

The Role of Emotion in PTSD: Two Preliminary Studies

Mick J. Power

Edinburgh University, Scotland, UK

Claire Fyvie

Rivers Centre for Traumatic Stress, NHS Lothian, UK

Background: Two studies are presented that highlight the role of emotion in PTSD in which we examine what emotions in addition to anxiety may be present. **Aims:** The first aim was to assess the overall emotion profile across the five basic emotions of anxiety, sadness, anger, disgust, and happiness in clients attending a stress clinic. A small pilot study was also carried out to see how the emotion profiles impacted on outcome for CBT. **Method:** In Study 1, 75 consecutive attenders at a trauma service who were diagnosed with PTSD were assessed with a number of measures that included the Basic Emotions Scale. **Results:** The results showed that less than 50% of PTSD cases presented with anxiety as the primary emotion, with the remainder showing primary emotions of sadness, anger, or disgust rather than anxiety. A second pilot study involved the follow-up across exposure-based CBT of 20 of the participants from Study 1. **Conclusions:** The results suggest that anxiety-based PTSD is more likely to benefit from exposure than is non-anxiety based PTSD. Implications both for the classification and the treatment of PTSD are considered.

Keywords: Emotion, PTSD, anxiety, exposure, treatment, outcome.

Introduction

Since its inclusion in the DSM-III (APA, 1980), Post-Traumatic Stress Disorder (PTSD) has been the subject of a great deal of empirical and theoretical work. A number of well thought out psychological models of PTSD have been proposed, many within a cognitive framework (e.g. Brewin, Dalgleish and Joseph, 1996; Ehlers and Clark, 2000; Foa and Rothbaum, 1998; Horowitz, 1979, 1997; Litz and Keane, 1989). According to DSM-IV (APA, 1994), PTSD can follow traumatic events in which individuals experience a threat to their own life or the lives of others or a threat to their own or others' physical integrity. Although such attempts at objectively defining the aetiological events in PTSD are useful, we have suggested that it is the impact of the event or events on an individual's current models of self, world and other that is central (Power and Dalgleish, 2008). For some this might indeed be the life-threatening car crash or the tour of duty in Vietnam; for others, however, being shouted at by their

Reprint requests to Mick Power, Clinical Psychology, Edinburgh University Medical School, Teviot Place, Edinburgh EH8 9AG, Scotland. E-mail: mjpower@staffmail.ed.ac.uk

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previously calm and supportive boss at work might be sufficient. These subjective evaluations or appraisals may override the supposedly objective features of a traumatic event and lead to different appraisals of the same event by different individuals (Power and Dalgleish, 2008).

The clinical features of PTSD following such traumatic events include: 1) reexperiencing symptoms, such as intrusive memories, thoughts or images and nightmares; 2) avoidance reactions such as emotional numbing where the individual is unable to feel a range of emotions or is able to describe the trauma in a dispassionate way, amnesia for all or part of the event, behavioural avoidance where individuals go to great lengths to avoid stimuli that will remind them of the trauma, and cognitive avoidance such as the use of distraction techniques to get rid of unwanted thoughts; and 3) arousal symptoms such as an exaggerated startle response, irritability, and hypervigilance for trauma-related information. These clinical features highlight the fact that some emotional regulation strategies may contribute to exacerbation or maintenance of PTSD symptomatology, so it is important to begin to document what these strategies are and whether or not they are dysfunctional (Phillips and Power, 2007).

In addition to anxiety, PTSD is commonly accompanied by a wide range of other emotions such as sadness, anger, guilt, and shame, such as noted by Lee, Scragg and Turner (2001) in their study of shame and guilt in relation to trauma. However, although the classification systems such as DSM-IV (APA, 1994) have classified PTSD as an anxiety-based disorder, and most clinicians and researchers have followed suit by the consideration of PTSD as anxiety-based, it has now been proposed that many PTSD reactions are not primarily anxiety-based (Dalgleish and Power, 2004). To give examples, the emergency worker who finds a partly decomposed body in a bedroom may have a primarily disgust-based reaction; similarly an adolescent who started eating a slice of cake but then started chewing a blackened fingernail developed disgust-based PTSD (the details of these clinical cases are presented in Dalgleish and Power, 2004). Anger-based PTSD can often be found in victims of accidents and in combat veterans, though sometimes coupled with fear reactions. Sadness-based PTSD can also occur in cases of traumatic loss such as sudden and unexpected bereavements following the loss of a loved partner or child; thus, studies of pathological bereavement show a considerable overlap with PTSD symptomatology (e.g. Jacobs and Dalenberg, 1999; Schuchter, Zisook, Kirkorowicz and Risch, 1986), especially where the bereavement was sudden and unexpected (Prigerson and Jacobs, 2001).

The purpose of the current study was to examine systematically a consecutive series of attendees at a trauma clinic and to assess the actual emotion profile for those individuals who met formal diagnostic criteria for PTSD. The assessment procedure was adapted from that previously used to examine emotion profiles in depressed and anxious individuals (Power and Tarsia, 2007). The study also permitted a follow-up of a proportion of those attendees who went on to receive cognitive behavioural treatment within the trauma service.

Study 1: Method

Participants

Out of a total of 129 attendees at the Edinburgh Trauma Service, 75 met diagnostic criteria for PTSD, so these are the focus of the present report. Of the 75 PTSD clients, 61.3% were male and 38.7% female, 31.7% lived alone, 25% were unemployed and 21.9% on sick leave

Table 1. Primary trauma

	Frequency	Percent	Valid percent	Cumulative Percent
Valid Childhood sexual abuse	3	4.0	4.0	4.0
Witnessing event	8	10.7	10.7	14.7
Imprisoned/hostage	3	4.0	4.0	18.7
Hospital/ICU	4	5.3	5.3	24.0
Domestic violence	2	2.7	2.7	26.7
Sexual assault (not rape)	2	2.7	2.7	29.3
Rape	6	8.0	8.0	37.3
Non-sexual assault	15	20.0	20.0	57.3
Road traffic accident	8	10.7	10.7	68.0
Industrial accident	2	2.7	2.7	70.7
Military service	12	16.0	16.0	86.7
Natural disaster	1	1.3	1.3	88.0
Terrorist attack	2	2.7	2.7	90.7
Not specified	7	9.3	9.3	100.0
Total	75	100.0	100.0	

from work; they had an average age of 37.2 years ($SD = 11.2$), and the problem onset had a mean of 69.6 months ($SD = 96.2$). Table 1 shows that they had experienced a wide range of trauma that included domestic violence, being taken hostage, road traffic accidents, and sexual assaults.

Measures

There were a number of measures used with the participants, but the focus of this report will be on those outlined as follows.

Basic Emotions Scale (BES). The scale was designed to assess the experience of a range of emotions derived from the five basic ones of sadness, anxiety, anger, disgust, and happiness (Power, 2006). In the version used in the current study, participants were asked to report emotions experienced since the index traumatic event. The scale has shown excellent psychometric properties (Finucane, Dima, Ferreira and Halvorsen, in press; Power, 2006).

Regulation of Emotions Questionnaire (REQ). This scale was designed to assess the extent to which respondents use emotion regulation strategies that are functional or dysfunctional, and internal to the individual (e.g. reappraisal) or external (e.g. social support) (see Phillips and Power, 2007, for a summary of its psychometric properties). For the current sample, the Cronbach alpha ranged from good (Internal Dysfunctional alpha = 0.60) to excellent (External Dysfunctional alpha = 0.80).

Impact of Events Scale Revised (IES-R). The scale assesses reactions to the traumatic event in areas that include arousal, hypervigilance, intrusion and avoidance (Weiss and Marmar, 1997) and was designed to extend the range of symptomatology that was included in the original IES (Horowitz, Wilner and Alvarez, 1979).

Clinical Diagnostic Interview. The assessment procedure for the Trauma Service includes a clinical diagnostic interview that gives ICD-10 diagnoses (World Health Organization, 1992). Only those participants with an ICD-10 diagnostic category of F43.1 were included in the

following analyses, so that even those participants with a category of F43.2 (Adjustment Disorders) were excluded in order to focus on the PTSD category.

Procedure

The Edinburgh Trauma Service now includes a range of self-report measures in addition to a clinician diagnostic interview that all referrals receive at initial assessment. The clinical interviews showed that for the PTSD groups defined by whether or not anxiety was the primary emotion (see Results section for a full description of this distinction) there were similar levels of co-morbid depression in the fear- and non-fear based PTSD (17 versus 16, respectively) and the BDI scores did not differ significantly between the fear (34.2, $SD = 11.7$) and the non-fear (37.6, $SD = 11.0$) groups ($t < 1$); the slightly raised rates of suicide attempts (16 versus 9) and other self-harm (17 versus 9) for the fear-based group were not significant ($\chi^2 < 1$). The self-report measures are normally completed prior to the assessment interview with the responsible clinician, and are then checked and discussed with the clinician during the interview. The outcome of the interview can include a range of possibilities that includes being put on a waiting-list for cognitive behaviour therapy (CBT), referral to other agencies especially where PTSD or Adjustment Disorder does not appear to be the primary problem, or a mutually agreed decision that no further input is necessary. Study 1 is based therefore on the results from 129 consecutive attenders to the Service, 75 of whom met ICD-10 criteria for PTSD. The results will focus on these 75 participants, because they offer the most stringent test of whether or not anxiety is the predominant emotion in PTSD. In Study 2, we report on those participants who progressed to receipt of CBT within the service.

Results

The socio-demographic data for participants are presented in the Method section, so here the focus will be primarily on the preliminary results for the BES and then subsequent analyses based on the outcome of these initial analyses.

Basic Emotions Scale (BES)

One of the key questions for the current study was what number of participants who met criteria for PTSD would show anxiety as the primary reported emotion versus what proportion of participants would show anger, disgust, or sadness as the primary emotions. Total scores were calculated for each of the five subscales on the BES, from which participants were allocated according to which emotion subscale was the highest scoring. The results showed: Anxiety highest - 31 (46.3%); Anger highest - 17 (25.4%); Sadness highest - 12 (17.9%); Disgust highest - 7 (10.4%).

These results are further broken down in Table 2, which shows the mean values across the BES subscales according to which subscale was the highest. We have further grouped BES scores into those that show anxiety to be the highest versus those that show one of the other emotions to be the highest; although this is a very crude categorization, which raises many questions, we believe it an important distinction to make while PTSD is primarily considered to be an anxiety-based disorder. Independent *t*-tests between the Anxiety and non-Anxiety based PTSD groups showed significant differences (at $p < .01$) between the values for Anger,

Table 2. Values for emotion subscale scores for Anxiety and Non-anxiety based PTSD (means and SDs)

	Anger highest (<i>N</i> = 17)	Sadness highest (<i>N</i> = 12)	Disgust highest (<i>N</i> = 7)	Anxiety highest (<i>N</i> = 31)
Anxiety-based PTSD	4.72 (1.19)	4.42 (1.26)	4.01 (1.60)	5.98 (0.94)
Non-anxiety based PTSD	5.84 (1.03)	5.54 (1.18)	5.04 (1.40)	5.62 (0.98)

Table 3. Means and SDs for Anxiety and non-Anxiety based PTSD groups

	Anxiety	Non-Anxiety
Problem onset (mths)	35.0 (52.7)	101.9 (118.6)**
REQ – Internal dysfunctional	1.88 (0.71)	2.28 (0.71)*
REQ - Internal functional	1.69 (0.80)	1.56 (0.82)
REQ - External dysfunctional	0.59 (0.67)	1.03 (0.86)*
REQ - External functional	1.22 (0.60)	0.90 (0.62)*
IES - Avoidance	2.20 (0.76)	2.39 (0.68)
IES - Intrusion	3.11 (0.70)	3.15 (0.65)
IES - Hyperarousal	2.92 (0.81)	3.12 (0.71)

* $p < .05$; ** $p < .001$

Sadness, and Disgust, but no differences for Anxiety. The values for Happiness (not shown in the Table) did not differ between the two groups, with means of 3.38 and 3.13, respectively.

Further analyses for the Anxiety and non-Anxiety based PTSD groups are presented in Table 3. Again, independent *t*-tests showed that the time since problem onset was significantly longer ($p < .01$) in the non-Anxiety group (mean = 101.9 months) than in the Anxiety group (mean = 35.0 months), although there were no significant differences in age between the two groups, with means of 37.8 and 37.6 years respectively. The *t*-tests for the Regulation of Emotions Questionnaire (REQ) showed that the non-Anxiety group used significantly more internal dysfunctional regulation strategies ($p < .05$), more external dysfunctional strategies ($p < .05$), and fewer external functional strategies ($p < .05$), but did not differ significantly on the use of internal functional strategies. Finally, there were no significant differences on the independent *t*-tests between the two groups for any of the Impact of Events Scale (IES-R) subscales, nor for total score.

Study 2

The results from Study 1 demonstrated that even though participants may all meet diagnostic criteria for PTSD, they may still differ significantly in their emotion profiles as predicted in the proposal that we made previously (Dalglish and Power, 2004) and supported by other studies (e.g. Lee et al., 2001). The findings from a consecutive series of referrals to a trauma service showed that just over 50% of the referrals presented with a primary emotion that was not Anxiety-based, but which consisted of one or more of the Anger, Sadness, or Disgust based emotions, as measured by the BES (Power, 2006). Furthermore, when the two groups were compared on a range of other measures, other interesting differences emerged, such as in the use of different emotion regulation strategies that have potential implications for prognosis and outcome for PTSD. As some of the participants who were assessed in Study 1 were then

offered CBT within the Trauma Service, it was possible to follow up those who received CBT at immediate post-treatment to see if there were any further insights that could be gained from the assessment of emotion in PTSD.

Method

Participants

A total of 34 out of the 75 PTSD participants from Study 1 were referred on for further input from the Trauma Service after their initial assessment. Other individuals were referred to other services such as a specialist sexual abuse service, were managed on medication, or were managed by the original referring agency. To date, there has been no explicit use of the emotion profiles for different referral paths, but it is an empirical question that we plan to address to see if therapists do make implicit use of emotion profiles for the different referral paths. The 34 who proceeded for CBT within the trauma service were therefore assessed for a second time using some of the earlier symptom measures. Not all of the referrals received CBT, with some receiving only a psychoeducational group, some receiving art therapy, and some only medication. However, 20 of the 34 participants received CBT and were assessed for a third time at immediate post-treatment. These will provide the main focus of Study 2.

Cognitive behaviour therapy

The therapists in the Trauma Service use a CBT-based therapy that is adapted for work with trauma and that typically lasts an average of 8 one-hour sessions. The main component of the therapy is an exposure-based treatment that can either be in vivo exposure or based on the tape-rewind method developed by Richards and colleagues (Richards, Lovell and Marks, 1994), in which an audio-recording is made of the client's narrative of the key traumatic incident, which the client then plays repeatedly between sessions so as to provide the main exposure component of the therapy. The exposure methods derive from previous exposure-based work developed by Foa and colleagues (e.g. Foa and Rothbaum, 1998) and draws on her therapeutic model in which exposure activates fear structures in memory, to which new material can be added that updates those structures and makes them more manageable. The CBT therapists in the Service are senior practitioners with membership of the UK CBT society (the British Association of Behavioural and Cognitive Psychotherapy) and who regularly provide teaching and supervision in CBT for PTSD.

Procedure

The Time 2 (beginning of therapy) and Time 3 questionnaire assessments were carried out by the research assistants employed in the Trauma Service. A number of self-report measures were administered that included the BES, the REQ, the IES-R, and the Beck Depression Inventory (BDI-II) (Beck, Steer and Brown, 1996). The data were entered into SPSS and analyzed using SPSS-17.

Results

The allocation of the participants to Anxiety and non-Anxiety-based PTSD groups was based on the Time 1 BES measurement, described earlier in Study 1. The key question that the study

Table 4. Values for IES-R total scores at Initial assessment (Time 1), Beginning of treatment (Time 2), and Immediate post-treatment (Time 3) (means and SDs)

	Time 1	Time 2	Time 3
Anxiety-based PTSD ($N = 9$)	55.3 (17.04)	51.7 (19.94)	43.9 (25.19)
Non-Anxiety based PTSD ($N = 11$)	55.18 (12.15)	54.80 (12.98)	50.40 (23.34)

Table 5. Categorization of improvement versus no improvement across therapy in Study 2

	Anxiety-based PTSD	Non-Anxiety based PTSD
No improvement	2	8
Improvement	7	3

was aimed to assess was therefore whether or not the Anxiety and non-Anxiety PTSD groups might differ in their response to an exposure-based CBT treatment. The results presented in Table 3 show that numerically there was a larger decrease in Total IES-R score in the Anxiety group from Time 1 to Time 3 (11.4 points) than in the non-Anxiety group where the reduction was much smaller (4.8 points). However, a repeated measures ANOVA did not show any main effect of Time ($F(2,17) = 1.64$, ns), nor of PTSD Group ($F(1,18) = 0.187$, ns), nor did the interaction between Time and Group reach significance ($F(1,18) = 0.56$, ns). When the analysis was repeated using residualized change scores estimated from the regression of Time 1 on Time 3 IES-R scores, the results were consistent with the repeated measures ANOVA approach and did not show any significant difference between the groups ($p > .05$). The results from Table 4 show that there was clearly a high level of variance in the IES-R, which might have swamped any decreases in the scores because of the small sample size.

A further analysis was carried out therefore of dichotomized IES-R change scores in which Time 3 scores were compared to the average of the Time 1 plus Time 2 scores (because Time 1 plus Time 2 gives a more accurate average of the pre-intervention scores) and then classified as either No Improvement (scores remained the same or got worse) versus Improvement. The results in Table 5 showed that this analysis highlighted important differences between the Anxiety and non-Anxiety PTSD groups, such that the majority of the Anxiety PTSD group showed improvement with exposure-based CBT, whereas the majority of the non-Anxiety group showed no improvement with therapy or even did worse. These results were significant on a Fisher Exact Probability Test ($p = .035$, 1-tailed), with the one-tailed analysis being justified by the prediction that the participants should improve across time with the intervention.

The Time 3 values for the BDI-II did not show any significant differences between the Anxiety group (mean = 28.0, $SD = 12.46$) and the non-Anxiety group (mean = 26.6, $SD = 16.42$) ($t(18) = 0.205$, ns).

Discussion

The findings from Study 1 showed that when the emotion experienced since trauma was assessed using a formal emotion measure, the BES (Power, 2006), not quite 50% of referrals

to a trauma service who met criteria for PTSD had anxiety as the primary emotion. The remaining 50% of PTSD sufferers had one of the other basic emotions of anger, sadness, or disgust as the primary emotion. These findings are similar to those reported by Holmes and colleagues (Grey and Holmes, 2008; Holmes, Grey and Young, 2005), who found high levels of anger and sadness reported in trauma memory “hotspots”. In contrast therefore to the DSM-IV (APA, 1994) classification of PTSD as an anxiety-disorder, these results demonstrate clearly that many PTSD episodes following trauma show primary emotions other than anxiety in their response, especially given that there were no overall levels of co-morbid conditions such as depression that might otherwise explain these findings. As we have argued previously (Dalgleish and Power, 2004), trauma can be followed by a range of emotions, such as emotions of sadness as in the case of traumatic grief, by anger following combat stress, and by disgust in emergency workers attending fatal accidents. The current findings require replication; nevertheless, they highlight that both classification and treatment of PTSD as an anxiety disorder may need to be reviewed, especially in the non-anxiety trauma cases. We do note however that the label we have used throughout this paper of “non-anxiety PTSD” is a simplification, given that most such cases also report significant levels of anxiety even though one or more of the other basic emotions are higher.

Study 1 also suggested that there may be other interesting differences between anxiety-based and non-anxiety-based PTSD. The fact that there was a significant difference between the two in terms of time since problem onset could indicate that the non-fear cases could be more chronic in their presentation, although an alternative explanation that emotions might change with time following PTSD would require longitudinal data in order to test this possibility against our preferred interpretation. Further information would also need to be collected longitudinally to see if the chronicity might be predicted by factors such as emotion coupling (Power and Dalgleish, 2008) in which the presence of two or more emotions can repeatedly regenerate each other. For example, in traumatic grief, the grieving person may not only experience intense sadness, but may also experience considerable anger at the causes and circumstances of a sudden and unexpected death (e.g. Prigerson and Jacobs, 2001). The results also suggested that there may be significant differences in the types of emotion regulation strategies used by anxiety-based and non-anxiety based PTSD sufferers. Results from the REQ (Phillips and Power, 2007) showed that the non-anxiety group reported using significantly more dysfunctional strategies, both internal (e.g. avoidance and denial) and external (e.g. bullying, shouting), but used significantly fewer external functional (e.g. using social support) strategies. Again, these results need replication, although we would note that in a re-analysis of a previous RCT for exposure versus cognitive restructuring the use of a significant other (an external functional strategy) significantly improved outcome in both types of therapy for PTSD cases (Thrasher, Power, Morant, Marks and Dalgleish, 2009).

In Study 2 we presented findings from an initial pilot study in which a small number of PTSD cases from Study 1 were followed-up to immediate post-treatment in the Edinburgh Trauma Service. We must of course emphasize the limitations of this exploratory study and add a note of caution to our interpretation of the findings. The PTSD sufferers received an exposure-based form of CBT in which the index episode is narrated and recorded, which allows a tape-rewind method of exposure based on the technique developed by Richards et al. (1994). Numerically, the anxiety-based group showed more improvement across therapy than the non-anxiety group, although the results failed to reach significance both because of the small numbers involved and the increase in score variance at the endpoint of therapy.

However, when the groups were classified very simply into those who had improved across therapy versus those who had not, the results gave some support for the proposal that although the exposure-based CBT is beneficial for anxiety-based PTSD, the non-anxiety group seem less likely to benefit from exposure therapy. However, the study was not designed to test the range of previously identified predictors of outcome for PTSD treatment such as verbal memory (Wild and Gur, 2008), or physical injury from trauma (Gillespie, Duffy, Hackmann and Clark, 2002); so until a suitably powered and appropriately designed study is carried out, we must be cautious in our interpretation of these exploratory data. Nevertheless, the data point to the possibility that one interpretation of the evidence summarized in the guidelines on PTSD treatment (e.g. NICE, 2005) is the possibility that the recommendations for exposure-based treatment may be more appropriate for anxiety-based PTSD than for non-anxiety based. It is possible that non-anxiety based PTSD could be more likely to benefit from cognitive restructuring approaches (Dalglish and Power, 2004), but this possibility will need to be tested fully in an appropriately designed RCT. Of course, it is recognized that the range of approaches that now cover trauma-focused CBT include a considerable amount of cognitive restructuring as, for example, in Ehlers' Cognitive Therapy for PTSD (e.g. Ehlers, Clark, Hackmann, McManus and Fennell, 2005) and in Resick's Cognitive Processing Therapy (e.g. Resick and Schnicke, 1993). However, the current findings suggest the possibility that the exposure component in trauma-focused CBT could be contraindicated for the non-anxiety-based PTSDs, given that significantly fewer of the non-anxiety PTSD participants improved following the exposure intervention in comparison to the anxiety-based PTSD.

In conclusion, these two preliminary studies have highlighted the need for a systematic assessment of emotion in likely cases of PTSD. Although the classification systems have focused on the anxiety-based forms of PTSD, it is now time to review this approach and revise this view of PTSD. One of the possible consequences of the over-emphasis on anxiety is that PTSD treatment is most likely to involve exposure-based CBT. Although exposure is of proven benefit in anxiety, there is a possibility that non-anxiety PTSD might not benefit with exposure-based forms of treatment. The current studies highlight how important it is to evaluate emotion in PTSD and then to develop interventions that differ according to the primary emotion that is presented.

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