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# The Role of Trauma-Specific Irrational Beliefs and Sociodemographic Risk Factors in Posttraumatic Stress Responses

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Abstract

Posttraumatic stress responses have been linked to a range of social-cognitive and sociodemographic factors. Rational Emotive Behaviour Therapy suggests that responding to a traumatic life event with a set of irrational beliefs should play a crucial role in predicting the development of posttraumatic stress disorder (PTSD: Ellis, 2001). The current study assessed the role of trauma-specific irrational beliefs in the prediction of clinically relevant posttraumatic stress responses, while controlling for a range of important sociodemographic factors. A sample of 313 trauma-exposed military and law enforcement personnel took part in the current study and were divided into two groups according to the intensity of reported PTSD symptomology. Results of the binary logistic regression indicated that trauma-specific Catastrophizing, Low Frustration Tolerance, and Depreciation beliefs, respectively, significantly predicted belonging to the group reporting strong symptoms of PTSD compared to those reporting mild symptoms of PTSD. These results provide important evidence of the role of irrational beliefs in posttraumatic stress responses and highlight the importance of considering context-specific variants of each irrational belief process.

Key Words: Irrational beliefs, posttraumatic stress disorder (PTSD), logistic regression, trauma, risk factors

# Introduction

Large-scale national epidemiological surveys reveal that the anywhere between 60-90% of western populations will experience at least one traumatic event in their lifetime (Bresslau et al., 1998; Creamer, Burgess, & McFarlane, 2001; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Exposure to traumatic experiences does not appear to be evenly distributed throughout the population. Inner city dwellers seem to experience greater community-related violence (Norris & Slone, 2007) while employees in front-line emergency service occupations such as military personnel, law enforcement officers, paramedics and fire-fighters are exposed to traumatic incidents much more commonly (Corneil, Beaton, Murphy, Johnson, & Pike, 1999). Comparable rates of trauma exposure have been found in other western countries with Creamer et al. (2001) reporting that within a nationally representative sample of Australian adults, 50% of females and 65% of males had experienced a minimum of one significant trauma during their lifetime. Among nations that experience high levels of civil unrest and war, exposures to serious traumatic events are even higher with as many as 90% of the population found to have been exposed to a serious trauma in their lifetime (de Jong et al., 2001). In Algeria, 92% of the population reported experiencing a serious traumatic event, and within this population prevalence of posttraumatic stress disorder (PTSD) was found to be 37.4%.

Despite the frequency with which individuals within the population are exposed to traumatic life events, relatively few people actually go on to develop clinically significant symptoms of PTSD. Successive national comorbidity surveys conducted in the United States have suggested prevalence rates of 7.8% (Kessler et al., 1995) and 6.8% (Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005; Kessler, Chiu, Demler, Merikengas, & Walters, 2005).

*PTSD Diagnosis*

PTSD is an anomalous psychiatric condition as it along with its precursor Acute Stress Disorder are the only disorders listed within the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5: American Psychiatric Association [APA], 2013) that require the presence of a specific etiological variable for a diagnosis to be made; namely the direct experience of, or being witness to, an extremely stressful event. Despite a great deal of empirical literature on the subject, there is much controversy surrounding many of the theoretical and clinical features of PTSD (Rosen, Spitzer, & McHugh, 2008). Much of this controversy concerns two major issues. Firstly, an enormous body of factor analytic research has led to a reconceptualisation of the symptom structure of PTSD in the new addition of the DSM so that the official diagnostic classification comes more in-line with the overwhelming majority of evidence supporting a four-factor solution (see Yufik & Simms, 2010). Secondly, it is apparent that an "extreme stressor" is not necessary for the development of PTSD as many individuals can develop clinically relevant symptoms following routine life events such as loss of employment, divorce, social upheaval, and bereavement (Rosen & Lilienfeld, 2008). Furthermore, evidence of a dose-response relationship is inconsistent with findings suggesting that increasingly severe traumatic experiences are not always related to more intense traumatic reactions (e.g., McNally, 2003; Rosen & Lilienfeld, 2008).

*Social-Cognitive Models of PTSD*

Social-cognitive models of PTSD generally focus on the effect that experience of a traumatic stressful event has on an individual's existing belief system. Contemporary cognitive models are mainly derived from the theoretical perspective of Cognitive Therapy (CT). A number of influential cognitive models of PTSD have been developed (e.g. Ehlers & Clark, 2000; Resick & Schnicke, 1993). In Ehlers & Clark's (2000) model of PTSD, two

cognitive processes are deemed critical in the development and maintenance of the disorder. First, there is an overly negative interpretation of the traumatic event and its sequelea, and second, there is a poor elaboration of the memory of the traumatic incident and insufficient integration of the trauma memory within one's autobiographical memory. Clark and Beck (2010) have presented an updated cognitive model of PTSD in which traumatic experiences are hypothesised to interact with pre-existing schematic vulnerability factors. This gives rise to a range of maladaptive beliefs about the self, others, the world, the future, and the traumatic event itself. The presence of these belief systems has a negative impact on a number of cognitive processes leading to faulty trauma memories and attentional cognitive biases towards threatening stimuli. This process is hypothesised to produce the characteristic intrusive and hyperarousal symptoms which are consequently appraised in a negative manner leading to maladaptive behavioural control strategies which involve avoidance and emotion control/suppression efforts. A range of psychometrically validated measures of PTSD cognitions derived from these theoretical models have been developed (e.g. Foa, Ehlers, Clark, Tolin, & Orsillo, 1999; Najavits, Gotthardt, Weiss, & Epstein, 2004; Vogt, Shipherd, & Resick, 2012). One of the most frequently utilized measures of dysfunctional trauma-cognitions is the Posttraumatic Cognitions Inventory (PTCI: Foa et al., 1999). This scale captures three dysfunctional cognitive processes: Negative Cognitions about the Self, Negative Cognitions about the World, and Self-Blame beliefs (Daie-Gabai, Aderka, Allon-Schindel, Foa, & Gilboa-Schechtman, 2011). Various studies utilizing the PTCI have indicated that the Negative Cognitions about the Self are most strongly associated with symptoms of PTSD, and depression (Daie-Gabai et al., 2011; Foa & Rauch, 2004). Given that the PTCI and other existent measures of dysfunctional trauma-related cognitions are derived from the theoretical perspective of CT theory these scales focus exclusively on capturing representational cognitions rather than the evaluative or appraisal based cognitions

stressed by REBT theory (see Hyland & Boduszek, 2012 or David & Szentagotai, 2006 for a fuller discussion on this distinction).

From the perspective of REBT theory therefore these cognitive models and psychometric measures are somewhat incomplete. Contemporary REBT theory (David, Lynn, & Ellis, 2010; Ellis, 2001; Hyland & Boduszek, 2012) describes four main irrational belief processes: (i) Demandingness beliefs which are rigid imperatives for how things "must be", "have to be", "ought to be", or "absolutely should be"; (ii) Catastrophizing beliefs which are extreme negative evaluations of unpleasant life events; (iii) Low Frustration Tolerance beliefs which involve appraisals of a negative event as unbearable and intolerable; and (iv) Depreciation beliefs which reflect global negative evaluations of the self, others, and of life events. REBT theory states that Demandingness beliefs represent the core cognitive construct in the emergence and maintenance of psychopathological responses and their impact on such outcomes will be mediated through the secondary irrational belief processes of Catastrophizing, Low Frustration Tolerance, and Depreciation beliefs (David, Schnur, & Belloiu, 2002; DiLorenzo, David, & Montgomery, 2007). Recent empirical findings have provided further support for this hypothesised organisation of the irrational beliefs specifically in the context of PTSD, and highlighted the importance of these cognitive processes in the prediction of posttraumatic stress responses (see Hyland, Shevlin, Adamson, & Boduszek, 2013).

Despite the empirical support such findings offer REBT theory in general, the field of REBT has been criticised from many within the wider cognitive-behavioural therapy community for lacking the ability to develop disorder-specific models of psychopathology (Padesky & Beck, 2003). A more elaborated version of REBT theory (see Dryden, 2009) states that the presence of generalised irrational beliefs represent cognitive vulnerability factors for the development of psychopathology given that activation of these belief systems

during specific activating events biases information processing in a manner congruent with the activated belief systems. An individual is then prone to making a number of inaccurate misinterpretations of daily events. These distorted thoughts and inferences are the types of cognitions currently emphasised within cognitive models of PTSD derived from the theory of CT. REBT theory predicts however that these distorted representations while *necessary* cognitions for the development of psychopathological responses, are by themselves *insufficient* to produce a psychopathological response. In order that a psychopathological response emerges, such distorted inferential cognitions must be evaluated by means of a context-specific set of irrational beliefs. Unfortunately, empirical evidence regarding the role of context-specific variations of the irrational beliefs is generally sparse in the REBT literature and is non-existent in the context of PTSD. REBT theory has predominately favoured a more trans-diagnostic approach to theoretical considerations of psychopathology however given that recent theoretical formulations (Dryden, 2009) stress the importance of context-specific manifestations of the irrational belief processes as the most proximate antecedent of psychopathological outcomes, there is a pressing need to investigate the role of context-specific irrational beliefs in a variety of psychiatric disorders.

*Sociodemographic Predictors of PTSD*

Beyond the cognitive factors found to be important predictors of posttraumatic stress responses, researchers have investigated a multitude of sociodemographic factors crucial in the development and maintenance of PTSD. Population-based research designs and conditional risk studies indicate that although males are exposed to a greater number of traumatic events, females are more likely than males to experience posttraumatic stress responses (Breslau et al., 1998; Galea et al., 2007; Kessler et al., 1995). It has been suggested that females exhibit greater levels of posttraumatic stress symptomology due to the higher incidence of exposure to particularly toxic traumas such as sexual abuse (Creamer et al.,

2001; Kessler et al., 1995), as well as an increased history of other anxiety and depressive disorders that increase their vulnerability. PTSD is especially prevalent during adolescence to mid-adulthood. In the United States national comorbidity survey, the median age of onset of PTSD was 23 (Kessler, Berglund, et al., 2005). Interestingly, it is quite rare to identify new cases of PTSD in persons above the age of 50. Prevalence of PTSD symptomology appears to decease with age even when trauma exposure continues (Kessler et al., 1995; Kessler, Berglund, et al., 2005). Lack of social support subsequent to experiencing a trauma has also been found repeatedly to be related to a diagnosis of PTSD (e.g. Ozer, Best, Lipsey, & Weiss, 2003; Ullman, Filipas, Townsend, & Starzynski, 2007). In a large scale meta-analysis Brewin, Andrews, & Valentine (2000) found a moderate relationship (r = .40) between lack of social support and PTSD, while Ozer and colleagues (2003) identified weaker but still robust relationship of r = .28 between the two variables.

The current study is carried out in order to substantially contribute to the empirical literature by investigating the direct effect of trauma-specific irrational beliefs, along with a range of important sociodemographic factors including number or reported traumatic experiences, age, gender, occupation type, and current marital status, on the prediction of PTSD symptomology. This study will therefore mark the first effort to investigate the role of context-specific variants of the irrational beliefs outlined in REBT theory in the prediction of PTSD symptomology.

## Methods

### *Participants and Procedures*

The sample for the current study consisted of three hundred and thirteen participants (N = 313). The sample consisted of an international group of soldiers (n = 81, 25.9%), and police and associated emergency service personnel (n = 232, 74.1%) recruited from active duty

while serving in the Republic of Ireland and the Republic of Kosovo over a twelve month period (June 2011 – June 2012). The sample consisted of 212 males (67.7%) and 101 females (32.3%) with participants ranging in age from 23 to 65 (M = 38.18, SD = 8.70). All participants included in the current study had reported experiencing at least one Criterion A trauma. The most commonly reported traumatic event was being involved in a serious accident (60.4%, n = 189), followed by a non-sexual assault by a stranger (56.9%, n = 178), and military combat (42.5%, n = 133). Participants were informed of the nature of the study being under taken either by a member of the research team or an assigned liaison for a particular organisation, and each participant's involvement in the research project was voluntary. Those choosing to take part in the research project had the option of completing either an anonymous self-administered paper-and-pencil version of the questionnaires or an electronic version which was delivered and returned via email. The majority of respondents chose the paper-and-pencil option (63.26%, n = 198).

*Materials*

*The Posttraumatic Stress Diagnostic Scale* (PDS: Foa, Cashman, Jaycox, & Perry, 1997) is a 49-item self-report measure of the severity of posttraumatic stress symptomology related to a particular traumatic event. The PDS assess all aspects of a PTSD diagnosis from Criteria A to F as outlined in the DSM-IV (APA, 1994). The PDS measures the nature of the traumatic experience, the duration of the experienced symptoms, the impact of the experienced symptoms on daily functioning, and the severity of the symptoms. Seventeen items measure each of the identified symptoms of PTSD along a four-point Likert scale. Respondents rate the severity of each symptom from a score of 0 ("not at all or only one time") to 3 ("5 or more times a week / almost always"). This produces a total range of scores from 0 to 51 with higher scores indicating higher levels of posttraumatic stress symptomology. Scores from 0-10 reflect mild symptoms of PTSD; scores from 11-20 reflect

moderate symptoms of PTSD; scores from 21-35 reflect moderate-to-severe symptoms of PTSD; while scores from 36-51 reflect severe symptoms of PTSD. Within the current sample 59% (n = 181) of respondents reported mild symptoms, 15.3% (n = 47) reported moderate symptoms, 24.4% (n = 75) reported moderate-severe symptoms, and 1.3% (n = 4) reported severe symptoms. On the basis of the relatively unequal distribution of participants in each classification, for the purposes on the current study participants were classified into one of two groups: The "mildly symptomatic" group who reported scores on the PDS from 0-10 (n = 181, 59%) and the "strongly symptomatic" group who reported scores on the PDS from 11 or above (n = 126, 41%). The PDS possess strong psychometric properties with Griffin, Uhlmansiek, Resick, and Mechanic (2004) demonstrating that it shares a strong correlation (r = .71) with the Clinician-Administered PTSD scale (Blake et al., 1995). The PDS demonstrated satisfactory internal reliability among the current sample with the full scale recording a Cronbach's Alpha value of 0.95.

In order to measure context-specific variants of each of the four irrational belief processes a new scale called the *Trauma-Related Irrational Belief Scale* (TRIBS) was constructed (see Appendix A for the full scale). The TRIBS is an 8-item self-report measure of irrational beliefs specifically related to the experience of a traumatic life event. The scale was constructed in accordance with guidelines set forth by Montgomery, David, DiLorenzo, and Schnur (2007) in the development of their 'Exam-Related Belief Scale' which was used to capture rational and irrational beliefs specifically related to the context of exam-related distress. The TRIBS includes sub-scales for each of the four irrational belief processes and each belief process is measured via two items. Examples from each belief process include; "*I absolutely should have acted differently than I did during the traumatic event that I experienced*" (Demandingness); "*The traumatic event that I experienced was completely awful and catastrophic; the worst thing that could have happened*" (Catastrophizing); "*I*

*can't stand the fact that I had to experience this traumatic event and I find it hard to experience any kind of happiness as a result*" (Low Frustration Tolerance); and "*I think that life is less worthwhile because of what happened during the traumatic event*" (Depreciation). Items of the TRIBS are scored along a five-point Likert scale from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). Items 4 and 6 included in the scale were scored in a reverse direction (i.e., *strongly disagree* = 5 and *strongly agree* = 1). Scores on each subscale range from 2-10, while a total composite score of irrationality can be obtained by summating all eight items. Total scores for the TRIBS can therefore range between 8 and 40. In every case higher scores reflect higher levels of irrationality. Internal consistency for the full scale was satisfactory ($\alpha = .95$), and each of the subscales also yielded acceptable results with all alpha levels exceeding .80.

[Insert table 1 here]

## Results

### *Group Differences*

Table 2 presents group differences (between the mildly and strongly symptomatic groups) on trauma-specific Demandingness, Catastrophizing, Low Frustration Tolerance, and Depreciation beliefs, respectively, along with number of reported traumatic experiences. Independent sample t-test results suggest that those individuals reporting strong symptoms of PTSD (*M = 7.49, SD = 2.23*) and those reporting mild symptoms of PTSD (*M = 3.85, SD = 1.86*) significantly differed ($t_{(305)} = -15.07$, $p < .001$, $\eta^2 = .43$) with regards to the scores on trauma-specific Demandingness beliefs with higher scores reported by those experiencing strong symptoms of PTSD. Furthermore, those experiencing strong symptoms of PTSD (*M = 6.90, SD = 2.36*) scored significantly higher ($t_{(305)} = -15.92$, $p < .001$, $\eta^2 = .45$) than those experiencing mild symptoms of PTSD (*M = 3.19, SD = 1.36*) on levels of trauma-specific

Catastrophizing beliefs. Similarly, data suggests that those individuals reporting strong symptoms of PTSD (*M = 6.77, SD = 2.76*) tend to report increased levels of trauma-specific Low Frustration Tolerance beliefs ($t_{(305)} = -17.01$, $p < .001$, $\eta^2 = .49$) comparing to those experiencing mild symptoms of PTSD (*M = 2.41, SD = 0.97*). Finally, strongly symptomatic respondents (*M = 6.81, SD = 2.39*) were found to possess higher levels of trauma-specific Depreciation beliefs ($t_{(304)} = -15.29$, $p < .001$, $\eta^2 = .44$) than the mildly-symptomatic group (*M = 3.20, SD = 1.38*). In terms of number of experienced traumas, results from the independent samples t-tests did not indicate any significant differences between the two groups. Partial eta squared values ($\eta^2$) indicated that the magnitude of difference between the two groups on each of the respective irrational belief processes were large.

[Insert table 2 here]

*Binary Logistic Regression*

Direct binary logistic regression analysis was performed to assess the impact of trauma-specific Demandingness beliefs, Catastrophizing beliefs, Low Frustration Tolerance beliefs, and Depreciation beliefs, respectively, along with number of traumas experienced, age, gender, occupation type, and marital status on the likelihood of reporting strong symptoms of PTSD following exposure to at least one traumatic life experience. The correlations amongst all continuous predictor variables included in the study were examined (see Table 3). Each of the four irrational belief processes were positively related to one another, and to a moderately-strong degree with r values ranging between .59 ($p < .001$) to .80 ($p < .001$). Although some of these correlations were strong, investigation of the Tolerance and VIF statistics demonstrated that these associations did not exceed recommended levels indicating that multicollinearity was unlikely to be a problem (see Tabachnick & Fidell, 2007).

[Insert table 3 here]

A test of the full model containing all predictor variables against a constant-only model was statistically significant, $X^2$ (9, 302) = 273.617, $p < .001$, indicating that the model was able to distinguish between individuals who reported experiencing strong symptoms of PTSD and those that reported experiencing just mild symptoms. The model as a whole explained between 60% (Cox and Snell R square) and 80% (Nagelkerke R square) of the variance in PTSD status, and displayed satisfactory positive predictive value correctly classifying 89.7% of cases.

As shown in Table 4, only three of the variables in the model made a unique statistically significant contribution to the model (trauma-specific Catastrophizing beliefs, trauma-specific Low Frustration Tolerance beliefs, and trauma-specific Depreciation beliefs). The strongest predictor of belonging to the PTSD symptomology group was trauma-specific Depreciation beliefs (OR = 1.77, p < .01). This result indicates that for every unit increase in Depreciation beliefs related to a traumatic experience, an individual was 1.77 times more likely to belong to the strongly symptomatic PTSD group, controlling for all other factors in the model. Trauma-specific Catastrophizing beliefs (OR = 1.71, p < .01), and trauma-specific Low Frustration Tolerance beliefs (OR = 1.70, p < .01) exhibited similar results, suggesting that individuals scoring higher on both variable were approximately 1.7 times more likely to belong to the PTSD symptomology group than those individuals with lower levels of each belief process, controlling for all other factors in the model.

[Insert table 4 here]

## Discussion

The primary aim of the current study was to provide initial evidence of the role of trauma-specific irrational beliefs (as described by REBT theory) in the likelihood of reporting clinically significant symptoms of PTSD, while controlling for a range of important

sociodemographic risk factors. This research was undertaken in order to contribute to the field of REBT by evaluating the importance of each irrational belief process in distinguishing between those trauma-exposed individuals who develop serious symptoms of PTSD and those who develop mild symptoms. Furthermore, the current study was performed in order to highlight to the wider cognitive-behavioural therapy community the importance of the specific types of dysfunctional cognitions described in REBT theory in the predictions of PTSD symptomology.

Initial investigations revealed very large differences between the strongly symptomatic and mildly-symptomatic groups on each of the irrational belief processes. In each case the strongly symptomatic groups exhibited substantially higher levels of each irrational belief process than the mildly-symptomatic group. These results although striking are generally unsurprising in that they indicate that those participants displaying strong symptoms of PTSD display far high levels of irrationality compared to those who reported mild levels of PTSD. An interesting finding was that trauma-specific Demandingness beliefs were the most strongly endorsed irrational belief process among the strongly symptomatic group. These beliefs are hypothesised to represent the core cognitive variables in the emergence of PTSD according to REBT theory (Ellis, 2001) and current results indicate a high endorsement rate among the current sample.

Results from the binary logistic regression analysis produced strong support for the theoretical model, with nearly 90% of participants correctly classified, a substantial improvement over the nearly 60% of correctly classified cases in the constant only model. The results of this analysis identified three predictor variables that made a unique, statistically significant contribution to the prediction of reporting strong symptoms of PTSD. These three predictors were the secondary irrational belief processes: Catastrophizing, Low Frustration Tolerance, and Depreciation beliefs. Notably, once the effects of the cognitive factors were

controlled for, none of the sociodemographic variables included in this study (age, number of trauma's experienced, gender, marital status, and occupation type) made a statistically significant contribution to the prediction of reporting strong symptoms of PTSD. Although previous studies have identified these factors as important in the prediction of PTSD itself, current findings suggest that these variables do little to differentiate those who display clinically significant levels of PTSD from those who display mild symptoms, and as such are far less important in understanding the development of more severe symptoms of PTSD compared to the role of irrational beliefs.

Each of the three irrational belief processes identified as statistically significant predictors of belonging to the PTSD symptomology group yielded similar odds ratio levels, however trauma-specific Depreciation beliefs did emerge as the strongest predictor. Individuals who reported ever increasing levels of negative self-evaluative beliefs related to their traumatic experience were increasingly likely to report strong symptoms of PTSD. This finding is generally consistent with previous work applying the PTCI (Foa et al., 1999) which found that the latent factor reflecting negative views of the self was most strongly associated with developing PTSD (Daie-Gabai et al., 2011; Foa & Rauch, 2004). Current results therefore provide additional evidence that negative evaluations of the self are a critical cognitive vulnerability factor in the development and maintenance of posttraumatic stress responses.

Catastrophizing and Low Frustration Tolerance beliefs displayed near identical odds ratio values with results indicating that the more extreme a person's evaluations of the badness of the traumatic event, and the more one evaluates himself or herself as being unable to cope with, or withstand, the effects of the traumatic incident, the greater their likelihood of reporting strong symptoms of PTSD. Although approaching the level of statistical significance, Demandingness beliefs did not make a unique contribution to the prediction of

reporting symptoms of PTSD despite being the most strongly endorsed irrational belief process among the symptomatic group. This result is generally consistent with the predictions of REBT theory which states that Demandingness beliefs will not exert a direct influence on psychopathological outcomes but should instead indirectly impact psychological distress via the secondary irrational belief processes, all of which were identified as statistically significant predictors.

These results have a number of important implications to the REBT literature and the wider scientific literature regarding the cognitive constructs integral to the development and maintenance of posttraumatic stress responses. According to REBT theory, various psychopathological outcomes result from differential interactions between the primary irrational belief process and the various secondary irrational belief processes (David et al., 2002). Anxiety disorders are predicted to arise as a consequence of an interaction between Demandingness beliefs and Catastrophizing and/or Low Frustration Tolerance beliefs. Results of the current study are partially supportive of this prediction in that both Catastrophizing and Low Frustration Tolerance were identified as important predictors of posttraumatic stress responses. Additionally, Depreciation beliefs, which are hypothesised to be more relevant to depressive disorders (David et al., 2002), were also found to be a significant factor in the prediction of PTSD symptomology. PTSD and depression are well established to share a high degree of comorbidity (Kessler, et al., 1995; Zlotnick, Johnson, Kohn, Vicente, Rioseco, & Saldiva, 2006) and based on current and previous findings (e.g. Daie-Gabai et al., 2011; Foa & Rauch, 2004) it is possible that the comorbidity between these disorders is the result of the operation of the same basic cognitive process, namely negative evaluations of the self. Alternatively, given the cross-sectional nature of the studies from which these findings arise, it is possible that the consistent finding of a relationship between negative self-evaluative beliefs and posttraumatic stress responses is a consequence of failing

to control for the presence of depressive symptomology. Future studies should seek to investigate the effect of trauma-specific irrational beliefs, specifically Depreciation belief, on PTSD while controlling for the effect of depression, in order to more fully investigate this possibility. It is also interesting to note that in the new DSM-5 PTSD is no longer listed as an anxiety disorder, and is now rather included as a stress- and trauma-related disorder. Current findings may therefore indicate a development of David and colleagues (2002) model and suggest that stress- and trauma-related disorders arise as consequence of interactions between Demandingness beliefs and all three secondary belief processes.

Furthermore results of the present study provide additional evidence supporting the role of irrational beliefs in posttraumatic stress responses. Previous findings (Hyland et al., 2013) indicated that generalised forms of each of the irrational belief processes played an important role in the prediction of each symptom group of PTSD (Re-experiencing, Avoidance, Dysphoria, and Hyperarousal). Current results indicate that trauma-specific variants of the irrational beliefs are effective in differentiating strong from mild symptoms of PTSD, while also considering a range of important sociodemographic factors.

As with any research endeavour the current study contains a number of limitations which ought to be considered. The nature of the sample is limited to a specific strata of the population (law enforcement and military personnel), thus generalisations of current findings to the wider population is problematic. Additionally, a self-report measure of PTSD symptomology was used and although self-report measures of PTSD such as the PDS (Foa et al., 1997) used in the current study have been shown to highly correspond with clinician-administered measures (Griffin et al., 2004), clinician based measures would have been preferable as they are considered the gold standard method of assessing PTSD symptomology. Additionally correlations among the various irrational belief processes were rather high which may well have accounted for the non-significant effect of Demandingness

beliefs, however this is a perennial issue in REBT research given that the irrational beliefs are expected to share a high degree of association with each other and particularly in relationship to Demandingness beliefs. The continued development of ever more refined psychometic instruments with improved discriminant validity is clearly required.

In conclusion, this article has provided the first piece of empirical evidence demonstrating the direct effect of trauma-related irrational beliefs as outlined in REBT theory in the prediction of posttraumatic stress responses. Specifically, findings from the current study demonstrated that higher levels of trauma-related Catastrophizing, Low Frustration Tolerance, and Depreciation beliefs all predict a greater probability of reporting clinically significant symptoms of PTSD, while controlling for the effects of a range of key sociodemographic factors. These results thus provide a substantial contribution to the wider scientific literature regarding the types of cognitive variables involved in posttraumatic stress responses, and contribute additional empirical support for the predictions of REBT theory in the context of a psychiatric disorder that has not been widely investigated by the field.

Appendix A

## The Trauma Related Irrational Belief Scale

As you answer the following questions please think about the traumatic event you described in the previous section of this questionnaire.

For each statement below please indicate whether you Strongly Disagree (A), Somewhat Disagree (B), are Neutral (C), Somewhat Agree (D), or Strongly Agree (E).

| A STRONGLY DISAGREE | B SOMEWHAT DISAGREE | C NEUTRAL | D SOMEWHAT AGREE | E STRONGLY AGREE |
|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | I absolutely should have acted differently during the traumatic event that I experienced. | **A** | **B** | **C** | **D** | **E** |
| 2. | The traumatic event that I experienced absolutely should not have happened. | **A** | **B** | **C** | **D** | **E** |
| 3. | The traumatic event that I experienced was completely awful and catastrophic; the worst thing that could have happened. | **A** | **B** | **C** | **D** | **E** |
| 4. | The traumatic event that I experience was extremely bad and unpleasant but it wasn't the worst thing that could have happened. | **A** | **B** | **C** | **D** | **E** |
| 5. | I can't stand the fact that I had to experience this traumatic event and I find it hard to experience any kind of happiness as a result. | **A** | **B** | **C** | **D** | **E** |
| 6. | Although I don't like the fact that I experienced this traumatic event, I can stand the fact that it happened, and I find that I can experience happiness despite it. | **A** | **B** | **C** | **D** | **E** |
| 7. | I think that I am less worthwhile as a person because of what happened during the traumatic event. | **A** | **B** | **C** | **D** | **E** |
| 8. | I think that life is less worthwhile because of what happened during the traumatic event. | **A** | **B** | **C** | **D** | **E** |

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Table 1

Frequencies for the current sample of military and police and emergency service officers on each demographic variable (N = 313)

| Variable | Frequency | Valid Percentage |
|---|---|---|
| **Gender** | | |
| Male | 212 | 67.7 |
| Female | 101 | 32.3 |
| **Job** | | |
| Police/Emergency Services | 232 | 74.1 |
| Military | 81 | 25.9 |
| **Marital Status** | | |
| Married | 282 | 90.1 |
| Divorced | 31 | 9.9 |
| **Groups** | | |
| Mildly symptomatic | 181 | 59 |
| Strongly symptomatic | 126 | 41 |

Table 2

*Group differences between individuals with symptoms of PTSD and No-PTSD for irrational beliefs and number of traumas*

| | *Group* | *N* | *M* | *SD* | *t* | $\eta^2$ |
|---|---|---|---|---|---|---|
| Demandingness | Mildly Symptomatic | 181 | 3.85 | 1.86 | -15.07* | .43 |
| | Strongly Symptomatic | 126 | 7.49 | 2.23 | | |
| Catastrophizing | Mildly Symptomatic | 181 | 3.19 | 1.36 | -15.92* | .45 |
| | Strongly Symptomatic | 126 | 6.90 | 2.36 | | |
| Low Frustration Tolerance | Mildly Symptomatic | 181 | 2.41 | 0.97 | -17.01* | .49 |
| | Strongly Symptomatic | 126 | 6.77 | 2.76 | | |
| Depreciation | Mildly Symptomatic | 181 | 3.20 | 1.38 | -15.29* | .44 |
| | Strongly Symptomatic | 126 | 6.81 | 2.39 | | |
| Number of Traumas | Mildly Symptomatic | 181 | 2.69 | 1.44 | -1.25 | .21 |
| | Strongly Symptomatic | 126 | 2.91 | 1.56 | | |

*Note.* Statistical significance: *$p < .001$

Table 3

*Descriptive statistics, correlations, and reliability between all continuous predictor variables*

| Variables | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. Demandingness | 1 | | | | | |
| 2. Catastrophizing | .61* | 1 | | | | |
| 3. LFT | .66* | .76* | 1 | | | |
| 4. Depreciation | .80* | .59* | .75* | 1 | | |
| 5. Age | -.04 | -.06 | -.06 | -.03 | 1 | |
| 6. Number of Traumas | .04 | .00 | .01 | .04 | .18* | 1 |
| *Mean* | 5.33 | 4.72 | 4.18 | 4.67 | 38.18 | 2.75 |
| *Standard Deviation* | 2.69 | 2.58 | 2.87 | 2.57 | 8.70 | 1.51 |
| *Range* | 2-10 | 2-10 | 2-10 | 2-10 | 23-65 | 011 |
| *Cronbach Alpha* | .81 | .81 | .96 | .81 | n/a | n/a |

*Note.* Statistical significance: *$p < .001$

Table 4

*Binary Logistic Regression analysis predicting likelihood of reporting strong symptoms of PTSD*

| **Variable** | **B** | **S.E.** | **Exp(B) with 95% C.I.** |
|---|---|---|---|
| Demandingness | .23 | .13 | 1.26 (0.99 / 1.62) |
| Catastrophizing | .53 | .14 | **1.71*** (1.29 / 2.25) |
| Low Frustration Tolerance | .53 | .16 | **1.70*** (1.24 / 2.33) |
| Depreciation | .57 | .16 | **1.77*** (1.28 /2.44) |
| Age | .03 | .03 | 1.03 (.97 / 1.09) |
| Number of Trauma | .11 | .15 | 1.12 (.83 / 1.49) |
| Gender | | | |
| Female | | | 1 |
| Male | .54 | .51 | 1.71 (0.63 / 4.68) |
| Group | | | |
| Police | | | 1 |
| Military | .11 | .57 | 1.12 (0.37 / 3.40) |
| Marital Status | | | |
| Married | | | 1 |
| Divorced | .19 | .72 | 1.21 (0.29 / 4.96) |

*Note.* Significance level: * $p < .01$