



Experience of aversive tension and dissociation in female patients with borderline personality disorder — a controlled study

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Abstract

Assuming that the experience of strong aversive tension might be an indicator of the extent of affect dysregulation within patients with borderline personality disorder (BPD), we sought to operationalize the duration and intensity of these phenomena. In addition we studied the relationship between aversive tension and the experience of dissociative features. Seventy-two female patients with BPD, together with 55 healthy controls, completed a self-rating questionnaire covering the previous 24 h. Substantial and highly significant differences with regard to the duration and intensity of the subjectively perceived states of aversive tension were found. Amongst patients with BPD there was a strong correlation between duration and intensity of tension, and experience of dissociative features, both somatoform and psychological. The findings underline the clinical importance of states of aversive tension in BPD particularly with regard to stress-related induction of dissociative features. © 2001 Elsevier Science Ltd. All rights reserved.

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1. Introduction

Neurobehavioral theory postulates a dysfunction of affective regulation at the heart of borderline personality disorder (BPD). Authors such as Coid (1993), Linehan (1993a) and Herpertz (1995) refer to a high sensitivity to emotional stimuli, emotional intensity and a slow return to emotional baseline as characteristics of this state of emotional dysregulation. However, this formulation is based on clinical observation, and stands in need of systematic operationalisation of one or more key features.

A prime candidate, based on clinical accounts, is the presence of paroxysmal, intermittent intense states of tension. These are subjectively regarded as extremely

unpleasant. The term “tension” describes at the semantic level the subjective perception of aversive, high arousal (Marx, 1982; Daly et al., 1983), but with no specification of distinct emotions such as fear, anger or guilt. The experience is highly aversive and the affected individual experiences a strong need to terminate this state. According to Herpertz (1995) external frustrating events (rejection, loneliness, “failing”) often trigger a mood that can best be described as “dysphoria” and that, in turn, increases the level of tension. Coid (1993) reports in a preliminary study that there is a strong relationship between the factor “tension”, on which are highly loaded the symptoms tension, trembling and sleeplessness, and the diagnosis of BPD. Such tension persists for an average of 2 days in borderline patients (Coid, 1993); the intensity increases steadily, culminating in behaviour which promises relief through, for example, the administration of a painful stimulus by self-injury (Coid, 1993; Herpertz, 1995).

The first aim of the present study was to test the feasibility of adopting aversive tension as an operational

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definition of emotional dysregulation in BPD. To that end, we assessed the duration and intensity of the unpleasant states of inner tension in patients with BPD, in comparison with mentally healthy controls.

Numerous studies have found a strong association between the diagnosis of BPD and the occurrence of dissociative symptoms (e.g. Zweig-Frank and Paris, 1997; Zanarini et al., 2000). However, the etiology of, and risk factors for the development of dissociative behavior still remain unclear. The twin studies of Jang et al. (1998) provide strong evidence of genetic influence on the development of dissociative experience, whereas the role of childhood trauma or parental dysfunction is currently under discussion (for an overview see Gershuny and Thayer, 1999). Within the frame of traditional analytic theory, dissociative phenomena are discussed as expressions of hysteric personality patterns. From a phenomenologic view, as widely accepted since DSM-III (American Psychiatric Association, 1980), there is strong evidence, that dissociative phenomena also occur without the existence of psychosexual conflicts and hysteric personality patterns (for an overview see Fiedler, 1995). Independently of etiological questions, the mechanisms giving rise to acute activation of dissociative symptomatology require further research, integrating both psychological and neurobiological parameters. Clinical experience encourages the assumption that dissociative features in patients with BPD are triggered by the subjective perception of aversive tension. However, no formal studies exist of the relationship between dissociation and aversive tension.

Following Janet (1907/1965), dissociative phenomena can be divided into the subtypes “psychological” (such as derealization and depersonalization) and “somatoform” (such as analgesia and tonic immobility). Currently, the best-accepted self-rating questionnaires are the “Dissociative Experience Scale” (DES; Bernstein and Putnam, 1986), which assesses mainly psychological features, and the “Somatoform Dissociation Questionnaire” (SDQ-20; Nijenhuis et al., 1996), which exclusively focuses on somatoform features. Both questionnaires cover a broad timeframe (DES: lifetime; SDQ-20: 1 year). Along their association with aversive tension, the relationship between somatoform and psychological dissociation themselves warrants further investigation.

Accordingly, the second aim of the present study was to examine the intercorrelations of the duration and intensity of aversive tension with psychological and somatoform dissociation amongst both BPD patients and normal controls. Substantial correlations, specifically amongst BPD patients, would further validate the adoption of aversive tension as an operational definition of emotional dysregulation.

2. Methods

2.1. Subjects

Between July 1997 and May 1999, 82 female patients were recruited at the Department of Psychiatry and Psychotherapy at the University of Freiburg, Medical School. Patients had been referred to participate in a study to test the efficacy of Dialectical Behavior Therapy (Linehan, 1993a, 1993b) for BPD. All patients were included consecutively who fulfilled DSM-IV criteria for borderline personality disorder, assessed by the appropriate segment of the Structured Clinical Interview for DSM-IV Personality Disorders (First et al., 1997a; German adaptation: Wittchen et al., 1997a) and scored a minimum of eight points on the Revised Diagnostic Interview for Borderlines (DIB-R; Gunderson and Zanarini, 1983; German adaptation: Rohde-Dachser, 1990).

The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I; First et al., 1997b; German adaptation: Wittchen et al., 1997b) was used to exclude patients suffering from: schizophrenia; bipolar disorder I; alcohol or drug abuse; severe anorexia; current major depression. Also patients with mental retardation (IQ < 70) were excluded. Both in-patients and out-patients were included. Patients receiving psychotropic medication were not excluded.

Fifty-five female controls were recruited by word of mouth recommendation. Most of them were students in various departments at the university of Freiburg. None were aware in advance of the contents of the study. We excluded BPD (DSM-IV, DIB-R) and any Axis-I disorder (SCID-I for DSM-IV; $n = 1$), acute psychotherapy ($n = 3$), mental retardation or a first-degree relative with any mental disorder. All controls and patients gave written informed consent after the study procedures had been fully explained.

All controls and patients asked agreed to fill out the questionnaire. All questionnaires were returned. Ten patients (12.2%) and two controls (3.6%), however, returned incomplete questionnaires that were subsequently excluded from analysis. The final data set comprised 72 complete patient questionnaires and 53 complete control questionnaires. The patients were between 17 and 47 years of age (mean Age = 28.0 years, S.D. = 6.7). They met a mean 7 (S.D. = 1.3; range: 5–9) out of 9 DSM-IV BPD criteria. Many (80.6%) met the criteria for at least one additional Axis I diagnosis ($M = 1.6$ diagnoses, S.D. = 1.2; range: 0–5), and 41.7% were in receipt of regular psychotropic medication (see Table 1). Twenty-four patients were subsequently randomized to participate in an outpatient treatment program (mean Age = 29.4 years, S.D. = 6.8 years), and 48 to an inpatient-DBT program (mean Age = 27.3 years, S.D. = 6.5 years). The 53 controls were between the ages

of 20 and 47 years (mean Age = 29.8 years, S.D. = 6.5 years). The age difference between patients and controls was not statistically significant ($t = -1.54$, $d.f. = 1, 123$, $P = 0.13$).

2.2. Questionnaire

Since the awareness of aversive tension as well as dissociative features appears to be state dependent rather than a trait factor, the assessment of correlation between these two variables requires a questionnaire which covers short time intervals. To the best of our knowledge no such assessment scale has previously been published. We therefore developed a questionnaire referring to a time interval of the past 24 h. This period of 24 h was chosen since the symptoms covered might also occur on awakening during the night. Questionnaire development was informed by the following considerations: the smallest possible number of items should be used, whilst these should tap as specifically as possible the phenomena in question. Somatic dissociation items measured changes in perception of pain, vision and hearing, motor control and speech generation. Psychological dissociation items tapped derealization, depersonalization, amnesia, absorption and disturbances in awareness. Each item was assessed with respect to duration (percentage of time present over the

preceding 24 h) and intensity (maximum intensity experienced over preceding 24 h). All items were derived from the Dissociative Experience Scale (DES; Bernstein and Putnam, 1986), the German adaptation of the DES (Freyberger et al., 1998) and the 20-item Somatoform Dissociation Questionnaire (Nijenhuis et al., 1996). The questionnaire included 20 questions: one question concerning tension, nine questions concerning somatoform dissociation, and 10 questions concerning psychological dissociation. The response formats comprised 10 steps for the "intensity scale" ranging from 0 to 9, with 0 defined as no phenomenon was observed and 9 as that it was present extremely strongly. The instructions specified that, since certain feelings can occur several times within such a period and in differing strengths, the maximum intensity should be reported. The 11-step "duration scale" rated the proportional presence of a phenomenon over the past 24 h between 0 and 100%. The items and their allocation to somatoform or psychological features can be seen in Table 2. We want to point out, that English translations of German items can be problematic because of different semantic meanings.

Psychometric properties of the 19 dissociation items of the intensity scale were assessed via factor analysis, item-whole correlations and analysis of internal consistency. Item-whole correlations and internal consistency analyses were also performed for the subscales "psychological dissociation" and "somatoform dissociation". In a second step, dissociation items of the "duration scale" were tested for significant differences in comparison to the "intensity scale". For all assessments only data from patients ($n = 72$) were included to rule out between group effects and because so little symptom variance was expected within the control group.

Principal component analysis revealed five factors with eigenvalues > 1 , based on Kaiser-Guttman Criteria. The first factor explained 36.4% and the second 10.9% of the total variance; four items of the first factor showed loadings below 0.5. To check the number of significant factors the Horn Test (Horn, 1965) was used. Two factors were of importance. Using a Varimax rotated analysis with a solution of two factors, the first factor comprised 10 items with loadings above 0.5. These items mainly concerned phenomena of derealization and depersonalization as well as phenomena of analgesia. Within the second factor seven items reached loadings above 0.5, and these mainly concerned absorption and paralyzing phenomena. Two items were found to load on both factors with loadings between 0.34 and 0.42 (one item concerned somatoform dissociation and one psychological dissociation). Results for the duration scale were comparable. There were also five factors with eigenvalues > 1 ; the first factor explained 43.1% and the second factor 10% of the total variance. Within the first factor only one item showed a loading below 0.5. Using a rotated analysis the results

Table 1
Clinical characteristics of the BPD patients

Psychotropic medication	<i>n</i>	%
No psychotropic medication	42	58.3
1 psychotropic drug	19	26.4
2 psychotropic drugs	11	15.3
Selective Serotonine Reuptake Inhibitor	11	15.3
Tricyclic Antidepressives	11	15.3
Antihistaminic drugs	10	13.9
Clonidine	2	2.8
Neuroleptics	2	2.8
Benzodiazepines	2	2.8
Carbamazepine	2	2.8
Beta-blocker	1	1.4
Current Axis I comorbidity	<i>n</i>	%
No. Axis I diagnosis	14	19.4
1 diagnosis	23	31.9
2 diagnoses	21	29.2
3 and more diagnoses	14	19.4
Major depression	25	34.7
Social phobia	15	20.8
Agoraphobia	6	8.3
Panic disorder without agoraphobia	15	20.8
Post traumatic stress disorder	13	18.1
Obsessive compulsive disorder	11	15.3
Bulimia nervosa	18	25.0
Anorexia nervosa	6	8.3
Binge eating	4	5.6

Table 2

Items of the questionnaire and their allocation to somatoform or psychological features

Items	Somatoform	Psychological
1. I felt aversive inner tension.		
2. I could not feel my body or a part of it.	X	
3. I had problems with seeing.	X	
4. I remembered an event so vividly that I felt as if I am reliving that event.		X
5. I had the impression my body did not belong to me.		X
6. I had problems with listening, for example, I heard sounds from nearby as if they come from far away.	X	
7. I had difficulties in controlling and coordinating my movements.	X	
8. I was staring off into place and was not aware of the passage of time.		X
9. I felt like a robot while doing all my activities.		X
10. I could not speak, only whisper or felt my voice is failing.	X	
11. I experienced burning, a sort of itching or numbness in parts of my body.	X	
12. I felt as though I am standing next to me or watching myself do something and I actually saw myself as if I am looking at another person.		X
13. I felt paralysed, rigid.	X	
14. I had the impression that other people, objects, and the world around me are not real.		X
15. I had the impression that my body or a part of it is insensitive to pain.	X	
16. I was so much absorbed by something that I was not aware of other events happened around me.		X
17. I had the impression that I had done something which I cannot remember.		X
18. I had the impression, as if I was looking at the world through a fog so that people and objects appeared far away or unclear.		X
19. I was going through rare sensual experience, like lightnings, geometrical figures rightbefore my eyes or strange noises or smell.		X
20. I was remaining without any motion.	X	

were identical with those of the intensity scale except that nine rather than 10 items loaded on the first factor and eight rather than seven on the second factor.

The corrected item-whole coefficients for the combined intensity scale of all 19 items ranged between 0.38 and 0.7. Eleven of 19 items attained values above 0.5. Item-whole correlations for the somatoform subscale ranged between 0.38 and 0.68, with six of the nine items attaining values greater than 0.5. For the psychological subscale, item-whole correlations ranged between 0.33 and 0.7, with six of the 10 items attaining values greater than 0.5.

Similar results were obtained with the duration scale: the complete 19-item scale yielded item-whole correlations ranging from 0.38 to 0.73, with 15 of 19 items attaining values above 0.5; the somatoform subscale's item-whole correlations ranged from 0.35 to 0.77, with five of nine items attaining values greater than 0.5; all the psychological subscale's item-whole correlations were greater than 0.5, ranging from 0.52 to 0.7.

Internal consistencies were excellent for the full 19-item intensity scales (Cronbach's $\alpha = 0.9$). Somatoform and psychological subscales also demonstrated very high internal consistencies (Cronbach's $\alpha = 0.83$ and 0.83). Similar findings were obtained for the duration items (Cronbach's $\alpha = 0.92$ for the full scale, 0.84 for the somatoform subscale, and 0.87 for the psychological).

2.3. Statistical analysis

Since data were not normally distributed and variances were highly discrepant between the two groups, all parametric results have been retested by non-parametric tests. Their exact results will only be presented, if the two results differ with respect to whether or not they are significant at the 0.05 level.

An independent samples *t*-test was used to compare the two groups for duration and intensity of tension. The non-parametric equivalent test was the Mann-Whitney *U* Test. Similarly the two groups were compared for dissociative symptoms, both as a whole and separated into somatoform and psychological symptoms. Pearson's *r* and its non-parametric equivalent, Spearman's rank correlation, were used to test the correlation between tension and dissociative phenomena. All tests were carried out two-sided.

3. Results

3.1. Aversive tension

The group of patients reported significantly longer duration (percentage of time of the day) of aversive tension ($M = 61.4\%$, $S.D. = 23.6\%$) than did the group of controls ($M = 12.3\%$, $S.D. = 15.3\%$; $t = 14.1$, $d.f. = 1, 123$, $P < 0.001$).

Patients also reported significantly higher values on the “intensity scale” ($M=6.1$, $S.D.=2.2$) than did the control group ($M=2$; $S.D.=2.3$; $t=10.4$, $d.f.=1$, 123 , $P<0.001$).

3.2. Dissociative features

Compared with healthy controls, patients with BPD experienced significantly longer and more intense somatoform and psychological dissociative features. For patients *duration of somatoform dissociation* was a mean 16.7% ($S.D.=16.1\%$) of the assessed time, for controls 1.5% ($S.D.=2.7\%$; $t=7.8$, $d.f.=1$, 123 , $P<0.001$). *Duration of psychological dissociation* was a mean 20.5% ($S.D.=19.0\%$), for controls 2.2% ($S.D.=2.6\%$; $t=8.1$, $d.f.=1$, 123 , $P<0.001$). Thus, patients reported experiencing somatoform and psychological dissociative features 10 times as much of the time as did controls. Concerning *intensity of somatoform dissociation* patients experienced on the 0–9 scale a mean of 2.3 ($S.D.=1.8$), controls a mean 0.1 ($S.D.=0.2$; $t=9.7$, $d.f.=1$, 123 , $P<0.001$). Concerning *intensity of psychological dissociation* patients reported a mean of 2.7 ($S.D.=1.9$), controls a mean of 0.5 ($S.D.=0.6$; $t=9.1$, $d.f.=1$, 123 , $P<0.001$) on a similar 0–9 scale. Thus, patients subjectively experienced an intensity of somatoform as well as psychological dissociation that was at least six times stronger than that reported by controls — with the exception of two controls, who reported intensities of psychological dissociation of 2.1 and 3.4 (this last one also reported a maximum tension of nine).

These two participants, in line with four other people, with scores between 1.3 and 1.6, were students preparing for their exams (see Fig. 1).

All the above results remained significant at the 0.001 level after Bonferroni correction for multiple tests.

3.3. Correlation between somatoform and psychological dissociative features

Data revealed a strong correlation between the somatoform dissociation and psychological dissociation subscales amongst the patient group (for the duration scale: $r=0.84$, $P<0.001$; for the intensity scale: $r=0.75$, $P<0.001$; see Fig. 1). The lack of variation in dissociation prevented testing of this correlation among controls for this and the following tests.

In light of these high correlations between somatoform and psychological dissociation, only the combined intensity and duration scales were analyzed further.

3.4. Correlation between aversive tension and dissociation

Within the patient group there is a significant positive correlation between the *duration of aversive tension* and

the duration of dissociative phenomena ($r=0.37$, $P<0.01$). The same is true for the *intensity of aversive tension* and the intensity of dissociative phenomena ($r=0.38$, $P<0.001$; see Fig. 2).

4. Discussion

The study confirms the hypothesis that patients with BPD experience states of aversive tension which are reported as significantly longer in duration and more intensive compared with mental healthy controls. We wish to emphasize that the German term “Spannung” which was used as the key item on a semantic level describes the experience of tense aversive arousal without awareness of a distinct basic emotion, e.g. anxiety, guilt or anger. Therefore, action tendencies like intentions

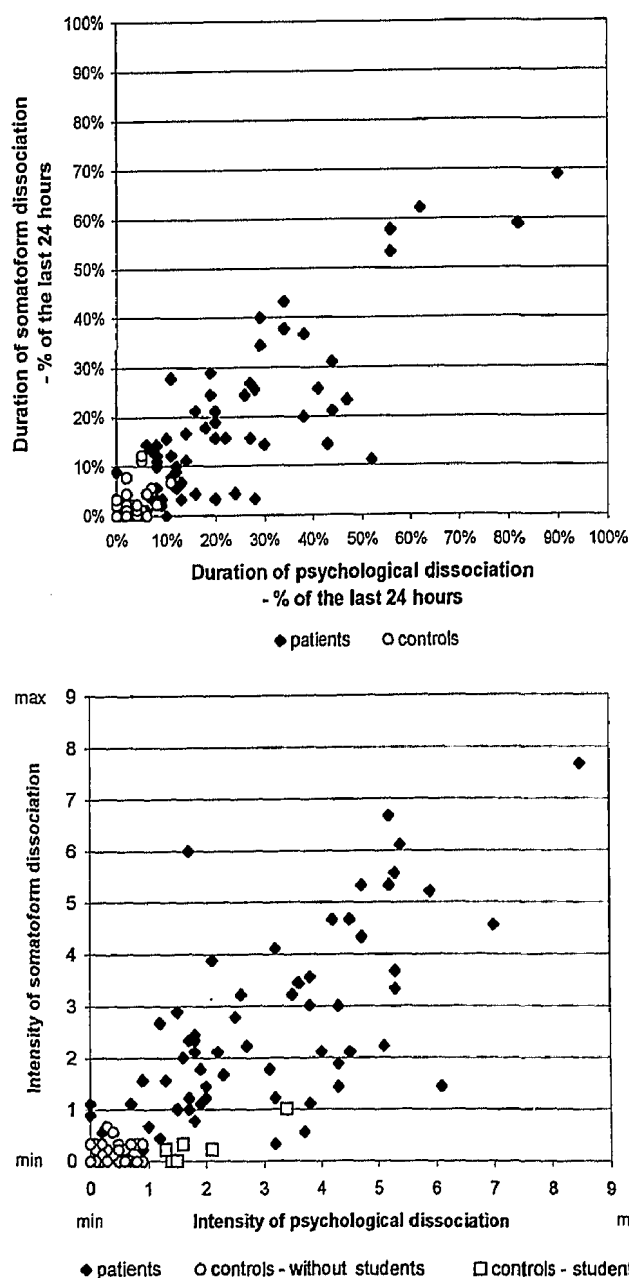


Fig. 1. Scatter-plots of the correlations of somatoform dissociation with psychological dissociation in patients with BPD and in controls.

to flight, expiate or defend oneself are not activated. Nevertheless the subject affected feels a strong impulse to terminate that state immediately. There is good evidence that the intention to reduce the intensity of aversive tension is the major reason for self-mutilating behavior amongst patients with BPD (Herpertz, 1995).

The BPD-patients estimated that they had experienced somatoform dissociation on an average of 17% and psychological dissociation on an average of 20% of the past 24 h. Only four (5.6%) patients did not experience any dissociative phenomena within this time interval. Concerning the intensity of the symptoms we defined a cut-off of 2.7 for having severe dissociative features. This value cuts the first 30% of attainable points of the scale, which is in conformity with the cut-off of the DES (cut-off of 30 with a maximum of 100). Twenty four (33.3%) patients experienced severe somatoform and 30 (41.7%) patients severe psychological

dissociation. These data does not confirm the findings of several studies (Putnam et al., 1996; Zweig-Frank & Paris, 1997; Zanarini et al., 2000), conducted with the DES, which confound at about 60% of BPD-patients with severe dissociative features. That can be an effect of the short time interval, the DSS covers but also of different populations. Future research has to clarify this difference. Within the 24-h period reported, with exception of six participants, preparing for their exams, control participants did not report significant dissociative experiences.

With regard to dissociative features, Nijenhuis et al. (1996, 1998) emphasize the necessity to distinguish between somatoform (alterations of the sensory system) and so called psychological dimensions (e.g. derealization and depersonalization). However, psychometric evaluation of our questionnaire did not support this distinction: not only did the factors revealed by principal components analysis combine somatoform and psychological items, but also the intercorrelations between the a priori somatoform and psychological subscales approached the values of their respective reliabilities. Despite the phenomenological distinction that may be drawn between these two dimensions, analysis of the obtained self-report data reveal a strikingly strong correlation between them even when considering BPD patients on a case-by-case basis as in the scatterplots of Fig. 1. According to this data, it seems to be likely, that these dimensions represent a common underlying neurobiological mechanism.

As shown by the scatterplots in Fig. 2, there is strong evidence for a positive correlation between the duration and intensity of self reported aversive tension and the experience of dissociative features, with regard to both, duration and intensity. With regard to the levels of dissociation the scatter-plot clearly reveals a continuous distribution. That is, the data support the prevailing continuum model of dissociation (Putnam, 1991). We want to point to two issues of clinical relevance: (1) There is a subgroup of patients who certainly report experience of strong aversive tension but do not report any or only little indication of dissociative symptomatology; five (6.9%) patients have a maximum tension between seven and nine and at the same time a maximum dissociation between zero and one. (2) Generation of dissociative features seems to be strongly dependent on the activation of aversive tension.

One could argue that the experience of features such as derealization or analgesia might be a distress factor that could lead to the appraisal of aversive tension. Clinical evidence (Bohus et al., 1999) however, based on thorough behavioral chain analysis (Linehan, 1993a) confirms the idea that aversive tension leads to the activation of dissociative patterns.

Our findings can then be interpreted as suggesting that the perception of aversive tension can in time

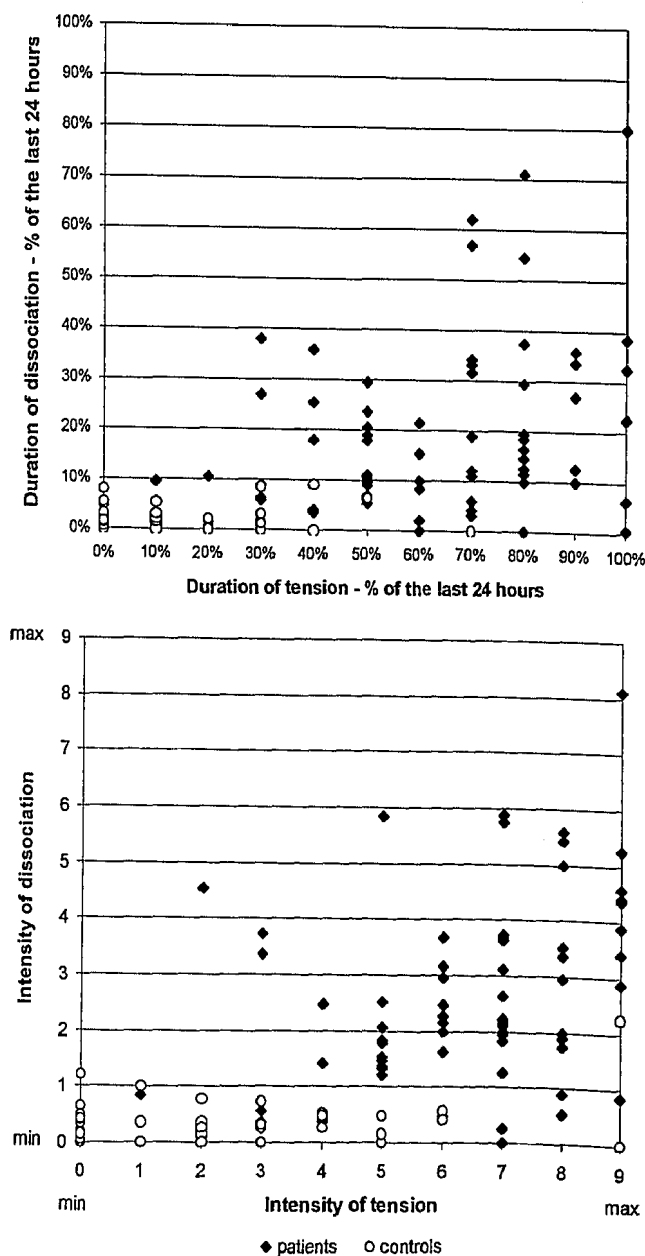


Fig. 2. Scatter-plots of the correlations of aversive tension with dissociation in patients with BPD and in controls.

become a stimulus for uncontrolled dissociation. This would have considerable consequences for the field of pharmacotherapy (Bohus et al., 1999) as well as psychotherapy, assuming that patients who dissociate in states of non-specific stress lack capacity for cortical regulation, for example during a process of habituation (Foa et al., 1991). Nevertheless, these clinical findings have to be proved by experimental research.

The factors underlying the reported frequent and intense subjective states of tension appear to be multiple. At the biological level there might be a general hyperactivity of the so-called basal subcortical motivational processes (Charney et al., 1993). At the cognitive level, dysfunctional schemata are involved that are not available for throttling basal subcortical motivational processes (Beck et al., 1990). And finally, in terms of learning theory, one might adduce the patient's failure to have developed within their own learning history, an individual system for regulating distinct categorical emotions (Linehan, 1993a; Herpertz, 1995), including states of inner tension as their physiological correlate (Russell, 1980). Strategies for reducing such aversive inner tension are already discussed in general (Thayer et al., 1994) and specific for borderline-patients (Linehan, 1993b).

Several limitations should be considered: first, despite psychometric properties, the instrument used here was generally promising, it has yet to be tested in any large studies. Validity evidence concerning these theory-guided items is limited. Content validity was assumed based on theory, and since convergent and divergent validity were not tested, no conclusive statements can be made at this time. Concerning differential validity there are significant differences between patients with BPD and healthy controls but there are no data in comparison to other Axis I or Axis II disorders. A validation of the scale is currently underway. Results of the study must remain preliminary at best until the validation results have been published.

Second, studies from Kaepler (1994) and Margraf (1990) appear to show that retrospective rating indicated more negative mood and worries amongst patients with panic attacks than to be expected from present state ratings. It is suspected that a retrospective survey of such sensitive parameters like aversive tension and dissociative features over such a relatively long period of time leads to comparable biases. Additionally because there is only one assessment point no statement as to the course of duration and intensity of the individual features can be made, for example concerning the frequency of aversive states of tension or the rapidness of rise of it. Third, in this context, it is critical to note that no further psychometric tools were used, e.g. for the assessment of depression or anxiety.

Further research should explore the conditions that trigger states of aversive tension. The frequent use of a

handheld PC would be a suitable survey method (Fahrenberg and Myrtek, 1996). This would also create an opportunity to carry out a longitudinal study of states of aversive tension and dissociation. Of further research interest is the effect of therapy on the experience of states of aversive tension as well as of the associated dissociative phenomena.

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