = .17, p = .17$ Autonomy $\beta = .13, p < .0$ Normative Com. Total indirect effect $\beta = .02, p < .01$
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Kehl, Knuth, Hulse, & Schmidt (2014)	Cross-Sectional	PTG Demographics Time since incident	PTGI-SF Behaviour, Culture and Security First Responder	1916	36.1 (9.54)	96.90%	Hierarchical Regression	Sig. Time since incident <i>Education:</i> Low vs. High Med vs. High <i>Country:</i> Czech Republic Italy Poland Turkey UK Non-Sig Gender Age Profession (Paid vs. Unpaid) Rank Years of Service	Time $\beta = -.052, p < .05$ <i>Education:</i> Low vs. High $\beta = .068, p < .05$ Med vs High $\beta = .092, p < .001$ <i>Country:</i> Czech Rep. $\beta = .17, p < .001$ Italy $\beta = -.126,$ $p < .001$ Poland $\beta = -$.169, $p < .001$ Turkey $\beta = .331,$ $p < .001$ UK $\beta = -.12,$ $p < .001$
Kehl, Knuth, Holubova, Hulse, & Schmidt (2014)	Cross-Sectional	PTG PTSS Time since incident	PTGI-SF Impact of Events Scale- Revised Behaviour, Culture and Security First Responder	927	34.4 (9.66)	95.70%	Loess Curve fitting Multivariate regression analysis	Sig. Linear relationship between PTG and distress in recent and distant exposure group but Cubic curvilinear relationship presents best fit to data between post event distress and PTG for recent exposure group Quadratic curvilinear relationship is best fit to the data for distant exposure group Non-Sig Time since incident	Linear (recent) $\beta = .47, p < .001$ Linear (distant) $\beta = .386, p < .001$ Cubic (recent) $\beta = -.48, p < .01$ Quadratic (distant) $\beta = .018, p = .919$

Kehl, Knuth, Hulse, & Schmidt (2015)	Cross-Sectional	PTG Emergency Related Factors impacting upon operational performance	PTGI-SF Behaviour, Culture and Security First Responder	1916	36.1 (9.54)	96.90%	Hierarchical Regression	<p>Sig.</p> <p>Education <i>Incident features</i> Natural disasters Knowing deceased in incident Operational Distress Peri-event emotional distress Perceived life threat <i>Cultural Context</i> <i>Countries higher</i> <i>than grand mean</i> Czech Republic Turkey <i>Countries lower</i> <i>than grand mean</i> Italy Poland UK</p> <p>Non-sig</p> <p>Gender Age Employment Status Years of service No. of life threatening incidents Type of incident (excluding natural disaster) Years since incident No. of fatalities Subjective incident features (except operational stress) Germany Spain Sweden</p>	<p>Education $\beta = -.132, p < .01$) Natural disasters $\beta = .106, p < .05$ Knowing the deceased $\beta = -.123, p < .01$ Operational Stress $\beta = -.091,$ $p < .05$ Peri-event emotional distress $\beta = .148, p < .001$ Perceived life- threat $\beta = .160, p < .001$ Czech Republic $\beta = .132, p < .01$ Turkey $\beta = .305, p < .001$ Italy $\beta = -.249, p < .001$ Poland $\beta = -.169, p < .001$ UK $\beta = -.133, p < .01$</p>
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Leykin, Lahad, & Bonne (2013)	Cross-Sectional	PTG PTSS	Response to the event -derived from Posttraumatic Stress Diagnostic Scale Impact of Events Scale-Revised PTGI-SF	65	36.64 (7.93)	100%	Curve Estimation Regression Analysis	Sig. Linear and Quadratic Curvilinear relationship between PTSS and PTG (3.5 weeks after specific exposure) Non-Sig. Family Status Income Seniority Education	Linear R ² =.396, b ₁ = 1.20 p<.001 Quadratic R ² = .465, b ₁ =2.84, b ₂ =-.77, p<.001
Moran (2012)	Cross-Sectional	PTG Co-Worker exposure to trauma Type of co-worker relationship Type of employment	PTGI Self-report of other variables	370	36.68 (10.26)	97.30%	Multiple Anovas	Non-Sig. Difference between type of crisis and PTG Difference between type of co-worker relationship (subordinate, co-worker, superior) and PTG Overall, PTG is not seen vicariously in co-workers Difference between type of employment (voluntary/ paid full time/ part time) and PTG	n.s

Oginska-Bulik (2013)	Cross-Sectional	PTG Harmony Religion Support from co-workers	PTGI 'What support can you count on' scale Self-Description Questionnaire	Total <i>n</i> =116 Firefighters = 43 (37.1%) Other emergency service personnel = 73	35.28 (8.13)	100%	Stepwise Regression	Sig. <i>Spirituality</i> Harmony Religion Support from co- workers Non-sig. Support from supervisors	Spirituality Harmony $\beta=.34, p=.001$ Religiousness $\beta=.25, p=.020$ Support from co-workers $\beta=.25, p=.020$
Ogińska-Bulik (2015)	Cross-Sectional	PTG PTSS Social support	PTGI Impact of Events Scale-Revised 'What support can you count on' scale	Total <i>n</i> =116 Firefighters = 43 (37.1%) Other emergency service personnel = 73	35.28 (8.13)	100%	Stepwise Regression Correlations	Sig. Support from co- workers PTG significantly correlated to support from co- workers only when subjects have average/high levels of PTSS Non-Sig. Support from supervisors	Co-worker support $\beta=.31, R^2=.10,$ $p=.01$ Average/high PTSS $r=.39, p<.001$
Oginska-Bulik & Kobylarczyk (2016)	Cross-Sectional	PTG Stress Appraisal Resiliency	PTGI Stress Appraisal Questionnaire Resiliency Assessment Scale	100	31.5 (6.34)	100%	Mediation Analysis	Sig. Stress as threat acts as mediator (suppressor) between resiliency and PTG Stress as challenge acts as mediator between resiliency and PTG Non-Sig. Weak relationship between resilience and PTG	Stress as threat mediator (indirect effect size) $\beta = .046, p<.05$ Stress as challenge mediator (Indirect effect size) $\beta= .028, p<.05$

Sattler, Boyd & Kirsch (2014)	Cross-Sectional	PTG Critical Incident Exposure PTSS Critical Incident Stress Debriefing Attendance Resource Availability Coping Occupational Stress	PTGI (adapted version) All measures either adapted from other measures or constructed for purpose of study	286	38 (11)	89.90%	Hierarchical Linear Regression	Sig. Female Critical Incident exposure Critical Incident Stress debriefing attendance PTSS Occupational Support Occupation satisfaction Occupational Effort Problem-focused coping Emotion Focused Coping Personal Characteristic Resources Non-Sig. Years as firefighter Voluntary versus Paid Experience of Critical Incident Stress Debriefing General Support	Female $\beta = .13, p < .05$ Critical Incident exposure $\beta = .18, p < .05$ Critical Incident Stress debriefing attendance PTSS $\beta = .15, p < .05$ PTSS $\beta = -.14, p < .05$ Occupational Support $\beta = .16, p < .01$ Occupation satisfaction $\beta = .16, p < .01$ Occupational Effort $\beta = .19, p < .05$ Problem-focused coping $\beta = .13, p < .05$ Emotion Focused Coping $\beta = .18, p < .01$ Personal Characteristic Resources $\beta = .30, p < .001$
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Note: SD= standard deviation, β = standardised regression coefficient, sig= significant (p value is $<.05$), non-sig = non-significant p value ($>.05$), PTG= posttraumatic growth, PTGI= posttraumatic growth inventory, PTGI-SF= posttraumatic growth inventory-short form, PTSS= post- traumatic stress symptoms

Kehl, Knuth, Hulse, et al. (2014) found a significant negative relationship between time since incident and PTG; however this was a very small association. The remaining two papers did not find a significant relationship. Given that all three papers were based on the same sample it would appear the difference in statistical methods used accounts for this disparity in findings, further the significant relationship reported is very small and likely became insignificant in the presence of other factors. Methodological issues limit the evidence of the predictive value of time since exposure has on PTG, however it is possible that there is a relationship, albeit a weak one, but not enough supporting evidence is available.

Overall, aspects of the the exposure to trauma were predictive of PTG, particularly if the trauma was more severe and experienced over and above witnessing it. Time since exposure generally did not predict PTG.

Post-traumatic stress symptoms (PTSS)

PTSS in this context can be classified as presenting with symptoms of PTSD without necessarily meeting other criterion to warrant a diagnosis of PTSD.

Kehl, Knuth, Holubova et al. (2014) demonstrated good methodological quality and found a linear relationship (moderate effect size) between PTG and PTSS. Further they found that in those who were exposed to a traumatic incident within the last 12 months, a cubic relationship (moderate effect size) was present between PTSS and PTG; that is when overall PTSS severity is ranked as intermediate, PTG is at its highest, increasing linearly with PTSS then beyond intermediate PTSS severity growth decreases, but when PTSS symptoms rank as severe (upper end of severity) then growth appears to occur again. For those who were exposed to a traumatic event within 12 - 24 months, a quadratic relationship between PTSS and PTG was found, i.e. those who had an intermediate level of post-event distress showed the greatest level of growth. However, whilst the quadratic model was a significant fit to the data, the relationship between PTG and PTSS was not significant.

Similarly, Leykin et al. (2013) found a positive linear and quadratic relationship (inverted) between PTG and PTSS at 3.5 weeks after a trauma exposure. However, Leykin et al. (2013) demonstrates poor methodological quality in that the sample size was small and a relatively short duration of time since exposure and time of study might limit the potential for PTG to have occurred, thus the value of the findings are limited.

Gray (2004) found a significant positive relationship between PTSS and PTG (moderate effect size) and organisational factors autonomy and normative commitment mediated this relationship (small indirect effect). Finally, Oginska-Bulik (2015) found that PTG only significantly related to support from co-workers when PTSS severity was in the average to severe range. However, this was analysed by separating PTSS severity levels into low, average and high and then correlated rather than an a-priori hypothesis using methods of moderation.

Overall, the four studies tend to demonstrate that PTSS predicts PTG to a degree, and depending on severity the relationship with PTG differs. Studies suggest that the presence of distress in the form of PTSS predicts PTG until PTSS becomes relatively intermediate-severe in which case PTG does not occur again until PTSS is at the severe end of distress. Further to this relationship, mediating factors such as support in the work place affect this relationship between PTSS severity and PTG.

Operational and Organisational Factors

Operational factors refers to factors regarding the day to day work of a firefighter, such as shift work, type of incidents attended, work demands, fatigue due to work, etc. Organisational factors refer to relationship with colleagues, resources available, paperwork burden, perceptions of management, etc.

Based on the same sample, Armstrong et al. (2014, 2016) found that operational factors did not significantly relate to PTG. Kehl et al. (2015) found a small negative relationship between operational stress and PTG. Sattler et al. (2014) found occupational satisfaction and effort to be positively related to PTG (small effect size). Sattler et al. (2013) however used measures that had been adapted and shortened and thus the reliability of using these altered measures was not established.

Of the studies included in this review, operational factors tended not to convincingly predict PTG, small relationships exist between job stress and how much one enjoys and contributes to the job, however these findings are in isolation and are not explored in other studies.

Armstrong et al. (2016) found that organisational belongingness mediated the relationship between organisational stress and PTG (small positive effect). Organisational Stress was not directly related to PTG. Gray (2004) found organisational support mediated and moderated the relationship between PTG and severity of trauma exposure (small positive relationship). The organisational factors of autonomy in the workplace and normative commitment mediated the relationship between PTSS and PTG. Perceived organisational support was positively related to PTG (small effect). Finally, Sattler et al. (2014) found a small but significant positive relationship between occupational support and PTG. Three studies suggest organisational factors play a role in PTG however this may be more of a mediating role between PTG and other factors, suggesting that it does not on its own promote PTG. However, Sattler et al. (2014) is of poor methodological quality which limits the value of their findings.

Operational factors tended not to predict PTG; however, occupational stress and job satisfaction positively predicted PTG. Organisational factors did not predict PTG, however organisational belongingness and support mediated relationships between other factors and PTG.

Social Support

Armstrong et al. (2014) and Moran (2012) found a non-significant relationship between PTG and social support. Oginska-Bulik (2013) found a small to moderate positive relationship between PTG and support from co-workers but not supervisors. In addition Oginska-Bulik (2015) found using the same data as Oginska-Bulik (2013) that PTG only significantly correlated to support from co-workers when PTSS ranged from average to severe levels, however this was not analysed using a mediation/moderation model. Armstrong et al. (2014) and Moran (2012) both demonstrate superior methodological quality compared to Oginska-Bulik (2013),

2015) and thus from the evidence available perceived social support does not appear to strongly promote PTG, however may potentially play a role during times of more severe distress (severe PTSS symptoms).

Coping Strategies

Armstrong et al. (2014) found that self-care as a coping strategy had a small but positive relationship with PTG and found other forms of coping were non-significant e.g. avoidance coping. Sattler et al. (2014) found problem-focused and emotion-focused coping strategies had a small positive association with PTG. Evidence is mixed and heterogeneous in regards to coping strategies and PTG, small effect sizes of specific coping strategies are reported however evidence is too limited and methodologically flawed to accurately report on the predictive value of coping style.

Demographics

Kehl, Knuth, Hulse, et al. (2014) and Kehl et al. (2015) found a significant positive relationship between a higher education and PTG (small association). They also found a positive relationship between PTG and being from the Czech Republic and Turkey, and a negative relationship between PTG and being from Italy, Poland and the UK. Whilst cultural differences may exist, methodological issues, e.g. translation of measures and the lack of theoretical reasoning make it difficult to theoretically understand why country of work would affect PTG. There was no significant relationship between gender, age, profession (paid vs. volunteer), rank or years of experience. Leykin et al. (2013) found no significant relationship between PTG and family status, income, rank or education. Leykin notably has a much smaller sample size than the Kehl, Knuth, Holubova, et al. (2014), Kehl et al. (2015), Kehl, Knuth, Hulse, et al. (2014) sample and only looked at PTG 3.5 weeks after trauma exposure, whereas Kehl et al. (2015) and Kehl, Knuth, Hulse, et al. (2014) had a much larger sample that had experienced at least one trauma exposure over the past several years. Finally, Sattler et al. (2013) found a significant positive relationship between PTG and being female; however it should be noted that the sample was 90% male. They found no significant association between years of

experience or profession (paid vs. volunteer). Again, Sattler et al.'s (2013) use of adapted measures limit the reliability of their findings.

From the evidence available, demographics tend not to reliably predict PTG. Two of the three studies are of poor methodological quality and thus there is not enough available adequate evidence to demonstrate the presence of a relationship between demographic variables and PTG.

Participant Traits

Oginska-Bulik (2013) found a significant positive relationship between spirituality, specifically spiritual harmony and religion. However, the PTGI measure in part encapsulates spirituality as part of the construct of PTG. It is likely that Oginska-Bulik's (2013) finding is due to high co-variance of measures. Oginska-Bulik and Kobylarczyk (2016) did not find a significant relationship between resilience and PTG; however did find that stress perceived as 'threat' and stress perceived as 'challenge' were significant mediators of resilience and PTG (small to moderate indirect effects). Stress perception may overlap with operational and organisational factors given that they tend to measure job stressors and perceptions of the organisation. Thus, results may lend some support to the role operational and organisational factors play in mediating relationships with PTG.

Studies tended not to overlap in variables of interest which makes it methodologically difficult to ascertain the value of the above mentioned relationships as direct comparisons between findings was generally not possible.

Risk of Bias Assessment of Included Studies

Table 1.2 presents the individual risk of bias assessment for each study on each item. Overall, eight of the 12 studies scored as good, two scored as fair, and two scored as poor.

All studies were cross-sectional and thus causality cannot be determined. In general, studies tended to approach a relatively large cohort, e.g. across several fire stations in an area, and used inclusion criteria based on endorsement of exposure to a traumatic event and thus the capacity to demonstrate posttraumatic growth. Given the nature of

the role of a firefighter it is likely most will have been exposed to an incident that could objectively be deemed traumatic, yet in several studies participants who have completed measures are later excluded; Oginska-Bulik (2013; 2015) recruited 200 participants but only 116 endorsed exposure to a trauma highlighting the potential for information bias, as many firefighters may not have defined distressing incidents as necessarily traumatic and thus not included in the studies. Kehl, Knuth, Holubova, et al. (2014), Kehl, Knuth, Hulse, and Schmidt (2014) and Kehl et al. (2015) recruited a total of 3011 participants but across studies used different samples of the total population based on the occurrence of their most stressful event occurring within a certain time frame. This likely increased information bias as PTG in its current conceptualisation does not stipulate time elapsed as a criterion for PTG to occur.

All studies but one (Sattler et al., 2013), used either the PTGI or the PTGI-SF in their entirety in conjunction with other valid measures, thus measurement bias will be limited in this way as most studies have measured the same dependent construct. However, given the self-report nature of most of the studies there is likely to be differences across participants' ability to reflect upon their experiences, thoughts, feelings, etc., as well as the potential for response biases and thus a high risk of measurement bias exists across studies.

Several studies made clear attempts to control for potential confounds, however around half did not. Further, most studies collected data asking participants to consider one traumatic event, however the continuous exposure to distressing events that occurs as part of the role of a firefighter likely produces a confound due to the potential impact of these events on PTG. No studies accounted for this, some accounted for number of exposures but not the impact or perceived distress for each exposure. Thus, whilst several studies were assessed as controlling for confounds a more general issue is controlling for confounds in a cross-sectional study that includes participants who have likely had more than one single exposure to a traumatic incident. Overall, studies tended to use valid and reliable measures, most were adequately powered and appropriate analyses were conducted.

Table 1.2. Risk of Bias Assessment

	Armstrong, Shakespeare-Finch, & Shochet (2014)	Armstrong, Shakespeare-Finch, & Shochet (2016)	Gray (2004)	Kehl, Knuth, Hulse, & Schmidt (2014)	Kehl, Knuth, Holubova, Hulse, & Schmidt (2014)	Kehl, Knuth, Hulse, & Schmidt (2015)	Leykin, Lahad, & Bonne (2013)	Moran (2012)	Oginska-Bulik (2013)	Ogińska-Bulik (2015)	Oginska-Bulik & Kobylarczyk (2016)	Sattler, Boyd & Kirsch (2014)
Objective stated	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Study Population	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Participation Rate	No	No	No	No	No	No	No	No	No	No	No	No
Recruitment	Yes	Yes	No	Yes	Yes	Yes	CD	Yes	No	No	Yes	Yes
Power	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Exposures measured prior	No	No	No	No	No	No	No	No	No	No	No	No
Association Time	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Levels of Exposure	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Independent variable validity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Times exposure assessed	No	No	No	No	No	No	No	No	No	No	No	No
Dependent variable validity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Assessors Blind	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Follow-up Loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Confounds Controlled	No	No	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes
Rating	Good	Good	Fair	Good	Good	Good	Poor	Good	Fair	Good	Good	Poor

Note: NA=not applicable, CD= cannot determine

1.5 Discussion

Overall, there appears to be several factors that weakly predict PTG in firefighters; aspects of the aetiological trauma such as perceived severity and personal experiences of trauma, and emotion and problem-focused coping strategies. PTSS severity had a moderate relationship with PTG and was the strongest predictor of PTG of the investigated variables. Results regarding social support were equivocal and organisational and operational factors tended to predict PTG through indirect means, as did resilience. Demographic characteristics and time since exposure did not predict PTG. However, all significant findings with the exception of PTSS were only weakly associated with PTG.

Findings appear to be in line with that of Zoellner and Maercker's (2006) observation that PTG appears to only weakly associate with other factors or not significantly relate at all. Given the small associations and comparatively large number of null findings it appears that PTG is a concept relatively independent of other constructs measured in the studies in this review and cannot easily be predicted to occur.

Relationships of factors with PTG appear to be multifactorial and probably based on a number of predictors correlating with each other to increase the likelihood of PTG. Moreover, given the lack of an established relationship in the literature between PTG and mental health and wellbeing it is questionable if PTG actually serves an adaptive function. Unfortunately, it does not appear that there are any studies explicitly investigating the relationship between mental health or wellbeing specific to firefighters and thus it is difficult to draw conclusions on how relevant PTG is to overall adaptive functioning in this population.

In terms of Tedeschi and Calhoun's (2004) model it would appear that PTG is related to distress levels as indicated by PTSS severity. Findings suggest that if distress does not occur as a result of the trauma then PTG is less likely to develop, however as distress increases so does PTG until distress becomes more severe then PTG appears to not develop, when distress ranks as very severe then PTG is seen to occur again. This pattern perhaps suggests that psychological resources are less easy to access due to the overwhelming nature of the distress in the intermediate-severe range, however

when distress is extremely high and potentially affecting everyday functioning PTG is utilised as a way to take action against distress (Kehl, Knuth, Holubova, et al., 2014).

Contrary to Tedeschi and Calhoun's supposition that characteristics of emotional hardiness such as resilience would likely impede PTG, Oginska-Bulik and Kobylarczyk (2016) found resilience did not predict PTG growth or lack thereof; however this was the only study that explicitly focused on this. It may be that firefighters possess particular traits that either draw them to the profession or allow them to continue in the line of work, such as potentially being more resilient and typically less emotionally affected by distressing situations than the general population. Those who do not possess these traits may either not enter into the profession in the first instance or perhaps prematurely leave the job, thus those who possess traits that Tedeschi and Calhoun (2004) hypothesised to impede PTG may also be the least likely to be found in the emergency services given the continuous exposure to trauma. This perhaps accounting for the lack of significant associations in general found in this review. Again, highlighting the potential limited relevancy PTG has within the emergency services.

One of the main arguments of the construct of PTG is that it is able to co-exist with distress and moreover, distress can be the catalyst to PTG (Tedeschi & Calhoun, 2004). When addressing the question of clinical relevance the argument is limited because much of the evidence on post-trauma outcomes focuses on psychological maladjustment and the presence and absence of this indicating negative and positive adaptation. However, Tedeschi and Calhoun's (2004) concept of PTG does not pertain to act as a psychological buffer to distress, and thus cannot necessarily be used to argue that because distress exists PTG is not beneficial. Therefore, whether PTG is modelled as an outcome or a coping strategy to trauma produces a methodological issue. If PTG is conceptualised as a coping process then methodological limitations of cross-sectional studies cannot capture this development or determine the direction of the relationship, i.e. does distress lead to PTG (outcome) or does PTG leads to less distress (coping strategy). As a coping strategy one would expect there to be evidence of psychological adjustment over

time and an eventual reduction in distress; however, if PTG is process-orientated and likely specific to the individual, studies may be more likely to produce skewed results given the different stages one might be in at the time of participation. Current evidence suggests distress and PTG interact in curvilinear relationship but crucially, given the conflicting theoretical underpinning of PTG as an outcome variable versus PTG as an adaption to reduce distress causality cannot be determined given the design of the included studies. The presence of distress in cross-sectional studies is therefore limited in informing the clinical utility of PTG and the assertion that distress can act as a predictor is theoretically ambiguous.

Limitations of Review

All studies were cross-sectional in nature and thus causality cannot be assumed and overall, conclusions of this review are limited by a relatively high risk of methodological bias. Studies included were restricted to specific measures of PTG to maintain homogeneity of the construct being measured. This may also have resulted in a more conservative review limiting the conclusions drawn to Tedeschi and Calhoun's (2004) model; however, the PTG inventories appear to be the predominant measures employed in studies (Taku, Cann, Calhoun, & Tedeschi, 2008). Studies utilised self-report measures which reduce objectivity given that participants will have conceptualised their own system to rank items on measures that are unlikely to have been standardised across participants.

A further limitation is the different conceptualisations of PTG as an outcome of trauma or a coping strategy to trauma. If PTG is conceptualised as an outcome of trauma and distress encourages the development of PTG regardless if distress diminishes over time one cannot argue that the presence of distress is relevant to the clinical importance of PTG. If PTG is modelled as a coping strategy to reduce distress then the presence of distress can be used to argue PTG is not a significantly useful coping strategy. This review is therefore limited in its ability to draw conclusions on this given the methodological limitations of the included studies. This is of particular importance in emergency services due to the pervasiveness of exposure to distressing situations; one could likely assume the presence of recurrent

distress may likely impact upon PTG development and this may have different implications on PTG depending on theoretical stance.

Implication for Clinical Practice and Research

Results show a general weak association or no significant relationship between PTG and other factors. It is therefore difficult to say whether PTG is actually clinically useful or that it is simply that the factors that have been of interest in the included studies are not conceptually related and that there may be other more clinically useful variables that have not been examined. However, the studies included in the review covered a relatively wide range of factors and most were not indicative of maladaptive functioning; data on mental health issues above and beyond PTSS was not collected. Thus it would seem that for firefighters and perhaps more generally emergency services PTG has limited clinical utility and if it does we currently cannot confidently know what would encourage its development. In terms of future research longitudinal studies are essential to understand PTG as a process over time and the potentially complex relationship between distress, multiple trauma exposures and PTG development. Cross-sectional studies are methodologically limited and may not provide much further useful evidence.

Conclusion

This review and findings in the overall literature have shown that PTG is typically not strongly related to other psychological constructs, personal, trauma or work characteristics. Evidence suggests that PTSS severity is currently the most robust predictor of PTG in firefighters, however methodological issues limit findings. Future research may benefit from investigating other forms of positive psychological outcomes following a trauma in the emergency services rather than PTG in its current conceptualisation.

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Chapter 2: Empirical Paper

Post-Traumatic Stress Symptoms in Ambulance Clinicians: Severity and Associations with Self Compassion, Psychological Inflexibility and Wellbeing

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2.1 Abstract

Background

Ambulance Clinicians present with significantly higher levels of Post-Traumatic Stress Disorder (PTSD) than the general population. Given the high frequency of trauma exposure over the course of an Ambulance Clinician's career, the current study examined the severity and prevalence of post-traumatic stress symptoms (PTSS) experienced by participants. This study also tested a hypothesised model regarding the relationships between PTSS, self-compassion, psychological inflexibility and psychological wellbeing.

Method

A total of 508 Ambulance clinicians, Paramedics and Technicians, completed an online survey including the following measures: Impact of Events Scale-Revised, Self-Compassion Scale, Acceptance and Action Questionnaire-II and Short Warwick-Edinburgh Mental Well-Being Scale. PTSS severity was determined by using clinical cut-off scores. Structural equation modelling was used to examine the inter-relationships between these constructs.

Results

Nearly 50% of ambulance clinicians reported levels of PTSS severity of clinical concern and above. Psychological inflexibility was strongly positively related to PTSS (.69) and negatively to psychological wellbeing (-.48). Self-compassion was not related to PTSS but was significantly related to psychological wellbeing. The model explained 46% of the variance of PTSS severity and 64% of the variance of psychological wellbeing.

Conclusions

Our results indicate concerning levels of trauma symptomology within a representative Ambulance Service sample. Findings support further investigation into potential causal relationships between psychological flexibility and PTSS in order to deliver effective interventions to reduce PTSS severity in this population.

The potential impact of relying on PTSD criteria of symptoms lasting for 4 weeks or more may mask the extent of PTSS experienced in this population.

2.2 Introduction

Ambulance clinicians are often exposed to extremely distressing situations as a function of their working life (van der Ploeg & Kleber 2003). In 2014, paramedics across nine UK Ambulance Trusts took over 40,000 sick days due to stress, amounting to a 28% increase from 2012 (Kirk, 2015). High levels of early retirement and work disability (Rodgers 1998; Van der Ploeg & Kleber 2001) indicate that this line of work has a notable impact on both an individuals' mental health and the economy as a whole. In the general population, exposure to distressing and traumatic situations has consistently been related to reduced quality of life, poorer psychological wellbeing and mental health issues, in particular PTSD (Herrenkohl et al. 2012; Afifi et al. 2007). The International Statistical Classification of Diseases and Related Health Problems (ICD-10) defines PTSD as symptoms following exposure to an aetiological event deemed extremely distressing (World Health Organisation, 1992). Symptoms of re-experiencing, avoidance, hyperarousal and emotional numbing are most commonly observed (National Institute for Clinical Excellence [NICE] , 2007).

Evidence increasingly suggests that ambulance clinicians are more prone to traumatisation than other groups; amongst UK ambulance service workers PTSD is approximately 22% (Bennett et al., 2004), seven-to- tenfold more than the prevalence rate in the general population (1.3%-3.6%; NICE, 2007). When compared with other emergency services, ambulance personnel show the highest levels of PTSD (Berger et al., 2012) and furthermore, Alexander and Klein (2001) found that approximately 30% of an ambulance service endorsed high levels of post-traumatic stress symptoms (PTSS); that is, presenting with symptoms of distress without necessarily fulfilling criteria for a PTSD diagnosis, and as high as 40% demonstrated at least a medium level of symptom severity. The disparity in figures is likely accounted for by the use of different methodologies of PTSD assessment. However, whilst clinical interviews demonstrate the most reliable form of diagnosis, screening measures serve as a less time-intensive, resource-laden indicator of perceived PTSS severity across a population (Coffey et al. 2006).

Whilst the ICD-10 (World Health Organisation 1992) does not specify a required duration for a diagnosis of PTSD, the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V; American Psychiatric Association 2013) states that symptoms must be present for at least a month. In the general population the DSM-V sub-classifications can be useful in that within the initial few days, weeks and months following a traumatic event, symptoms can substantially remit without intervention (Kessler et al. 1995). However, in contrast to the general population, emergency services are likely to be exposed to potentially traumatising situations on a recurrent basis. This effectively means that over the course of their career ambulance clinicians may have many occasions where they suffer with PTSS following an incident that diminish within four weeks. It is possible that this in effect could mask the true extent of trauma symptom prevalence at any given time and essentially produce a waxing and waning of PTSS not picked up by studies that use a minimum of four weeks duration as part of their inclusion criteria. This means that studies that research PTSD exclusively are potentially missing out on a large proportion of the population who are experiencing some level of PTSS but are diagnostically sub-threshold. Bennett et al. (2004) reported that approximately two thirds of ambulance workers experienced intrusive and distressful thoughts related to work but not necessarily meeting diagnostic criteria. These findings suggest that using a time-sensitive cut-off criterion may in effect be underestimating the levels of trauma symptomology experienced by individuals working in ambulance services. Therefore, it is argued here that symptom duration may not only be of limited relevancy given exposure prevalence but may also obscure important findings within emergency services.

Given the inevitability of exposure it is important to develop a better understanding of potential psychological mechanisms that impact upon the development of PTSS specific to ambulance clinicians. A better insight into these mechanisms will facilitate the development of informed interventions from a sound theoretical understanding. Current conceptualisations of PTSD focus on processing traumatic memories through interventions that result in habituation to stimuli that evoke strong emotional responses leading to the reduction of PTSD symptoms (Foa et al. 1993). However, evidence is increasingly indicating the presence of other factors that may

maintain PTSD symptoms such as high levels of self-criticism, shame and experiential avoidance (Hoffart et al. 2015; Burrows 2013).

There is an emerging evidence base with regards to self-compassion and how this relates to psychological symptoms of trauma (Thompson & Waltz 2008). Self-compassion is a core component of several 'Third Wave' therapies, particularly Compassion Focused Therapy (CFT; Barnard & Curry 2011) which was primarily developed to target shame and self-criticism using self-compassion as a mechanism of change (Gilbert & Procter 2006). Self-compassion is characterised as being kind and understanding to oneself through difficult and painful times, possessing a balanced non-judgemental view of one's negative emotions without diminishing or exaggerating them and accepting emotional pain as a common experience of humanity (Neff 2003). High levels of self-compassion have been associated with lower risk for psychopathology in the general population (MacBeth & Gumley 2012). Specifically, Thompson & Waltz (2008) found that self-compassion was negatively related to avoidance strategies in individuals with PTSD; likely because those who demonstrate high levels of self-compassion also show an increased readiness to confront distressing thoughts and feelings (Neff et al, 2007) rather than having to resort to unhelpful avoidance strategies. Further, Hoffart et al. (2015) found that self-compassion acts as a maintenance factor for PTSD and the reduction of negative self-compassion and increase of positive self-compassion during therapeutic intervention was correlated with symptom improvement.

While evidence indicates that greater self-compassion is associated with lower psychopathology and more beneficial coping strategies in the general population, Mitmansgruber et al. (2008) demonstrated that in experienced paramedics, presenting as 'strict and contemptuous' about one's own feelings (i.e. non-accepting of thoughts and emotions) was positively associated with psychological well-being. It was posited that paramedics regularly experience incidents where strict control of their emotions is crucial, so those who could better do this report better psychological health. To date this was the only study that has hinted at this potential relationship in paramedics.

Further, Mitmansgruber et al. (2008) reported that nearly 40% of variance in overall psychological well-being was accounted for by experiential avoidance. Experiential avoidance is conceptualised in Acceptance and Commitment Therapy (ACT) as a component of psychological inflexibility (Hayes et al. 2006); whereby one avoids internal experiences (thoughts, feelings and memories), struggles to connect with the present moment in a non-judgemental way and a failure to behave in accordance with core values (Bond et al. 2011). Like self-compassion, psychological inflexibility is linked to decreased psychological wellbeing, increased psychopathology and higher levels of PTSS (Kashdan & Rottenberg 2010; Kumpula et al. 2011; Fledderus et al. 2010). Evidence suggests that self-compassion and psychological inflexibility are related constructs but demonstrate distinctive predictability for other constructs (Marshall & Brockman 2016). However, Woodruff et al. (2014) found that psychological inflexibility regressed with self-compassion resulted in self-compassion becoming a redundant variable in predicting negative mental health measures but independently predicted positive mental health over and above psychological inflexibility. Seligowski et al. (2014) posited that having a high degree of self-compassion and being more psychologically flexible may protect against the impact of being exposed to distressing situations. In a structural model they found psychological inflexibility was positively associated with PTSD and negatively with wellbeing, self-compassion was positively related to wellbeing but not with PTSD. However, given Mitmansgruber et al.'s (2008) findings it is possible that different risk mechanisms may be present in ambulance clinicians from the general population.

Given the implications of previous research the aim of the current study was two-fold; firstly to examine the level of PTSS severity in ambulance clinicians and secondly to test Seligowski et al.'s (2014) model in trauma-exposed ambulance clinicians, examining the relationships between self-compassion, psychological inflexibility, PTSS and psychological wellbeing.

It was hypothesised that negative self-compassion would predict higher PTSS levels and lower psychological wellbeing, and positive self-compassion would predict higher psychological wellbeing and lower PTSS levels. It was hypothesised that

psychological inflexibility would positively predict PTSS severity and negatively predict psychological wellbeing and would account for more variance in the model than self-compassion. It was hypothesised that the overall model would predict a significant amount of variance of PTSS severity and psychological wellbeing.

2.3 Method

Participants

Participants were recruited via an invitation email sent out nationwide to the Scottish Ambulance Service (SAS). Participants had to be over 18 years of age and employed within the SAS either as a qualified Ambulance Technician or as a Paramedic.

Measures

Life Events Checklist-5 (LEC-5; Weathers et al. 2013)

The LEC-5 is a self-report screening tool used to assess exposure to potentially traumatic aetiological experiences. It contains 16 items of common traumatic events related to PTSD and requires participants to answer under what context they were exposed to the event (e.g. 'Happened to me', 'Part of my Job'). The LEC-5 is an updated version of the LEC which demonstrates a strong correlation with PTSS and convergent validity with other measures of traumatic exposure (Gray et al. 2004). The LEC-5 was used to verify that each participant had at least one exposure to trauma. Cronbach's alpha for the current sample was .75.

Impact of Events Scale- Revised (IES-R, Weiss 2007)

The IES-R is a 22-item measure used to assess psychological responses subsequent to traumatic events, measuring symptoms of hyperarousal, intrusion and avoidance. On a 5-point Likert Scale participants ranked answers ranging from 'Not at all' to 'Extremely'. It has demonstrated a high internal consistency with a Cronbach's alpha of .96, good test-retest reliability and a single factor solution (Creamer et al. 2003). Cronbach's alpha in the current sample was .95 for the total scale, .88 for the

hyperarousal sub-cluster, .92 for the intrusions sub-cluster and .84 for the avoidance sub-cluster.

Self-Compassion Scale (Neff 2003)

The self-compassion scale is a 26 item self-report scale, consisting of six sub-scales measuring three facets of self-compassion; self-kindness vs. self-judgement, common humanity vs. isolation and mindfulness vs. over-identified. Participants ranked items on a 5-point Likert scale ranging from 'Almost Never' to 'Almost Always'. It has demonstrated high internal consistency reliability (.92). Seligowski et al. (2014) used a two-factor model of the self-compassion scale; positive and negative self-compassion, finding that a two-factor model was a good fit to the data in both a trauma exposed and unexposed sample. A two-factor model was adopted for the current study with positive self-compassion constituting self-kindness, common humanity and mindfulness, and negative self-compassion including self-judgement, isolation and over-identified. Cronbach's alpha for positive self-compassion was .87 and .90 for negative self-compassion.

Acceptance and Action Questionnaire- II (AAQ-II; Bond et al. 2011)

Psychological inflexibility was measured by the 7-item AAQ-II. On a 7-point Likert scale participants ranked answers ranging from 'Never True' (1) to 'Always True' (7). It has demonstrated a high level of reliability with a Cronbach's alpha of .84 and 12 month test- retest reliability of .79 (Bond et al., 2011). Cronbach's alpha for the current sample was .92.

The Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS; Stewart-Brown et al. 2009)

The SWEMWBS is a 7-item self-report measure of cognitive, affective and psychological functioning. It has a single-factor solution devised from the original measure, showing strong associations with alternative well-being scales and a content validity of .91 (Tennant et al. 2007). The SWEMWBS has a correlation of

.95 to the full length scale (Stewart Brown et al., 2009). Items were ranked on a 5-point Likert scale ranging from 'None of the time' to 'All of the time'. Cronbach's alpha for the current sample was .90.

Procedure

Ethics approval was obtained from the University of Edinburgh and the SAS Research and Development Board (see Appendices E and F). An invitation email was sent to all employees of the SAS providing information regarding the study and an online link to the questionnaire, including the information sheet and consent form (see Appendices G, H and I). An advertisement was also placed on the SAS intranet. The information sheet outlined the purpose of the study and written consent was sought prior to the administration of the battery of psychometric scales. The questionnaires were completed online within a single session and all completed surveys were anonymous. The order of the questionnaires was presented as listed in the measures section. A de-briefing sheet was provided upon completion (see Appendix J), suggesting further information regarding available support and to contact their GP if they had concerns regarding their mental health.

Statistical Analysis

Clinical cut-off scores recommended in the literature were used to assess PTSS severity levels. A score of 24 and above indicated severity of clinical concern, 33 and above indicated a probable diagnosable level of distress and a score over 37 indicated severe distress (Creamer et al. 2003; Asukai et al. 2002; Kawamura et al. 2001). Further, in order to assess the prevalence of symptoms in any given week, a seven day period with the most completed questionnaires was extracted from the data and analysed ($n=318$).

Multivariate normality was tested by checking skewness and kurtosis. All variables except the hyperarousal variable for PTSS were normally distributed. The hyperarousal cluster demonstrated a skewness of 1.06; however given the large sample size and the robustness of the maximum likelihood estimation approach it was deemed acceptable to have a skewness of up to 1.5 (Awang, 2012).

Bivariate correlations were conducted (with Bonferroni correction) to establish the direction of the relationship between constructs. A structural equation model (SEM) using Amos Version 22 was tested based on Seligowski et al.'s (2014) original model. For the SEM, Self-Compassion was modelled as a two-factor construct, positive self-compassion (positive SC) and negative self-compassion (negative SC); with each latent factor consisting of three manifest indicators representing the self-compassion subscales. For the latent factor of psychological inflexibility all seven items of the AAQ-II were used as a one-factor solution. For the latent factor of PTSS the three sub-clusters of the IES-R; intrusions, hyperarousal and avoidance were used as manifest indicators, and finally for the latent factor of psychological wellbeing all seven items of the SWEMWBS were used in a one-factor solution. Pooled confirmatory factor analysis was conducted prior to the SEM and maximum likelihood models were used with fit indices comparative fit index (CFI), Tucker Lewis Index (TLI) and root mean square residual (RMSEA). Carmines and McIver (1981) suggest that a CMIN/df in the range of 1-3 indicate an acceptable fit, a value over .95 for the TLI and CLI and a RMSEA under .6 are considered indications of a good fit to the model (Hu & Bentler 1999).

2.4 Results

A total of 508 Ambulance Clinicians were recruited consisting of Paramedics ($n=355$, 69.9%) and Ambulance Technicians ($n=153$, 30.1%). The age range was from 21 to 62 with a mean age of 44 years ($SD=9.06$). The years of experience ranged from under a year to 39 years with a mean of 14.7 years ($SD=9.22$). In total 342 (67.3%) of the participants were male, 160 were female (31.5%), and 6 preferred not to say (1.2%). All participants reported exposure to at least one traumatic event, either via experiencing it first hand, witnessing it or learning about it over their lifetime. There are approximately 2800 ambulance clinicians employed by the SAS (SAS, personal communication), therefore the overall response rate was just over 18% of the population.

PTSS severity

Results from the descriptive analysis of the IES-R showed that 51.8% of ambulance clinicians did not have any significant symptom severity, 14.6% showed levels of clinical concern, 10% showed probable diagnosable levels of distress and 23.6% showed severe distress when asked about symptoms over the past week.

Examination of data extracted over a week-long period that saw the most responses produced similar results; 52.8% displayed no significant level of symptoms, 16.4% demonstrated a severity of clinical concern, 9.7% presented with probable diagnosable levels of impairment and 21.1% demonstrated severe impairment.

Bivariate Correlations

All bivariate correlations were found to be significant and in the hypothesised directions. PTSS as measured by the IES-R was negatively associated with positive self-compassion and positively associated with psychological inflexibility (AAQ-II) and negative self-compassion. Psychological wellbeing as measured by the SWEMWBS was positively related to positive self-compassion and negatively to psychological inflexibility and negative self-compassion. See Table 1 for descriptives and correlations of the measures.

	Mean	SD	IES _{tot}	IES _{int}	IES _{av}	IES _{hyp}	SC _{total}	SC _{pos}	SC _{neg}	AAQ _{tot}
IES _{total}	25.07	17.64	-							
IES _{int}	10.27	7.14	.94**	-						
IES _{av}	9.13	6.58	.91**	.76**	-					
IES _{hyp}	5.67	5.36	.92**	.84**	.75**	-				
SC _{total}	74.46	11.15	-.32**	-.27**	-.29**	-.34**	-			
SC _{pos}	36.43	8.76	-.19**	-.16**	-.17**	-.20**	.92**	-		
SC _{neg}	39.34	11.65	.46**	.40**	.41**	.47**	-.65**	-.35**	-	
AAQ _{tot}	21.24	9.45	.61**	.51**	.55**	.63**	-.57**	-.38**	.73**	-
WE _{con}	22.18	4.15	-.46**	-.41**	-.40**	-.48**	.57**	.43**	-.61**	-.68**

IES_{int}, IES-R intrusions subscale; IES_{av}, IES-R avoidance subscale; IES_{hyp}, IES-R hyperarousal subscale; SC_{total}, SC scale total; SC_{pos}, SC scale sum of positive items; SC_{neg}, SC scale sum of negative items; psychological inflexibility, tot AAQ-II, total score; WE_{con}, SWEMWBS conversion scores to WEMWBS
*p<.05, **p<.0006 (Bonferroni Correction)

Table 2.1: Descriptive statistics of variables and bivariate correlations

Confirmatory Factor Analysis (CFA)

Pooled confirmatory factor analysis (see Appendix K) was used to examine the fit for each modelled latent factor (Awang 2012). For positive SC, the three manifest variables of self-kindness, common humanity and mindfulness loaded moderately to highly onto the factor (.76, .72 and .81 respectively) as did self-judgement, isolation and overidentification for negative SC (.87, .86 and .88). The seven AAQ-II items initially loaded moderately to highly onto the latent psychological inflexibility variable (.76, .76, .78, .80, .76, and .80) and in replication of Seligowski et al.'s (2014) model the items were subsequently parcelled into three observable variables, parcel 1 (P1) consisted of items 5 and 7, parcel 2 (P2) included items 1 and 2 and parcel 3 (P3) consisted of items 3, 4 and 6. The three parcels loaded highly onto the latent factor psychological inflexibility (.80, .91, and .94 respectively). The three manifest variables for PTSS; hyperarousal, intrusions and avoidance also loaded highly onto the latent variable (.93, .89, and .82 respectively). Finally, the seven items of the SWEMWBS loaded reasonably well (.75, .76, .79, .74, .68, and .63). Modification indices suggested the presence of several notable covariance between variables within the SWEMWBS, thus item 7 was removed due to high covariance with item 6 and a relatively low factor loading (.63). Other significant covariance was reflected in the model as free parameters, resulting in a notable improvement in model fit, CMIN/DF= 2.54, CFI=.97, TLI=.96, RMSEA=.055 (90% CI: .48 to .63; see Appendix L). Validity, reliability and multivariate assumptions were met (see Appendix M).

SEM

The model was overidentified, indicating good model fit will provide further evidence that the model reasonably represents the proposed pathways. The structural model suggested a good fit to the data, CMIN/DF = 2.54, TLI= .96, CFI= .97 and RMSEA= .055 (90% CI .48-.63). Psychological inflexibility was significantly related to PTSS ($\beta=.69, p<.001$) and psychological wellbeing ($\beta=-.48, p<.001$), both positive and negative self-compassion were related to psychological wellbeing ($\beta=.23, p<.001$ and $\beta=-.23, p<.001$ respectively), but not PTSS ($\beta= .07, p=.11$ and $\beta=.03, p=.69$ respectively; see figure 1). Overall, the model accounted for 46% of

the variance in PTSS scores and 64% of the variance in psychological wellbeing scores (see Figure 2.1. and Appendix N for full Amos model).

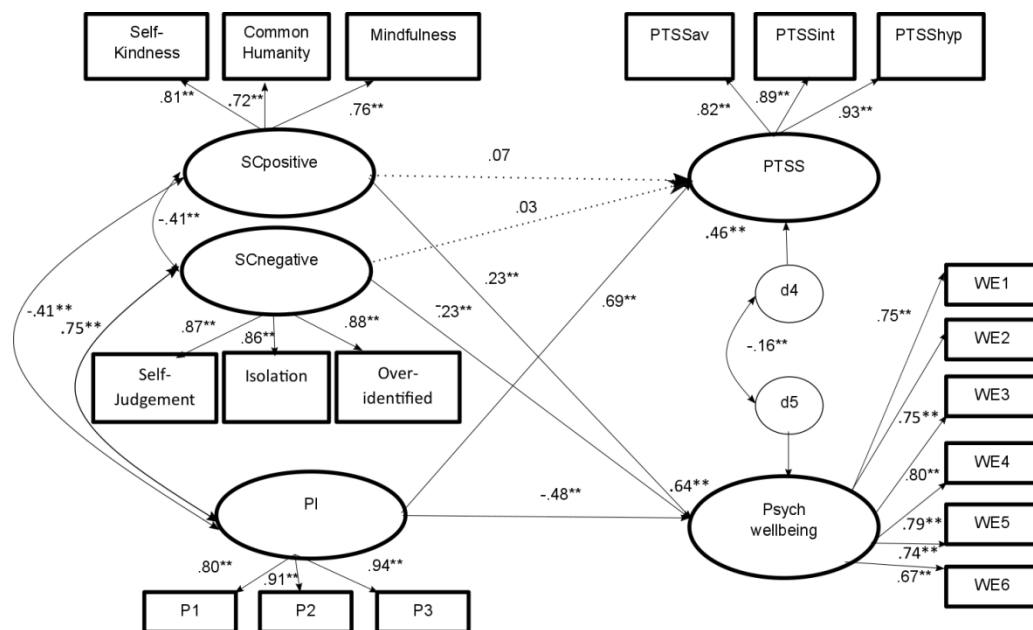


Figure 2.1. SEM model showing standardised estimates and variance explained of dependent variables by factors. Dashed lines represent non-significant paths; ** $p < .001$. PTSSav, avoidance sub-cluster; PTSSint, intrusions sub-cluster; PTSShyp, hyperarousal sub-cluster.

2.5 Discussion

The aim of the current study was to establish levels of trauma symptomology in ambulance clinicians and extend this to a psychological model specific to this population. Overall, there was a considerable level of PTSS, further this level of PTSS severity was maintained when looking at symptom prevalence over a one week period. Mirroring Seligowski et al.'s (2014) findings in the general population, psychological inflexibility showed a significant strong positive relationship with PTSS and a moderate to strong negative relationship with psychological wellbeing. Self-compassion whilst correlated with PTSS was not a significant predictor of PTSS in the structural model. Both positive and negative self-compassion significantly related to psychological wellbeing. Overall, the model accounted for a significant

level of variance of both PTSS severity and psychological wellbeing. The current sample constitutes over 18% of the currently employed ambulance clinicians in the Scottish Ambulance Service, and hence it should be considered as a representative sample of the studied population.

Approximately half the population demonstrated levels of PTSS indicative of clinical concern, with around 24% of the population presenting with severe levels. This highlights an area of significant concern; a considerable amount of ambulance clinicians are presenting with symptoms of traumatisation. Whilst previous research has established that over one in five ambulance clinicians have clinically diagnosable levels of PTSD (Bennett et al. 2004) the current study shows that one in two suffer notable symptoms. The higher number of participants falling into the category of clinical concern and above compared to findings relating to PTSD is likely due to removing the four week criterion. While results are not a diagnostic indicator of PTSD it does indicate a significant level of distress present at any given time in this population.

The evidence of being exposed to trauma resulting in negative psychological outcomes is well established (Afifi et al. 2007; Herrenkohl et al. 2012) particularly the set of resulting symptoms that is collectively known as PTSD. What is less established is the potential harm caused from frequent and continuous on-off exposure to trauma and the subsequent PTSS experienced regardless of how long these symptoms persist for. This study highlights the magnitude of PTSS experienced within this population and given the distressing nature of these symptoms raises questions about the toxic effect this may have over time for those working within emergency services.

Psychological flexibility is a broad concept that incorporates contact with the present moment, behaviours, fusion and values as well as acceptance (as opposed to avoidance) and self as context (including self-compassion; Hayes 2004). Results suggest that other components of psychological inflexibility are driving this relationship with PTSS over and above concept of self. Given that participants were employed at time of recruitment a relatively high level of functioning can be assumed. It may be that psychological inflexibility initially acts as a buffer to protect

against recurrent trauma exposure but may subsequently lead to long term costs. It is possible that this system of psychological flexibility is effectively ‘shut-down’, and ambulance clinicians can then operate day-to-day work without necessarily lingering on unpleasant experiences; a dissociation that allows them to function in a high-stress environment. However, given the nature of trauma sequelae, in particular flashbacks and intrusions and the subsequent distress, ambulance clinicians may feel too uncomfortable with this experience not only at the time of the aetiological event but also with the intrusive nature of these symptoms to accept them when they occur. Thus, they avoid thoughts of the past event and the present symptoms which then precludes them from engaging in behaviours that may process the trauma and paradoxically increase the intensity of symptoms (Hayes 2004). This may eventually lead to a toxic psychological effect, as evidenced by diminished wellbeing and increased post-traumatic stress and in the long-term; high sickness, greater work disability and early retirement rates (Kirk 2015; Rodgers 1998; van der Ploeg *et al.* 2003).

The relationship found between positive and negative self-compassion and psychological wellbeing is similar to that already established in the CFT literature (MacBeth & Gumley 2012); however results appear to be at odds with Mitmansgruber *et al.* (2008) which suggested that being ‘strict and contemptuous’ towards oneself was positively related to wellbeing in paramedics. However, it should be noted that Mitmansgruber *et al.* did not measure self-compassion directly; rather emotion regulation strategies were measured, perhaps in part explaining the difference in findings. It could also be that this difference in measuring one’s perception of self and emotions resulted in different aspects of self-compassion as a construct to be picked up. For instance, if an ambulance clinician demonstrated elements of self-compassion by accepting that they needed to be in emotional control of themselves to perform optimally and reflected positively on regulating themselves in the moment they may then see being less emotive as a protective buffer to their overall wellbeing. Thus, being ‘strict and contemptuous’ could be conceptualised as a positive reflection of an act of emotional control and would therefore not be scored as critical self-judgement; a component of negative self-compassion.

In terms of therapeutic interventions focusing on self-compassion the aim is to promote self-compassion as a way to cope with shame and self-criticism (Gilbert, 2009). Given the lack of a significant relationship between self-compassion and PTSS severity on the structural level it may be that the positive nature of an ambulance clinicians' role, in that they 'rescue' mean levels of shame are not particularly associated with traumatic exposure. When psychological inflexibility is accounted for the relationship between PTSS and self-compassion became non-significant. This may be because the AAQ-II (Bond et al. 2011) is a more direct measure of experiential avoidance which might better account for PTSS severity than self-compassion. Further, Hoffart et al. (2015) found that particular components of self-compassion were more associated with a reduction of PTSD symptoms than others, in particular self-judgement. If however in emergency services self-compassion facets are viewed differently, i.e. being in control of emotions and not judging this negatively, then an association with PTSS severity would not be reflected as a disparity is created between how the measures are constructed and interpreted as adaptive and maladaptive in the general population versus what is perceived as adaptive and maladaptive in emergency services. Thus self-compassion in this population may not necessarily act as a marker of risk for psychopathology in the presence of a measure of psychological inflexibility, but may act as a marker of positive emotional wellbeing, consistent with Woodruff et al.'s (2014) findings.

Limitations

There are several limitations of note to this study. Firstly, the data collected was cross-sectional thus causality cannot be inferred from the SEM. Secondly, all data was collected via means of self-report and thus may be less reliable than more objective methods of collecting data. Thirdly, whilst adequate discriminant validity of measures was ascertained in this sample, the negative self-compassion scale, the AAQ-II and the SWEMWBS (Bond et al. 2011; Stewart-Brown et al. 2009) were just above the recommended threshold level. Finally, while this study highlights the relevancy of PTSD against PTSS in the context of emergency services, there is no direct comparison between the two in this study limiting the extent it can be argued

that symptom duration has questionable value in populations where exposure is continuous.

Clinical and Research Implications

This study uniquely highlights the extent of PTSS severity in a representative ambulance service population and is the first to offer a new, refined understanding of the underpinnings of post-traumatic stress and wellbeing specific to highly trauma exposed populations. Our findings suggest that one in two ambulance clinicians have concerning levels of PTSS severity; this raises several important points: Regardless of whether PTSD criteria are met, almost half of the population suffering with post-traumatic stress in an emergency service is of considerable clinical concern. A minimum duration of symptoms in emergency services may mask important clinical findings that may benefit those in these occupations and moreover camouflage the true extent of the impact of working in a profession where trauma is an intrinsic part of the job. Interventions that specifically focus on increasing psychological flexibility and self-compassion such as ACT and CFT may be particularly beneficial to this population particularly within the context of reducing post-traumatic stress and increasing psychological wellbeing. It may be of particular importance to focus on increasing psychological flexibility within this population given its relationship to PTSS and the pervasiveness of these symptoms; however, longitudinal research is required in order to better determine causality within this relationship. Future research is needed to map out PTSS over time in order to better understand its trajectory and impact on ambulance clinicians and other emergency services.

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Conflict of Interest

None

Ethical Standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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Appendix A: Author guidelines for the Journal of Clinical Psychology

From [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1097-4679/homepage/ForAuthors.html](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1097-4679/homepage/ForAuthors.html)

Manuscript Preparation

Format . Number all pages of the manuscript sequentially. Manuscripts should contain each of the following elements in sequence: 1) Title page 2) Abstract 3) Text 4) Acknowledgments 5) References 6) Tables 7) Figures 8) Figure Legends 9) Permissions. Start each element on a new page. Because the *Journal of Clinical Psychology* utilizes an anonymous peer-review process, authors' names and affiliations should appear ONLY on the title page of the manuscript. Please submit the title page as a separate document within the attachment to facilitate the anonymous peer review process.

Style . Please follow the stylistic guidelines detailed in the *Publication Manual of the American Psychological Association, Sixth Edition*, available from the American Psychological Association, Washington, D.C. *Webster's New World Dictionary of American English, 3rd College Edition* , is the accepted source for spelling. Define unusual abbreviations at the first mention in the text. The text should be written in a uniform style, and its contents as submitted for consideration should be deemed by the author to be final and suitable for publication.

Reference Style and EndNote . EndNote is a software product that we recommend to our journal authors to help simplify and streamline the research process. Using EndNote's bibliographic management tools, you can search bibliographic databases, build and organize your reference collection, and then instantly output your bibliography in any Wiley journal style. *Download Reference Style for this Journal*: If you already use EndNote, you can [download the reference style](#) for this journal. *How to Order*: To learn more about EndNote, or to purchase your own copy, [click here](#) . *Technical Support*: If you need assistance using EndNote, contact endnote@isiresearchsoft.com , or visit www.endnote.com/support .

Title Page . The title page should contain the complete title of the manuscript, names and affiliations of all authors, institution(s) at which the work was performed, and name, address (including e-mail address), telephone and telefax numbers of the author responsible for correspondence. Authors should also provide a short title of not more than 45 characters (including spaces), and five to ten key words that will highlight the subject matter of the article. Please submit the title page as a separate document within the attachment to facilitate the anonymous peer review process.

Abstract. Abstracts are required for research articles, review articles, commentaries, and notes from the field. A structured abstract is required and should be 150 words or less. The headings that are required are:

Objective(s): Succinctly state the reason, aims or hypotheses of the study.

Method (or Design): Describe the sample (including size, gender and average age), setting, and research design of the study.

Results: Succinctly report the results that pertain to the expressed objective(s).

Conclusions: State the important conclusions and implications of the findings.

In addition, for systematic reviews and meta-analyses the following headings can be used, Context; Objective; Methods (data sources, data extraction); Results; Conclusion. For Clinical reviews: Context; Methods (evidence acquisition); Results (evidence synthesis); Conclusion.

Permissions . Reproduction of an unaltered figure, table, or block of text from any non-federal government publication requires permission from the copyright holder. All direct quotations should have a source and page citation. Acknowledgment of source material cannot substitute for written permission. It is the author's responsibility to obtain such written permission from the owner of the rights to this material.

Article Types

- **Review Articles** . Review articles should focus on the clinical implications of theoretical perspectives, diagnostic approaches, or innovative strategies for

assessment or treatment. Articles should provide a critical review and interpretation of the literature. Although subdivisions (e.g., introduction, methods, results) are not required, the text should flow smoothly, and be divided logically by topical headings.

Appendix B: Data extraction template



Data collection form

Intervention review – RCTs and non-RCTs

This form can be used as a guide for developing your own data extraction form. Sections can be expanded and added, and irrelevant sections can be removed. It is difficult to design a single form that meets the needs of all reviews, so it is important to consider carefully the information you need to collect, and design your form accordingly. Information included on this form should be comprehensive, and may be used in the text of your review, 'Characteristics of included studies' table, risk of bias assessment, and statistical analysis.

Notes on using a data extraction form:

- Be consistent in the order and style you use to describe the information for each included study.
- Record any missing information as unclear or not described, to make it clear that the information was not found in the study report(s), not that you forgot to extract it.
- Include any instructions and decision rules on the data collection form, or in an accompanying document. It is important to practice using the form and give training to any other authors using the form.
- You will need to protect the document in order to use the form fields (Tools / Protect document)

Review title or ID
Predictors of Posttraumatic Growth in Firefighters : A systematic review

General Information

1. Date form completed <i>(dd/mm/yyyy)</i>	
2. Report title <i>(title of paper/ abstract/ report that data are extracted from)</i>	
3. Report ID <i>(if there are multiple reports of this study)</i>	

4. Publication type <i>(e.g. full report, abstract, letter)</i>	
5. Study funding source <i>(including role of funders)</i>	
Possible conflicts of interest <i>(for study authors)</i>	
6. Notes:	

Eligibility

Study Characteristics	Review Inclusion Criteria <i>(Insert inclusion criteria for each characteristic as defined in the Protocol)</i>	Yes/ No / Unclear	Location in text <i>(pg & ¶/fig/table)</i>
Type of study		...	
7. Participants		...	
8. Types of intervention		...	
9. Types of outcome measures		...	
10. Decision: ...			
11. Reason for exclusion			
12. Notes:			

DO NOT PROCEED IF STUDY EXCLUDED FROM REVIEW

Population and setting

	Description <i>Include comparative information for each group (i.e. intervention and controls) if available</i>	Location in text <i>(pg & ¶/fig/table)</i>
13. Population description <i>(from which study participants are drawn)</i>		
14. Setting <i>(including location and social context)</i>		
15. Inclusion criteria		
16. Exclusion criteria		
17. Method/s of recruitment of participants		
18. Notes:		

Methods

	Descriptions as stated in report/paper	Location in text <i>(pg & ¶/fig/table)</i>
19. Aim of study		
20. Design <i>(e.g. parallel, crossover, non-RCT)</i>		
21. Start date		

22. End date		
23. Duration of participation <i>(from recruitment to last follow-up)</i>		
24. Notes:		

Participants

Provide overall data and, if available, comparative data for each intervention or comparison group.

	Description as stated in report/paper	Location in text (pg & ¶/fig/table)
25. Sample size		
26. Age (mean and SD)		
27. Sex		
28. Race/Ethnicity		
29. Co-morbidities		
30. Other treatment received <i>(additional to study intervention)</i>		
31. Other relevant sociodemographics		
32. Notes:		

Results

Copy and paste the appropriate table for each outcome, including additional tables for each time point and subgroup as required.

For randomised or non-randomised trial - Continuous outcome

	Description as stated in report/paper					Location in text <i>(pg & ¶/fig/table)</i>				
33. Measure of PTG										
34. Comparison										
35. Measure used										
36. Outcome										
37. Results <i>Note whether: ... post-intervention OR ... change from baseline And whether ... Adjusted OR ... Unadjusted</i>	Correlation -					Correlation-				
	r	R2	AR2	SE	B(p)					
38. No. missing participants and reasons										
39. Any other results reported										

	Description as stated in report/paper		Location in text (pg & ¶/fig/table)
40. Power of sample			
41. Statistical methods used and appropriateness of these methods <i>(e.g. adjustment for correlation)</i>			
42. Reanalysis required? <i>(if yes, specify why)</i>	... <i>Yes/No/Unclear</i>		
43. Reanalysis possible?	... <i>Yes/No/Unclear</i>		
44. Reanalysed results			
45. Notes :			

Applicability

46. Have important populations been excluded from the study? <i>(consider disadvantaged populations, and possible differences in the intervention effect)</i>	... <i>Yes/No/Unclear</i>	
47. Does the study directly address the review question?	... <i>Yes/No/Unclear</i>	

<i>(any issues of partial or indirect applicability)</i>		
48. Notes:		

Other information

	Description as stated in report/paper	Location in text <i>(pg & ¶/fig/table)</i>
49. Key conclusions of study authors		
50. References to other relevant studies		
51. Correspondence required for further study information <i>(what and from whom)</i>		
52. Further study information requested <i>(from whom, what and when)</i>		
53. Correspondence received <i>(from whom, what and when)</i>		
54. Notes:		

Appendix C: Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (National Heart, Lung and Blood Institute, 2014)

Criteria	Yes/ No/ A
<p>1. Was the research question or objective in this paper clearly stated?</p> <p>2. Was the study population clearly specified and defined?</p> <p>3. Was the participation rate of eligible persons at least 50%?</p> <p>4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?</p> <p>5. Was a sample size justification, power description, or variance and effect estimates provided?</p> <p>6. For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?</p> <p>7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?</p> <p>8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?</p> <p>9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?</p> <p>10. Was the exposure(s) assessed more than once over time?</p> <p>11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?</p> <p>12. Were the outcome assessors blinded to the exposure status of participants?</p> <p>13. Was loss to follow-up after baseline 20% or less?</p> <p>14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?</p>	

Appendix D: Author guidelines for Journal of Psychological Medicine

From <https://www.cambridge.org/core/journals/psychological-medicine/information/instructions-contributors>

Generally papers should not have text more than 4500 words in length (excluding abstract, tables/figures and references) and should not have more than a combined total of 5 tables and/or figures. Papers shorter than these limits are encouraged. For papers of unusual importance the editors may waive these requirements. Articles require a structured abstract of no more than 250 words including the headings: Background; Methods; Results; Conclusions. Review Articles require an unstructured abstract of no more than 250 words. The name of an author to whom correspondence should be sent must be indicated and a full postal address given in the footnote. Any acknowledgements should be placed at the end of the text (before the References section). Contributors should also note the following: 1. S.I. units should be used throughout in text, figures and tables. 2. Authors should spell out in full any abbreviations used in their manuscripts. 3. Foreign quotations and phrases should be followed by a translation. 4. If necessary, guidelines for statistical presentation may be found in: Altman DG., Gore SM, Gardner, MJ. Pocock SJ. (1983). Statistical guidelines for contributors to medical journals. *British Medical Journal* 286, 1489-1493.

Contributors should also note the following: 1. S.I. units should be used throughout in text, figures and tables. 2. Authors should spell out in full any abbreviations used in their manuscripts. 3. Foreign quotations and phrases should be followed by a translation. 4. If necessary, guidelines for statistical presentation may be found in: Altman DG., Gore SM, Gardner, MJ. Pocock SJ. (1983). Statistical guidelines for contributors to medical journals. *British Medical Journal* 286, 1489-1493

References (1) The Harvard (author-date) system should be used in the text and a complete list of References cited given at the end of the article. In a text citation of a

work by more than two authors cite the first author's name followed by et al. (but the names of all of the authors should be given in the References section). Where several references are cited together they should be listed in rising date order. (2) The References section should be in alphabetical order. Examples follow: Brown GW (1974). Meaning, measurement and stress of life events. In *Stressful Life Events: Their Nature and Effects* (ed. B. S. Dohrenwend and B. P. Dohrenwend), pp. 217-244. John Wiley: New York. Brown J. (1970). *Psychiatric Research*. Smith: Glasgow. Brown J, Williams E, Wright H (1970). Treatment of heroin addiction. *Psychological Medicine* 1, 134-136. Note: authors' names should be in bold font; journal titles should always be given in full.

Required Statements Acknowledgements You may acknowledge individuals or organisations that provided advice, support (non-financial). Formal financial support and funding should be listed in the following section. **Financial support** Please provide details of the sources of financial support for all authors, including grant numbers. For example, "This work was supported by the Medical research Council (grant number XXXXXXXX)". Multiple grant numbers should be separated by a comma and space, and where research was funded by more than one agency the different agencies should be separated by a semi-colon, with "and" before the final funder. Grants held by different authors should be identified as belonging to individual authors by the authors' initials. For example, "This work was supported by the Wellcome Trust (A.B., grant numbers XXXX, YYYY), (C.D., grant number ZZZZ); the Natural Environment Research Council (E.F., grant number FFFF); and the National Institutes of Health (A.B., grant number GGGG), (E.F., grant number HHHH)". Where no specific funding has been provided for research, please provide the following statement: "This research received no specific grant from any funding agency, commercial or not-for-profit sectors." **Conflict of interest** Please provide details of all known financial, professional and personal relationships with the potential to bias the work. Where no known conflicts of interest exist, please include the following statement: "None." **Ethical standards** Where research involves human and/or animal experimentation, the following statements should be included (as applicable): "The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on

human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.” and “The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional guides on the care and use of laboratory animals.”

Appendix E: Ethical Approval

Katie Davis
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Department of Clinical and Health Psychology
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28 January 2016

Dear Katie,

Application for Level 2/3 Approval

Reference: CLIN249

Project Title: How Paramedics Cope with Stress

Academic Supervisor: Stella Chan / Angus MacBeth

Thank you for submitting the above research project for review by the Department of Clinical and Health Psychology Ethics Research Panel. I can confirm that the submission has been independently reviewed and was approved on the 25th January 2016.

Should there be any change to the research protocol it is important that you alert us to this as this may necessitate further review.

Yours sincerely,



Kirsty Gardner



SCHOOL of HEALTH IN SOCIAL SCIENCE
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Katie Davis
Trainee Clinical Psychologist
Department of Clinical and Health Psychology
School of Health in Social Science
University of Edinburgh

16 February 2016

Dear Katie,

Application for Level 2 Approval - Amendment

Reference: CLIN249
Project Title: How Paramedics Cope with Stress
Academic Supervisor: Angus MacBeth

Thank you for submitting the above amendment for review by the Department of Clinical and Health Psychology Ethics Research Panel. I can confirm that the amendment has been independently reviewed and was approved on the 16th February 2016.

Should there be any change to the research protocol it is important that you alert us to this as this may necessitate further review.

Yours sincerely,

Kirsty Gardner
Administrator
Clinical Psychology

Appendix F: R&D Approval



**Scottish
Ambulance
Service**
Taking Care to the Patient

Chair David Garbutt GPM
Chief Executive Pauline Howle OBE



Ms Kate Davis
Trainee Clinical Psychologist
Cree West
Crichton Royal Hospital
Dumfries
DG1 4TG

Date: 9th February 2016

Dear Ms Davis,

How Ambulance Clinicians Cope with Stress

The Scottish Ambulance Service Research, Development and Innovation Governance Group has considered the aforementioned research proposal. The Chair of the group noted the high quality of this application and we are pleased to inform you that your study has been formally approved. However, prior to commencement we respectfully request two amendments to your proposal:

1. It is unclear whether you intend to recruit all Accident and Emergency ambulance clinicians for this study. If this is the case then please confirm this and replace the term 'Paramedic' with the more generic term 'ambulance clinician'. This will permit inclusion of both Ambulance Paramedics and Technicians in your study.
2. Please include a link to the Scottish Ambulance Service Counselling Service webpage and contact number in the 'de-brief' sheet (and other relevant documents i.e. posters). This will provide participants with an additional route for support and guidance other than their General Practitioner.

We were delighted that you elected to undertake research with the Scottish Ambulance Service and would like to offer you our full and continued support. If you should experience any difficulties undertaking this research please do not hesitate to contact Dr David Fitzpatrick (Paramedic Clinical Research Specialist) on: david.fitzpatrick@nhs.net who will be able to offer guidance and support.

We very much look forward to hearing from you.

Yours sincerely,



Dr JAMES WARD
MEDICAL DIRECTOR

Scottish Ambulance Service, National Headquarters, Gyle Square, 1 South Gyle Crescent, Edinburgh EH12 9EB
Telephone: 0131 314 0111 Email: jamesward@nhs.net
www.scottishambulance.com



Amendments following R& D review

Hi David,

Thanks for this, I have made the below changes and submitted to ethics for an amendment.

1. That the population recruited be under the terminology of 'Ambulance Clinician', this includes both qualified Paramedics and qualified Ambulance Technicians. In the documentation, the wording would be altered to replace the word 'paramedic' with 'ambulance clinician'.
2. The addition of a demographic question asking participant's to specify if they are a Paramedic or an Ambulance Technician
3. The inclusion of a link to a webpage and a phone number that will allow participants to receive further details on counselling services that the Scottish Ambulance Service will provide to their employees. It also offers further support and guidance for common health issues. To be included in the de-brief sheet (attached).

Response from Scottish Ambulance Service

From: Fitzpatrick David (SCOTTISH AMBULANCE SERVICE)

Sent: 08 February 2016 17:12

To: Davis Katie (NHS DUMFRIES AND GALLOWAY)

Subject: RE: RE:

Hi Katie,

Please see attached. You have covered the requests in your response email below.

Will catch up soon.

Bw

David

Appendix G: Invitation Email



Dear Colleagues,

I am a Trainee Clinical Psychologist at the University of Edinburgh

I am writing to invite you to take part in a research study because you are either a Paramedic or Ambulance Technician working within the NHS.

Research has shown that people who work in emergency services sometimes experience emotional difficulties due to the stressful nature of their work.

We are conducting this research study to understand how Ambulance Clinicians cope with their work stress and how their thoughts, feelings and personal values may impact on their ability to cope.

In the long-term this research will help us develop more effective strategies to support people working in emergency services.

If you would like to participate or find out more about the study, please follow the link below.

<https://edinburgh.onlinesurveys.ac.uk/how-ambulance-clinicians-cope-with-stress>

The questionnaire should take no more than 10 minutes to complete. With your input this research will eventually help ensure that as a profession you are receiving the necessary support.

Many thanks,

Katie Davis

Clinical Psychologist in Training
Cree West
Crichton Royal Hospital
Dumfries
DG1 4TG

Appendix H: Consent Form



CONSENT FORM

How Ambulance Clinicians Cope with Stress

Researcher: Katie Davis

1. I confirm that I have read and understood the information sheet (version 3.20/11/2015) for the study.
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected.
3. I agree to take part in the study and am providing consent by continuing on to complete the questionnaire.
4. I understand that relevant sections of data collected during the study may be looked at by individuals from the regulatory authorities and from the Sponsor (University of Edinburgh) or from the Scottish Ambulance Service where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.

Appendix I: Participant Information Sheet



How Ambulance Clinicians Cope with Stress

Participant Information Sheet

Invitation

You are being invited to take part in a research study that is being carried out by a Trainee Clinical Psychologist at the University of Edinburgh. **Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Talk to others about the study if you wish.** Please contact Katie Davis on xx if there is anything that is not clear or if you would like more information.

What is this research about?

You have been asked to complete this questionnaire as you are either a Paramedic or Ambulance Technician working in Scotland. The following questionnaire will help us understand if there is a relationship between how your thoughts, feelings and values relate to how you cope with stress and your emotional wellbeing.

Little is known about how Ambulance Clinicians view themselves and their emotions and how this may relate to experiencing distress. This study will provide us with further information on this relationship and may inform future strategies to help Ambulance Clinicians cope with stress and distress resulting from their work.

Who can take part?

We are inviting Paramedics and Ambulance Technicians working in Scotland to take part in this study.

Do I have to take part in this research?

No. Your participation is completely voluntary and you have the right to withdraw at any time without your professional role, legal rights or medical care being affected.

What's involved?

If you agree to take part in the study, you will be asked to complete a few short questionnaires including questions on how you cope with stress, your personal values, and your emotional wellbeing. It should take you no more than **10** minutes to complete.

Will my responses be treated as confidential?

Yes. You will not be personally identifiable and only the researchers involved will have access to the data which will be password protected and securely stored on Dumfries and Galloway NHS servers and the University of Edinburgh's servers. You will not need to provide your name at any point during the study.

To ensure that the study is being run appropriately, we will ask your consent for responsible representatives from the Sponsor and NHS Institution to access your unidentifiable data collected during the study, where it is relevant to you taking part in this research. The Sponsor is responsible for overall management of the study and providing insurance and indemnity.

What are the possible benefits of taking part?

There are no direct benefits to you in taking part. However, it is hoped that the information you provide will help us develop more effective strategies to help Ambulance Clinicians cope with stress resulting from their work.

What are the potential disadvantages and risks of taking part?

There is unlikely to be any risk or disadvantages in taking part. However, thinking about any stressful incidences could potentially cause some distress. A debrief form will be provided at the end of the study to provide further information regarding mental health.

You can also contact the Scottish Ambulance Service Help Health and Wellbeing Service on **0800 587 5670** or go to their website www.sg.helpeap.com for further support and guidance and the opportunity to seek Counselling services.

What will happen with the results?

The study will be part of a doctoral thesis and it is expected that it will be published in an academic health journal. A summary of the results will also be made available to the Scottish Ambulance Service. You will NOT be identifiable in any reports or publications.

If you want further information about the results of the study, please contact Katie Davis at [xx](#)

Who is organising the research and why?

This study has been organised and sponsored by the University of Edinburgh. *This study has been approved by the University of Edinburgh Research Ethics Committee ID number: xxxx* and approved by the Scottish Ambulance Service Research and Development Board.

What if there is a problem?

If you have any concerns about the study please contact Katie Davis or alternatively you can contact one of the supervisors via the contact details provided. Alternatively, if you feel you would prefer general information about research, independent of this study, contact Dr David Fitzpatrick from the Research Unit within the Scottish Ambulance Service via xx If you

wish to make a complaint about the study please contact the University of Edinburgh's Research Governance team via email at: xx

Dr Stella Chan
Academic Supervisor
University of Edinburgh
School of Health and Social
Science
Edinburgh
Email:

Dr Angus MacBeth
Academic Supervisor
University of Edinburgh
School of Health and Social
Science
Edinburgh
Email:

Dr Ross Warwick
Clinical Supervisor
Department of Psychological
Services and Research
Crichton Royal Hospital
Dumfries
DG1 4TG
Email:

Thank you for taking the time to read this information sheet.

Email addresses redacted

Appendix J: De-brief Sheet



How Ambulance Clinicians Cope with Stress

Thank you for taking part in the survey.

Sometimes filling in questionnaires may make people more aware of their feelings and may cause you some distress. Some people following traumatic incidences can experience some distressing thoughts and feelings, as well as having nightmares, poor sleep, flashbacks of incidences and can find themselves struggling to concentrate for any length of time. If you are concerned you are struggling with emotional difficulties, please consider going to your GP to discuss this further.

If you would like further information on common mental health issues or in particular Post-traumatic Stress Disorder you may find this website helpful:

<http://www.moodjuice.scot.nhs.uk/>

You can also contact the Scottish Ambulance Service Help Health and Wellbeing Service on **0800 587 5670** or go to their website www.sg.help.eap.com for further support and guidance and the opportunity to seek Counselling services.

If you have any further questions about the study please contact Katie Davis at xx

Appendix K: Figure A1: Amos 22 CFA showing Standardised Estimates

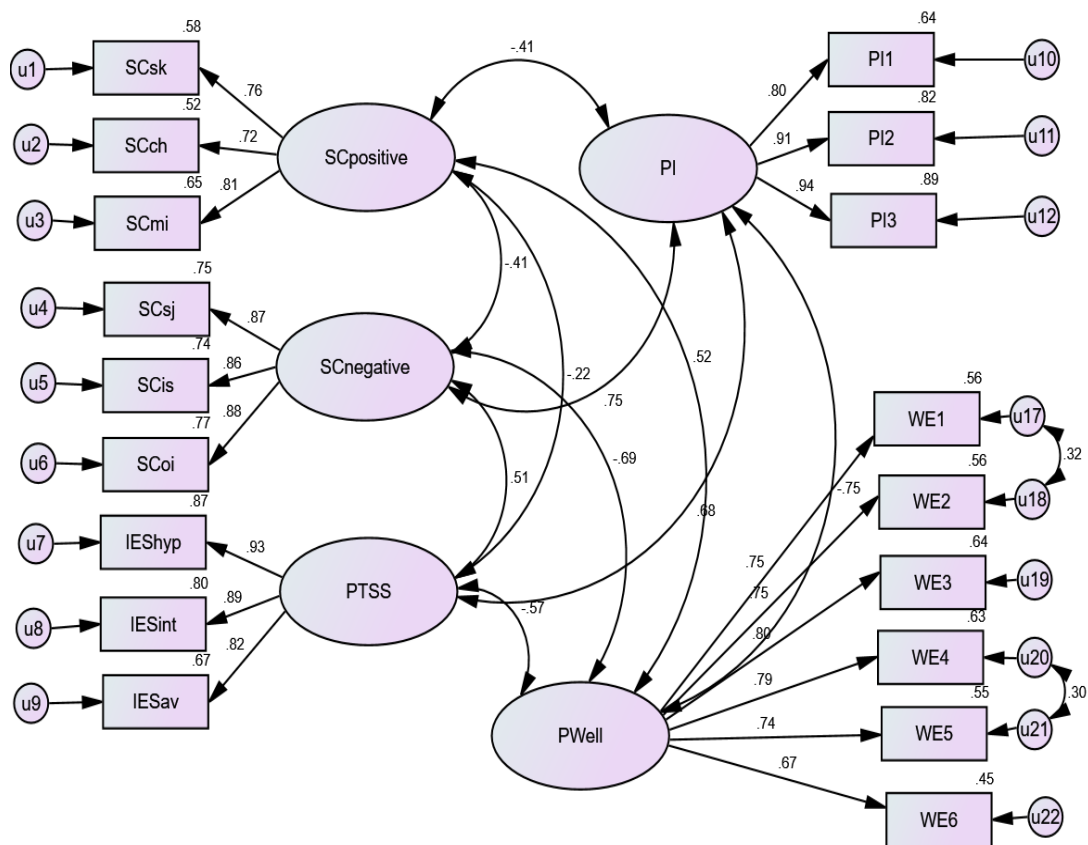


Figure A1. Confirmatory Factor Analysis

Appendix L: Table A1 Pre and post-modification goodness of fit indices

	RMSEA	CLI	TLI	CMIN/DF
Pre modification	0.074	0.93	0.92	3.76
Modified CFA	0.055	0.97	0.96	2.54

Table A1. Goodness of Fit indices pre-modification and the final measurement model (co-variances reflected as free parameters and the removal of item 7 of the SWEMWBS).

Appendix M: Tests of validity, reliability and multivariate assumptions

Validity of Measures and Factors in CFA

Unidimensionality was present for all factors, composite reliability was above .8, maximal reliability was above .9 for all factors, average variance extracted (AVE) was above .5 for all constructs and all factor loadings were significant. A discriminant validity index summary was created to ensure this was met and no relationship between the exogenous variables exceeded .85 (see table 3). Overall the model and measures demonstrated acceptable validity and reliability.

	CR	AVE	MaxR(H)	PI	SCpositive	SCnegative	PTSS	PWell
PI	0.91	0.78	0.93	0.88				
SCpositive	0.81	0.59	0.95	-0.41	0.77			
SCnegative	0.90	0.76	0.97	0.75	-0.41	0.87		
PTSS	0.91	0.78	0.98	0.68	-0.22	0.51	0.88	
PWell	0.89	0.57	0.98	-0.75	0.52	-0.69	-0.57	0.75

Composite Reliability (CR), Average Variance Extracted (AVE), Maximal Reliability of the latent factors (MaxR(H)), and discriminant validity index (in bold is the square root of the AVE). PI, psychological inflexibility

Table A2. Descriptives of Reliability and Validity

Test of Multivariate Assumptions

A Cook's distance analysis showed no single case affected the model as a whole (Cook's $D < 1$; Cook & Weisberg, 1982). Multicollinearity was assessed by examining Tolerance and the Variance Inflation Factor (VIF). Tests showed the assumptions of collinearity were met for the model; psychological inflexibility, Tolerance = .45, VIF= 2.24, positive SC, Tolerance =.85, VIF=1.18 and negative SC, Tolerance =.46, VIF=2.17. A common latent factor was used to assess if there was a significant difference in chi square and degrees of freedom between the fully constrained and unconstrained model, there was no significant difference found, $p=.090$.

Appendix N: Figure A2 Amos 22 Structural Model with Standardised Estimates

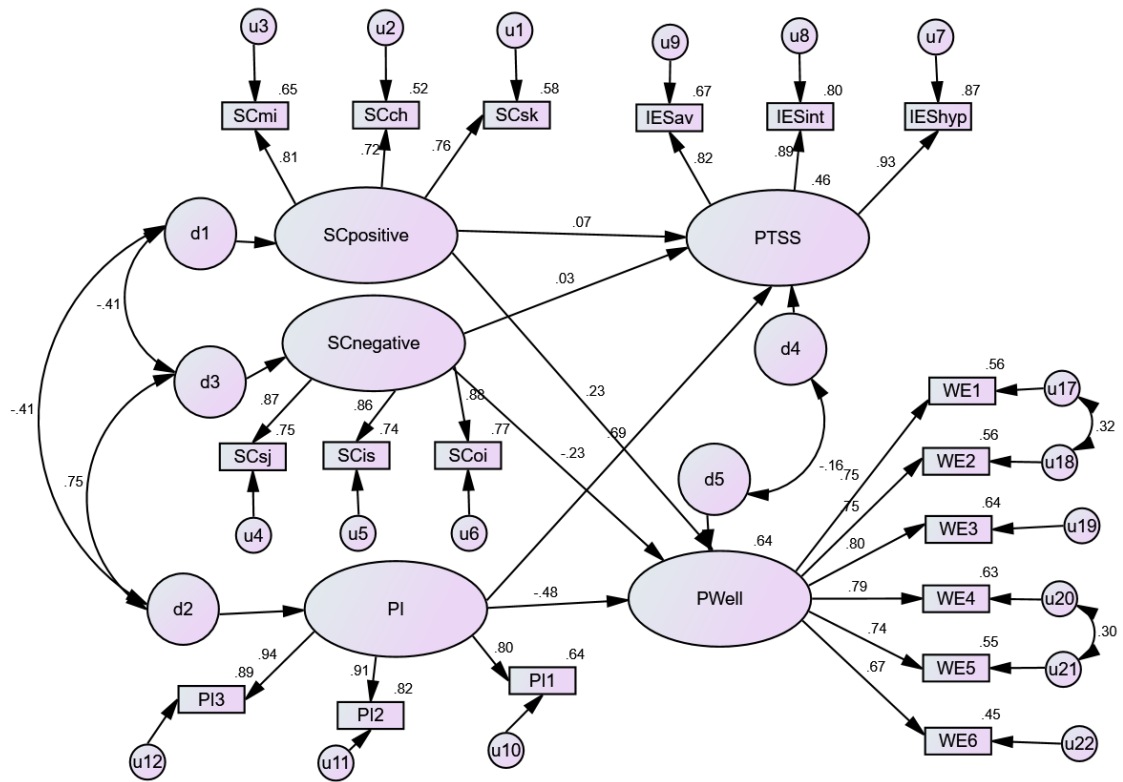


Figure A2. AMOS 22 SEM showing standardised regressions

Appendix O: Original Proposal



Doctorate in Clinical Psychology

Thesis Research Proposal (for Research 1 assessment).

Provisional Thesis Title: The Relationship between Self Compassion and Psychological Flexibility to Trauma in Paramedics

Allocated Thesis Project Supervisors

Clinical: Dr Ross Warwick

Academic 1: Dr Stella Chan

Academic 2: Dr Angus MacBeth

(where applicable)

Others involved as part of project team (if applicable)

Proposed setting(s): NHS Scotland (Nationwide), Scottish Ambulance Service (NHS)

(Where research will be carried out)

Anticipated Month & Year of Submission of Thesis: 1st May 2017

Version (date): 15.07.15

Introduction

- 1) Please provide a brief critical review of relevant literature, which should clearly demonstrate the rationale and scientific justification for the research. (Relevant to IRAS A12) (Guideline 1000 to 1500 words)

Following exposure to traumatic events; an aetiological event where there has been a serious threat to life, people can develop symptoms of Post-Traumatic Stress Disorder (PTSD), typified by symptoms of 'reliving' the incident repeatedly in one's mind, hyperarousal, emotional dysregulation, attempted avoidance of thoughts and memories, and avoidance of stimuli in the environment that is associated with the event (ICD-10, 1992). Furthermore, PTSD, like many other mental illnesses is associated with reduced quality of life (EMPRED, 2008).

Studies report that within the general population, PTSD has a prevalence of approximately 3% (McManus *et al.*, 2009) while Bennett *et al.* (2004) found that in the UK, approximately 22% of emergency service personnel reach the diagnostic threshold for PTSD. In addition, Alexander and Klein (2001) found that in 110 ambulance personnel in Scotland, 30% scored highly in the Impact of Events Scale, a self-report measure used to assess frequency of common PTSD symptoms (Horowitz *et al.*, 1979).

Emergency services are highly likely to endure extremely distressing situations as a core component of their career. It was found that in 2014, paramedics in England across 9 NHS ambulance trusts took over 40000 days off sick due to stress, which amounted to a 28% increase from 2012 (The Guardian, 2015). Compared to the national average of 4.4 days per year (Office of National Statistics), paramedics took over 15 sick days per year (HSCIC, 2014).

Given the above statistics, it is important to understand the relationship between being exposed to traumatic incidences and the presence of traumatic symptomology in this population. From Bennett *et al.*'s (2004) finding, approximately 80% of paramedics do not reach clinical threshold for a diagnosis of PTSD. Understanding potential protective and vulnerability factors specific to this population is critical to the development of specific proactive and reactive strategies and interventions to reduce traumatisation resulting from their work.

There is an emerging evidence base in regards to self-compassion (SC) and how this interacts with living with trauma (Thompson & Waltz, 2008). SC can be defined as having a balanced view of one's negative emotions without diminishing or exaggerating them and being accepting of one's own emotional pain creating the ability to reduce their own suffering through kindness for themselves. It incorporates the concept of being non-judgmental towards and understanding of oneself in terms of suffering, imperfections and failures; conceptualising this as part of the human condition (Neff, 2003). The concept of SC has been theorised as a mechanism of change and as a core component of several 'Third Wave' therapies such as Compassion Focused Therapy (Barnard & Curry, 2011).

SC has been found to have a positive correlation with psychological well-being; Neff *et al.* (2007) found that in 177 undergraduate students, higher SC was related to higher levels of self-reported positive psychological health; a finding generally replicated in the literature (e.g. Baer *et al.*, 2012; Wei *et al.*, 2011). Furthermore, SC has been linked to lower psychopathology in general; MacBeth and Gumley (2012) conducted a meta-analysis and found a large effect size ($r = -.54$) between the two variables where increased SC was related to lower psychopathology. This meta-analysis therefore suggests that higher SC may act as a protective factor against mental illness.

Thompson and Waltz (2008) conducted a study in over 200 undergraduate students who had experienced a traumatic event, investigating the relationship between SC and PTSD symptoms and found that SC was negatively related to avoidance strategies. Individuals who demonstrate high levels of SC show an increased readiness to confront distressing thoughts and feelings (Neff *et al.*, 2007). Avoidance of thoughts and feelings are a maintaining factor in trauma related mental health issues (Marx & Sloan, 2005). Therefore, those who have higher levels of SC may be less inclined to use avoidance strategies as a coping mechanism for traumatic experiences, and so be less prone to suffer from trauma (Thompson & Waltz, 2008).

Another construct that has been linked with increased psychopathology and decreased psychological well-being is 'psychological inflexibility' (Kashden & Rottenburg, 2011). Psychological inflexibility is the concept whereby one gives

rigid priority to psychological reactions over their values; this in turn influences behavior which can be in discord with those values. Negative judgements of oneself and avoiding internal experiences is also conceptualised as part of psychological inflexibility (Bond *et al.*, 2011).

Whilst evidence suggests that higher SC is linked to psychological well-being and more positive coping strategies, there is emerging literature that this association may not be as evident in the paramedic population. Mitmansgruber *et al.* (2008) found that in experienced paramedics (n=134) having low SC and being strict and contemptuous about one's own personal feelings (non-acceptance of thoughts and emotions) were positive attributes in terms of psychological well-being. They posited that personnel from these services frequently experience situations where stringent control of their emotions is a necessity for their own survival and the survival of others; it may be that these findings relate to the taxing and specific role of working in distressing situations and the need to control one's emotions to work. This paper would seem to suggest that in contrast to the general population; in paramedics having low SC may be related to higher psychological well-being and thus could be a potential protective factor. In addition, their analysis demonstrated that experiential avoidance (psychological inflexibility; measured by the Acceptance and Action Questionnaire [Hayes *et al.*, 2004]) was found to account for 39% of the variance in psychological well-being. Furthermore, they compared experienced paramedics with 'novices' (n=105) and found that the more experienced a paramedic was the less 'emotional' about their emotions (meta-emotions) they became. Mindful awareness increased with experience initially however decreased thereafter, and experiential avoidance (psychological inflexibility) appeared to not change with experience. The authors argue that with increasing numbers of exposures to stressful events, paramedics may come to adopt an accepting stance that results in decreased intensity of meta-emotions. However, given the finding that experienced paramedics are more non-accepting of their thoughts and emotions it may be that their answers are biased due to emotional suppression.

Seligowski *et al.* (2014) found that in undergraduate students SC and PTSD related in a bivariate correlation; however, this relationship was not present after controlling for psychological inflexibility. Further, Seligowski *et al.* (2014) found that using a 2-

factor model of SC (positive and negative), SC proved to be a good fit to their data. Given their findings, Seligowski *et al.* argue that Thompson and Waltz's (2008) finding that SC was negatively associated with the avoidance component of PTSD does not explain further variance in PTSD beyond the act of avoiding negative thoughts and emotions. Moreover, Seligowski *et al.* found that SC was significantly related to psychological well-being even when controlling for psychological inflexibility. The authors concluded that interventions aimed at increasing SC and psychological flexibility may be beneficial to individuals with PTSD in terms of reducing their trauma symptom severity and increasing their psychological well-being. However, given Mitmansgruber *et al.*'s (2008) findings it may be that this relationship is not generalizable to paramedics.

Seligowski *et al.* (2014) and Mitmansgruber *et al.* (2008) demonstrate the role of psychological flexibility in PTSD symptomology and psychological well-being. Evidence suggests that psychological inflexibility is associated with PTSD symptoms severity even after controlling for avoidance based symptoms (Meyer *et al.*, 2013). It may be that increasing psychological flexibility may prove to be a beneficial therapeutic target; however the relationship between this construct and SC is unclear. Neff and Tirch (2013) highlighted the benefit of further research into the ways in which SC can be related to psychological flexibility (as a construct of Acceptance and Commitment Therapy [ACT] model), in order to further understand how active the two components are as process variables in therapy. Further, it has been argued that SC and psychological flexibility share several core components, e.g. being self-accepting (see Yadavaia *et al.*, 2014); it is therefore theoretically important to determine if SC accounts for variance in trauma symptoms over and above psychological inflexibility, particularly given Seligowski *et al.* (2014) demonstrated it did not. Yadavaia *et al.*, (2014) conducted an ACT intervention for increasing SC and found that psychological flexibility acted as a process of change. They found the intervention more effective for those who had a history of trauma and argued this may be due to higher levels of experiential avoidance.

The relationship between SC and psychological flexibility and symptoms of trauma and psychological well-being is a growing literature; however evidence is lacking into how these variables interact with one another specific to paramedics. It is of

clinical and theoretical importance to better understand the relationship between these constructs in this population specifically to inform future interventions rather than generalise from other populations. Therefore, this project will investigate the relationship between self-compassion, psychological inflexibility, trauma symptoms and psychological wellbeing in paramedics. In effect, furthering our understanding of maladaptive responses to trauma specific to this population. The study will also seek to explore if this relationship may be moderated by years of experience given Mitmansgruber *et al.*'s (2008) comparison of novice vs. experience.

Research Questions / Objectives:

(Keep these focused and concise, with a maximum of five research questions).

2) What is the principal research question / objective? (IRAS A10)

What is the relationship between self-compassion and trauma symptoms in paramedics?

Would this relationship be mediated by psychological inflexibility?

Is the above relationship moderated by years of experience working within the profession?

3) What are the secondary research questions / objectives if applicable? (IRAS A11)

What is the relationship between self-compassion and psychological well-being in paramedics?

Would this relationship be mediated by psychological inflexibility? Is the above relationship moderated by years of experience working within the profession?

Methodology

4) Please give a full summary of your design and methodology. It should be clear exactly what will happen at each stage of the project. (Relevant to IRAS A13)

Design

The study will be a cross-sectional quantitative design.

Population

Participants will be Paramedics working within the NHS

Recruitment

Participants will be recruited from NHS across Scotland via online dissemination of the questionnaire and from circulating hard copies around relevant departments e.g. break rooms in A&E, as well as posters. Managers of relevant services will be contacted and informed about the study in order to raise further awareness and it will be requested that they email/ inform paramedics of the study and provide a link to the questionnaire.

Through preliminary discussions with the Scottish Ambulance Service they have provisionally agreed to help raise awareness through several mediums such as including the study in newsletters, monthly meetings, posters on notice boards and dissemination via email and online forums. There is further possibility that information regarding the study and where to access it online could be circulated along with pay slips.

Materials

The questionnaire will be available in hard copy format and online (The Online Bristol Questionnaire). The battery will consist of the measures as listed below, along with an information sheet, a consent form, and a de-briefing sheet.

Posters will consist of information regarding the study and a link to the questionnaire.

The battery will include the following:

Self-Compassion Scale (Neff, 2003)

Acceptance and Action Questionnaire- II (Bond *et al.*, 2011)

Impact of Events Scale- Revised (Weiss & Marmar, 1997)

The Warwick-Edinburgh Mental Well-Being Scale (Stewart-Brown *et al.*, 2007)

Further information will be collected on how long they have worked as a paramedic, age range, ethnicity and gender

Procedure

An information sheet will be provided outlining the purpose of the study and that it will take approximately 15 to 25 minutes to complete. Consent will be sought prior to the dissemination of a battery of scales either by agreeing online or signing a hard copy.

A de-briefing sheet will be provided upon completion, offering further information regarding easily accessible support, e.g. moodjuice, as well as encouraging participants to speak to their GP if they have any concerns regarding their mental wellbeing.

Data Analysis

Upon completion of recruitment, analysis in the form of a multiple regression will be conducted (see analysis section for details).

5) Please list the principal inclusion and exclusion criteria (IRAS A17-1 and A17-2)

Inclusion criteria: Qualified Paramedics

Exclusion Criteria: Emergency Service workers who are not trained paramedics.

This will be made clear in the information sheet and on posters that it is specifically only paramedics who are eligible to take part. Further, prior to commencing the battery of questionnaires, participants will be asked to tick their job role from a drop-down box, which only allows you to proceed if you have entered that you are a paramedic.

6) How will data be collected?

If quantitative, list proposed measures and justify the use of these measures. If qualitative, explain how data will be collected giving reasonable detail. (Don't just say 'by interviews')

Data will be collected via an online questionnaire using the Bristol Online Survey. Hard copies will also be disseminated in relevant areas within the NHS (as discussed

above) and a link provided in emails disseminated from relevant service heads and the Scottish Ambulance Service.

The following measures will be used to measure the constructs of interest:

Self-Compassion Scale (Neff, 2003)

The self-compassion scale is a widely used tool to assess SC. It is a 26 item self-report scale, consisting of 6 sub-scales measuring 3 facets of SC; self-kindness vs. Self judgement, viewing suffering as part of common humanity vs. Self-isolation and mindful awareness vs. Overidentification of thoughts. Participants will rank items on a 5-point Likert Scale ranging from 'Almost Never' to 'Almost Always'. The Self-Compassion Scale has demonstrated high internal consistency reliability (.92).

Seligowski *et al.* (2014) used a 2-factor model of the SC scale; positive and negative SC. Positive SC consisting of self-kindness, common humanity, and mindfulness, and negative SC consisting of self-judgement, isolation and over-identification. They found that the 2-factor model was a good fit to the data in both a trauma exposed and unexposed sample. Thus it would be advantageous to allow the same analysis of the best fit for the data in this current study and will be incorporated into the power calculation.

Acceptance and Action Questionnaire- II (Bond et al., 2011)

The Acceptance and Action Questionnaire-II (AAQ-II) is 7-item questionnaire designed as a measure of psychological inflexibility. It is a 7-point Likert scale where participants rank answers ranging from 'Never True' to 'Always True'. Bond *et al.* found a high level of reliability, a mean alpha coefficient of .84 and 12 month test- retest reliability of .79 using a one-factor solution.

Impact of Events Scale- Revised (Weiss & Marmar, 1997)

The Impact of Events Scale is a widely used tool to measure psychological reactions following traumatic events consisting of 22 items measuring symptoms of intrusion, avoidance and hyperarousal. It is a 5-point Likert Scale where participants rank answers ranging from 'Not at all' to 'Extremely'. It has demonstrated a high internal

consistency of .96 with a test-retest reliability and demonstrated a 2 factor solution (intrusion/ hyperarousal and avoidance) or a single factor solution and places more focus on dissociative avoidance strategies compared to other measures (Creamer *et al.*, 2003).

The Short Warwick-Edinburgh Mental Well-Being Scale (Stewart Brown et al., 2007)

The Short Warwick-Edinburgh Mental Well-Being Scale (SWEMWBS) was designed to measure affective, cognitive and psychological functioning (Stewart-Brown *et al.*, 2009). It is a 7-item self-report questionnaire with a one-factor solution devised from its original 14-item format, with content validity of .91 demonstrating strong positive correlations with other mental well-being scales (Tennant *et al.*, 2007). Items are ranked on a 5-point Likert Scale ranging from 'None of the time' to 'All of the time'. The SWEMWBS has a correlation of .954 to the full length scale.

Questions regarding demographic details incorporating occupational history (see Materials section) will also be included.

Sample Size

7) What sample size is needed for the research and how did you determine this? For quantitative projects, outline the relevant Power calculations and the rationale for assuming given effect sizes. For qualitative projects, outline your reasoning for assuming that this sample size will be sufficient to address the study's aims. (IRAS A59 and A60)

Power Calculation was determined using Daniel Soper's 'A-Priori Sample Size Calculator for multiple regression' (<http://danielsoper.com/statcalc3/calc.aspx?id=1>).

The anticipated effect size was set to 0.15, this is conventionally considered to estimate for a medium effect size. Given the lack of published evidence of the posed research question, using a medium effect size reduces the chances of the study being under-powered. The statistical power level was set to .8 (as is convention) and the probability level set to .05.

Given the principal research question there are 4 potential predictors of trauma severity as listed they are:

Self-compassion as 2-factors (positive and negative SC)

Psychological Inflexibility (1- factor)

Years of experience (1-factor)

Using these parameters a minimum sample size of 84 participants is required to adequately power the study.

A further sample size of 97 will allow for a further investigation into the effect of Self compassion, psychological inflexibility and trauma symptoms (2 factor) on psychological well-being based on 6 factors in total.

8) Outline reasons for your confidence in being able to achieve a sample of at least this size. (e.g. by giving details of size of known available sample(s), percentage of this type of sample that typically participate in such studies, opinions of relevant individuals working in that area)

The Scottish Ambulance Service is in the process of developing a staff welfare plan and options paper in relation to future welfare provision for the service, including support following major/traumatic incidents. This study would be directly relevant to that aim and thus the service has provisionally agreed to increase awareness of the study. The Scottish Ambulance Service has agreed to support the proposed research with a view to strengthening this strategic objective.

The Service has agreed to promote the study via postering, providing information in newsletters and forums (including online), dissemination through email/post and possibly to be included with pay slips as well as raising awareness through monthly meetings.

Ethical and NHS Research and Development approval will be sought to recruit Paramedics nationwide. There are 4500 ambulance workers in Scotland in total, therefore based on the above sample size calculations a response rate of 2% (approximately 100 participants) would be sufficient to address the research

questions proposed. Given the potential for a larger sample size to permit more complex data analyses, and the ethical difficulties in recalling postal questionnaires once sent we will permit a modest degree of over-recruitment once the target sample size has been met.

Through the support of existing research networks with ambulance workers, further advertisement of the study could be utilized and it has been provisionally agreed that this will be possible.

The clinical supervisor for the current study has experience of conducting research in the A&E department within the health board and is embedded well enough within that service that recruitment may prove highly feasible in this area.

Analysis

9) Please describe the methods of analysis (statistical or other appropriate methods, e.g. for qualitative research) by which the data will be evaluated to meet the study objectives. (IRAS A62)

Multiple regression analysis will be used to investigate predictors of trauma severity as measured by the IES-R scores.

Predictor variables:

Self-compassion Scale Scores (2-factor)

AAQ-II scores (1-factor) [mediator variable]

Years of experience (1-factor) [moderator variable]

Secondary, a parallel analysis looking at how the above variables predict psychological well-being. Sample size permitting, a further regression analysis using IES-R scores (2-factor) will also be included as a predictor variable.

Data will be coded and input into SPSS. Quality of the data will be screened and cleaned, e.g. checking and correcting for missing data. Tests of normality will be conducted by looking at the distribution of residuals with the use of histograms.

Multicollinearity will be checked by looking at the Pearson Correlations and the variance inflation factor.

Testing for a moderator

Baron and Kenny (1986) advise that to test for a potential moderating variable that an interaction term be created (predictor variable [SC] x moderator variable [years of experience]) and add the interaction term into the regression. If this is calculated as a significant predictor this is considered evidence that it acts as a moderator.

Testing for a mediator

Baron and Kenny (1986) advise that to test for a mediator variable the following steps should be carried out:

1. The mediator (psychological inflexibility) should be regressed onto the predictor variable (SC).
2. To regress trauma severity onto SC.
3. To regress trauma severity onto both SC and psychological inflexibility.

A mediator can be considered present when SC predicts psychological inflexibility and when psychological flexibility is included into the regression that the predictive effect of SC on trauma symptom severity is reduced.

Further, given that there is a hypothesised presence of both a mediator and a moderator, mediation will be investigated across the levels of the moderator.

If the data is found to be non-parametric then bootstrapping will be used. Bootstrapping can also be utilised if there are sample size issues.

Project Management: Timetable

10) Outline a timetable for completion of key stages of the project. (E.g. ethics submission, start and end of data collection, data analysis, completion of systematic review).

Ethical Approval – by October, 2015

Research and Development Approval – Pending Ethical Approval- November 2015

Liaison with recruitment sources – Pending Ethical and R&D approval (currently estimated for November, 2015)

Data Collection- October, 2015- October, 2016 (or to when the necessary sample size has been obtained)

Data Analysis- November- December, 2016

Completion of Systematic Review- October, 2015- July, 2016

Write up of current study- May, 2016- May, 2017

Management of Risks to Project

11) Please summarise the main potential risks to your study, the perceived likelihood of occurrence of these risks and any steps you will or have taken to reduce these risks. Outline how you will respond to identified risks if they should occur.

Due to the nature of the project, participants will be providing information on potential presence of trauma symptoms. The study will provide signposting of further services available to individuals regarding mental health (see Procedure Section).

Feasibility for recruiting up to target sample size has been established. Research and Development (R&D) approval across all of the Scottish NHS boards will be sought; this means that there are approximately 4000 potential participants, this study requires only 2% of that number (around 100 people).

This study aims to better understand the link to trauma in this population and will offer further signposting to people who may benefit from Psychological Services. Furthermore, the study will not be using a PTSD Diagnostic Tool rather the IES-R is designed to measure presence and severity of common known symptoms following exposure to traumatic events. Therefore, we do not anticipate difficulties in obtaining ethics approval.

Knowledge Exchange

12) How do you intend to report and disseminate the results of the study? (IRAS A51)

Through publication as a journal article in the British Journal of Clinical Psychology or equivalent and reporting results onto Scottish Ambulance Service as part of their initiative to explore and support paramedics following traumatic/ critical incidents

13) What are the anticipated benefits or implications for services of the project? (E.g. If this is an NHS based project, in what way(s) is the project intended to benefit the NHS?)

This study aims to provide reliable evidence of potential relationships between trauma and self-compassion and psychological inflexibility specific to paramedics. Our understanding of these relationships is currently limited and in order to provide the best care it is important we understand this interaction more fully. By doing so, this allows for further understanding of possible applications of specific treatment targets (Self-Compassion and or Psychological Flexibility) for Paramedics suffering with trauma symptoms in the future.

14) Are there any potential costs to this project?

Outline any potential financial costs to the project, including the justification for the costs (why are these necessary for the research project?) and how funding will be obtained for these costs (how will cost be met?). Please separate these into potential costs for the University and potential costs for your NHS Health board and note that you should ask your NHS Health board to meet stationery, printing, postage and travel costs.

1. There is a potential cost of liaising with different NHS boards and the Scottish Ambulance Service which may require travelling to different sites in order to further explain and build awareness of the project. This would most likely be an NHS expense.

2. Printing and disseminating paper copies of Questionnaire for participants would be a further NHS expense.

15) Any other relevant information.

N/A

16) Key References

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