

An Investigation into the Nature of Emotional Dysregulation in Borderline Personality Disorder

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Abstract: Dysregulation of the emotional domain is considered the core disorder in borderline personality disorder (BPD), and a greater intensity of emotional reaction is seen as central to this dysregulation. Empirical data has shown that people with BPD experience negative emotions more intensely than controls, however there is currently little support for the concept of dysregulation across the range of emotional experience. In this study the emotional intensity of negative and positive emotion was compared between a BPD sample (n=24) and non-clinical control group (n=24). Participants completed self-report questionnaires to assess general intensity of emotional experience and rated their reactions to emotionally salient visual stimuli. The results indicated a higher intensity of emotional experience in the BPD sample; however this effect was no longer significant when anxiety was controlled for. Self-reported anxiety about overwhelming emotional reactions was significantly higher in the BPD sample and this difference remained when a measure of current anxiety was controlled for. There was no difference between groups in the rating of visual stimuli for both negative and positive salience. The implications of the results are discussed with reference to the wider literature.

Keywords: Borderline personality disorder, emotional regulation.

INTRODUCTION

Borderline personality disorder (BPD) is a complex disorder characterised by a pervasive pattern of instability in emotional regulation, impulse control, interpersonal relationships and self-image. It is thought to be prevalent in 1-2% of the general population [1]. It has been reported that the suicide rate in people with BPD may be as high as 8% [2]. Subsequently BPD is a serious disorder that presents a major challenge to services, and that can have a significant effect on functioning and psychological wellbeing.

The treatment strategy with the most empirical support is Dialectical Behaviour Therapy [3-6]. This treatment approach was proposed by Linehan [7] with the underlying theory that an impairment of emotional regulation is the core mechanism of BPD and that the other symptoms are secondary to this dysregulation [8]. Thus impulsivity, intense anger and self-defeating behaviour are seen as learned strategies that attempt to regulate emotional reactions and are reinforced by reductions in emotional intensity. It is proposed that this emotional dysregulation is caused by a complex interaction of genetic, developmental and environmental factors.

Central to Linehan's conceptualisation of emotion dysregulation is that emotional reactions, both positive and negative, are experienced more intensely by

people with BPD. This concept has received some empirical support from a number of experimental studies. Time-sampling studies have demonstrated that when recorded over a period of time, people with BPD reported a higher frequency [9] and a greater intensity [10] of negative emotions than controls. A number of studies using self-report questionnaires have provided evidence that people with BPD rate their negative emotions to be more intense than controls [11-12] and people meeting the criteria for other Axis II disorders [13].

Other studies have investigated physiological responses to emotional reactions and reported contradictory results. A significantly increased startle response, which is amplified by negative affect, has been demonstrated in BPD samples when compared to controls [14-15]. However, Herpertz and colleagues [16] found no significant difference in startle response in a BPD sample while viewing emotional pictures. Furthermore, the BPD group was found to have a significantly lower skin conductance when compared to controls, which was interpreted as emotional underarousal. It is also notable that the majority of the experimental studies investigating emotional intensity do not control for current mood despite evidence the emotion generation system can be affected by both anxiety [17] and depression [18]. Consequently many questions about the specific nature of emotional intensity in BPD remain unanswered.

A notable limitation of the current literature is the emphasis on negative emotion. Linehan [8] proposes

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that emotion is experienced with significantly greater intensity by people with BPD irrespective of the hedonic valence of each emotional reaction, but that the difference may be more pronounced in negative emotions. There is a paucity of empirical support for an increased intensity of positive emotional responses in diagnostic BPD samples within the current literature. Experimental studies that have included positive stimuli have failed to demonstrate a difference between BPD and control groups, however these studies have made little attempt to match the salience of the positive stimuli to the corresponding negative stimuli. In a non-clinical sample comparable activation of the amygdala to both positive and negative stimuli has been demonstrated when two sets of stimuli were matched for level of emotional intensity [19]. This raises the possibility that greater intensity of both negative and positive emotion may be demonstrated with a sensitive experimental design. This remains an important area of investigation to future understanding of the mechanisms of emotional dysregulation in BPD.

The aim of the present study was to compare people with BPD to controls on self-report and experimental measures of intensity for both negative and positive emotions. Self-report measures were selected to detect differences in the intensity of emotional reactions and the effects of current anxiety and depression. In order to extend previous findings and investigate the effects of emotion intensity under experimental conditions the stimuli selected to evoke negative and positive emotions were matched for emotional intensity. The hypotheses of the study are:

1. People with BPD will report their emotions to be more intense than controls on self-report measures, and this difference will remain significant when the effects of anxiety and depression are controlled for.
2. People with BPD will rate their emotional reactions to emotional stimuli as more intense than controls in both negative and positive conditions when these stimuli are matched for level of intensity.

METHOD

Participants

The recruitment site for the study was an independent hospital with a specialist one-year programme for females with self-defeating behaviour.

The programme was a therapeutic community based on the principles of Dialectical Behaviour Therapy. However, recruitment to the inpatient sample was limited to 12 participants due to the small number of inpatient beds and the long average stay of clients on the programme. To increase recruitment to the study, further ethical approval was gained to recruit previous clients on the programme. Invite letters to take part in the study were sent out to clients in the community who had started the programme during the previous 5 years but had been discharged either prematurely or through completing the programme. A further 12 participants responded and were subsequently included in the clinical sample.

The inclusion criteria for the clinical group were:

1. Females between the age of 18 and 65 years
2. Borderline Personality Disorder according to Diagnostic and Statistical Manual of Mental Disorders (4th edition [20]).

The exclusion criterion for the clinical group (n=24) was:

1. No lifetime history of schizophrenia or depression with psychotic features.

The inclusion criteria for the normal control group (n=24) were:

1. Females between the age of 18 and 65 years
2. No lifetime history of the screened Axis I or Axis II disorders.

Measures

The following measures were used in the study:

Affect Intensity Measure (AIM [21]). The AIM is a 40-item self report measure that assesses the general intensity of emotional reactions to everyday life events. Statements are rated on a 6-point scale and the mean score is calculated to give an overall measure of emotional intensity. The measure includes items that relate to both positive and negative emotions. Adequate validity has been demonstrated by significant correlations with reported daily affect intensity and a test-retest reliability of 0.81 after three months has also been demonstrated [21].

Affective Control Scale (ACS [22]). The ACS is a 42-item self report measure that assesses fear of

intense emotional reactions. Items are rated on a 7-point scale and include items relating to positive emotion, anxiety, fear and depression. The convergent validity of the measure has been demonstrated by a correlation of -0.72 with a reverse scored measure of emotional control and discriminant validity demonstrated by a correlation of -0.17 with a measure of social desirability. A test-retest reliability of 0.78 after two weeks has also been demonstrated [22].

Hospital Anxiety and Depression Scale (HADS [23]). The HADS was administered to assess current levels of anxiety and depression. The HADS is a well established self-report measure that assesses current functioning on two subscales, anxiety and depression, which can be combined to give a full-scale score. The discriminate and convergent validity of the measure has been established in a number of studies [24] and its reliability has been demonstrated with Cronbach's alpha scores of 0.82, 0.77 and 0.86 in a large community sample [25].

International Affective Picture System (IAPS [26]). The emotional stimuli consisted of 30 colour pictures taken from the IAPS, which is a large database of colour photographs including objects, animals, people and non-social scenes. Every picture in the IAPS has corresponding normative data to indicate its hedonic valence and relative intensity as rated on a 9-point scale by a large non-clinical sample and this data was used to define stimuli conditions. The stimuli were grouped into three conditions (negative, positive and neutral) consisting of ten pictures each. The negative stimuli consisted of natural disasters, war and people in distress (with a mean valence of 2.18 (SD=0.53) and mean intensity of 5.39 (SD=0.9)). The positive stimuli consisted of natural landscapes, scenes of success and people demonstrating enjoyment or success (with a mean valence of 7.66 (SD=0.14) and mean intensity of 5.43 (SD=0.34)). The neutral stimuli consisted of inanimate objects and neutral social scenes (with a mean valence of 5.11 (SD=0.17) and mean intensity of 2.99 (SD=0.46)). The mean hedonic valence of the pictures was significantly different between conditions ($F(2,33)=859, p<0.05$). Furthermore there was no significant difference between the relative intensity of the negative (mean=5.4, SD=0.87) and positive (mean=5.4, SD=0.35) stimuli ($t(22)=0.06, p>0.05$). All conditions contained a mixture of social and non-social scenes. For ethical reasons the stimuli were approved in a pilot study by a small group of clients on the programme who did not take part in the main study. It

was decided that potentially traumatic pictures (e.g. mutilated bodies) would not be used in the study.

Self-Assessment Manikin (SAM [27]). The SAM was used to measure emotional reactions to the stimuli. The SAM is a pictorial assessment scale that measures subjective ratings of relative intensity of emotional reaction and hedonic valence, from pleasant to unpleasant, on a 9-point scale. This measure was chosen as it was used to collect the normative data for the images in the IAPS [26].

Procedure

The study was granted a favourable ethical opinion by the local Research Ethics Committee.

All participants were administered the Structured Clinical Interview for DSM-IV Axis II Disorders (SCID-II [28]) to confirm the diagnosis of BPD and to record concurrent Axis II disorders. Subsections of the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I [29]) were also administered to screen for co-morbid mood disorders, post traumatic stress disorder (PTSD), eating disorders, schizophrenia and current substance abuse disorders in order to provide an accurate description of the sample and ensure that exclusion criteria were not met.

The control group was recruited through the staff team at the hospital and a local university, and contained only females to match the clinical sample. All participants were administered the screening modules of the SCID-I [29] and SCID-II [28].

Participants who expressed an interest in taking part in the study were given an information sheet with a full description of the study procedure. They were then seen individually in a quiet room to provide privacy and minimise any disruptions. Informed consent was obtained and participants were asked to provide demographic information on a standard form. All participants were administered the screening modules of the SCID-I and SCID-II and subsequent sections of the structured interview schedules if indicated by the screening modules. The self-report questionnaires were completed by all participants in the same order; AIM, ACS and HADS. Participants were given the SAM along with written instructions describing how to use the scale. Each participant then viewed the colour pictures from the IAPS on an A4 flipchart. The stimuli were presented by the experimenter in blocks of three, with one picture from each stimuli condition. Each block

was presented once and the order of stimuli within each block was randomised to avoid effects from the order of presentation. Participants indicated their initial reaction to the stimuli using the 9-point SAM scale to rate each picture in terms of hedonic valence and relative intensity of emotional reaction. Time to respond was not recorded and the next stimulus was displayed as soon as both ratings had been made. When all the blocks had been presented, participants were debriefed.

Analyses

Univariate two-sample T-tests were used to compare the outcome scores between the BPD and control groups. ANCOVA were then used to control for the HADS depression and anxiety scores. Wilks' lambda tests were used to compare the mean valence score on the SAM scores, which were normally distributed.

RESULTS

The demographic variables for the two groups are presented in Table 1. There was no significant difference between the two groups in either age or level of education. Information about concordant Axis I and Axis II disorders in the BPD sample is shown in Table 2.

Table 1: Demographic Variables of the BPD and Control Groups

Variable	Group	
	BPD (n=24)	Control (n=24)
Age	33 (SD=10.9)	30 (SD=9.8)
Level of Education (years)	13.5 (SD=2.5)	14.5 (SD=1.9)
Employment		
employed	8 (33%)	23 (96%)
unemployed	14 (58%)	1 (4%)
retired	2 (8%)	0
Marital status		
single	13 (54%)	20 (83%)
married	7 (29%)	4 (17%)
separated/divorced	4 (17%)	0
Race/ethnicity		
British	22 (92%)	22 (92%)
mixed race	2 (8%)	1 (4%)
German	0	1 (4%)

Table 2: Concordant Axis I and Axis II Disorders in the BPD Sample

Variable	Frequency in BPD sample (n=24)
<i>Axis I</i>	
Mood disorders	
current	7 (29%)
lifetime	12 (50%)
PTSD	
current	14 (58%)
prior	1 (4%)
Eating disorders	
current	6 (25%)
in remission	6 (25%)
Alcohol/substance dependence	
current	0
in remission	7 (29%)
<i>Axis II</i>	
Avoidant	16 (67%)
Dependent	8 (33%)
Obsessive-compulsive	7 (29%)
Paranoid	7 (29%)
Schizotypal	2 (8%)
Narcissistic	1 (4%)
Schizoid	0
Histrionic	0
Antisocial	0

Between-group comparisons were made for all experimental measures. Mean scores for each measure between groups is presented in Table 3.

Table 3: Mean (SD) Scores for Experimental Measures

Measure	Group	
	BPD (n=24)	Control (n=24)
AIM	3.81 (0.7)	3.36 (0.63)
ACS	4.9 (0.85)	2.59 (0.6)
HADS		
anxiety	12.75 (5.49)	5.96 (3.64)
depression	8.92 (6.11)	1.5 (1.87)
SAM intensity score		
negative	5.71 (1.98)	5.3 (1.75)
positive	4.57 (1.87)	4.22 (1.67)
neutral	2.46 (1.31)	2.1 (1.37)

A univariate, two-sample T-test was undertaken to compare AIM scores between the BPD group and control sample. As hypothesised the BPD group reported significantly higher scores on this measure ($t(46) = 2.35, p < 0.05$). A further analysis of covariance (ANCOVA) was undertaken with scores on the HADS anxiety (HADSa) and depression (HADSd) subscales included as potential covariates. The results indicated that HADSa score was a significant covariate ($F(1,44) = 6.77, p < 0.05$) and when this variable was controlled for the difference in AIM score between groups was no longer significant ($F(1,44) = 1.15, p > 0.05$).

A univariate, two-sample T-test was then undertaken to compare ACS scores between groups. This indicated significantly higher ACS scores in the BPD group ($t(46) = 10.88, p < 0.05$). An ANCOVA was undertaken with HADSa and HADSd scores as potential covariates, of which HADSa score was found to be a significant covariate ($F(1,44) = 16.78, p < 0.05$). However, with this covariate controlled for in the analysis the difference in ACS scores between groups remained significant ($F(1,44) = 41.77, p < 0.05$).

In order to ensure that the hedonic valence of the stimuli had been rated similarly in both groups a multivariate, Wilks' lambda test was undertaken to compare mean valence score on the SAM scale for the three stimuli conditions (positive, negative and neutral). No significant group differences were found ($F(3,44) = 2, p > 0.05$), suggesting that the hedonic valence assigned to the stimuli was comparable between groups. A further multivariate, Wilks' lambda test was undertaken to compare the mean reported intensity of reaction to the stimuli on the SAM scale between groups and stimuli conditions. No significant between-group differences were found for the intensity ratings ($F(3,44) = 0.3, p > 0.05$).

DISCUSSION

Consistent with the findings of Bland *et al.* [12] and Koenigsberg *et al.* [13], the results partially support the hypothesis that people with BPD report their emotions to be more intense than controls on self-report measures. However, in the current study the higher mean score on the AIM measure in the BPD sample was no longer statistically significant when current anxiety was controlled for. This result suggests that the difference may be mediated by underlying symptoms of anxiety. The AIM was developed with the rationale that intensity of emotional experience is a stable personality trait that can be measured between individuals [21].

However, it is increasingly recognised that acquired anxiety disorders, and particularly PTSD, can lead to an over-arousal of the emotion generation system and an increase in the intensity of negative emotional experience [30]. This is an important consideration given the high concordance rate of PTSD in the current BPD sample.

The ACS is a self-report measure that assesses a subtly different aspect of emotional intensity. It was developed as an extension of the 'fear of fear' construct to assess anxiety about intense emotional reactions regardless of their hedonic valence [22]. In particular, the measure assesses the respondent's concern about overwhelming emotional reactions that may occur within everyday experiences. The results of the current study demonstrated significantly higher scores on the ACS even when the effects of current anxiety and depression were controlled for, and as far as the author is aware this is the first time such a difference has been shown in a diagnostic sample.

The results of the experimental paradigm do not support the hypothesis that people with BPD will rate their emotional reactions to negative and positive emotional stimuli as more intense than controls when these stimuli are matched for level of intensity. It may be that the pictures were not emotionally salient enough to detect subtle difference between groups. However the result does replicate a previous study using different IAPS stimuli [16]. Taken together these results suggest that it may not be possible to demonstrate increased emotional intensity under experimental conditions using non-specific emotional stimuli. It is worth noting that the two self-report measures in the present study rely on statements relating to general emotional experience. Subsequently it is left to the respondent to relate these statements to relevant prior experiences of emotional reactions, which may be more idiosyncratic and salient than the more generalised pictorial stimuli. A study investigating polarity of affective experience demonstrated significantly lower self-ratings of positive affect in a BPD sample compared to controls as recorded in an experience-sampling diary over a 21-day period [31]. Evidence that people with BPD report less frequent positive emotional experience than controls (Russell *et al.*, 2007) suggests that it may be more difficult to detect differences in experimental measures of the intensity of positive emotion in BPD samples. However, a more recent study [32] that used these stimuli under

fMRI scanning conditions suggests that they may be sensitive enough to detect differences in more sensitive measures of emotion generation.

Taken together the results raise interesting questions about the mechanisms of emotional intensity in BPD. The effect of current anxiety has not been adequately addressed in previous studies using BPD samples. It may be that the elevated negative emotional intensity that has been demonstrated [10,12,14] is mediated by underlying symptoms of anxiety. The significant difference in ACS score between groups even when the effects of anxiety and depression were controlled for provides further information about this result. The ACS measures the level of fear of experiencing intense emotional reactions, which can be considered a specific form of anxiety relating to emotional experience. This anxiety may be related to the wider symptomology of BPD, such as intense anger and chronic feelings of emptiness, and potentially contribute to behavioural strategies that attempt to regulate emotion, such as self-harm and dissociation. These are tentative hypotheses that would need to be tested with further measures of the construct and qualitative data about the subjective experience of emotion in people with BPD. However, in order to elucidate the mechanisms of elevated emotional intensity in people with BPD it appears essential that the effects of anxiety are controlled for. This may also indicate a greater emphasis is needed on anxiety management within treatment approaches focusing on emotion modulation [7].

The present study was similar to previous studies in failing to find any direct experimental evidence of a greater intensity of positive emotions in people with BPD [9,16]. As such empirical evidence for increased emotional intensity is currently limited to negative emotion and the concept of a general dysregulation [8] remains unsupported. This may be due to the mythological difficulties of investigating positive emotion [33], or because such a difference does not exist for positive emotion.

Some limitations of the current study are acknowledged. Given the high level of concordant Axis II disorders it would have been preferable to have an Axis II comparison sample in order to ensure that significant results are attributable to the diagnosis of BPD. The sample also met criteria for a high proportion

of Axis I disorders, and although this was addressed to some degree by the assessment of current anxiety and depression, a further clinical sample may have been useful, particularly a group meeting criteria for PTSD and not BPD. However, inclusion of a BPD sample with no concurrent Axis I disorders was not felt to be reflective of the prevalence data for co-morbidity in BPD [34] so the current sample does have the advantage of ecological validity. A further limitation is the inclusion of both inpatient and outpatient clients within the BPD sample. With greater participant numbers it may have been useful to separate these participants into separate samples in order to undertake between-group comparisons of demographic factors and experimental measures.

A further limitation was the absence of a measure of current dissociation. In a correlational analysis the extent of thought suppression has been shown to mediate the relationship between emotional intensity and number of BPD symptoms [35], and transient dissociative states are included in the diagnostic criteria for BPD. Further investigation may need to consider the effect this could have on experimental procedures designed to evoke emotion. Finally due to constraints on recruitment all participants in the study were female which may affect the generalisability of the results to BPD in males. Future studies could investigate the manner in which established gender differences in emotional experience [36] manifest in BPD.

In conclusion, this study provides empirical support for the role of anxiety, and particularly anxiety about overwhelming emotional reactions, in the greater intensity of negative emotions in people with BPD. Further investigation is required to investigate the nature in which this difference manifests in emotional reactions to specific stimuli.

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Received on 10-03-2014

Accepted on 05-12-2014

Published on 18-12-2014

DOI: <http://dx.doi.org/10.12970/2310-8231.2014.02.03.3>