

# Implicit affectivity in patients with borderline personality disorder

## *Affettività implicita nei pazienti con disturbo borderline di personalità*

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**SUMMARY. Aims.** It has been argued that borderline personality disorder (BPD) is related to an enhanced affective reactivity. According to findings from research based on self-report, individuals with BPD develop and feel more negative and less positive affect than healthy individuals. Implicit affectivity, which can be measured using indirect assessment methods, relates to processes of the impulsive, intuitive system. In the present study, implicit and explicit affectivity was examined in patients suffering from BPD compared to healthy persons. **Materials and methods.** Thirty-five women with BPD and 35 healthy women participated in the study. Implicit affectivity was assessed using the Implicit Positive and Negative Affect Test (IPANAT). Measures of explicit state and trait affectivity were also administered. **Results.** BPD women had lower explicit positive state and trait affect scores and higher negative state and trait affect scores than healthy women. They had also lower implicit positive affect but they did not differ from healthy women regarding implicit negative affect. Total number of comorbid disorders was correlated with both implicit positive and implicit negative affect. **Discussion and conclusions.** According to our data, BPD patients exhibit reduced implicit positive affect as well as reduced explicit positive affect compared to healthy persons. According to our IPANAT data, BPD patients are characterized by a normal disposition to develop negative affective reactions which is in line with a number of findings from psycho-physiological research on BPD. Self-reports of negative affectivity in BPD could be biased by negative distortion.

**KEY WORDS:** borderline personality disorder, implicit affect, explicit affect, indirect test, negative bias.

**RIASSUNTO. Scopo.** Si ritiene che il disturbo borderline di personalità (DBP) sia caratterizzato da una marcata reattività dell'umore. Secondo i risultati di studi basati su questionari self-report, i pazienti con DBP sviluppano e provano più stati emotivi negativi e meno stati emotivi positivi se confrontati con individui sani. L'affettività implicita, che può essere misurata con test indiretti, si riferisce a processi del sistema impulsivo o intuitivo. Nel presente studio sono state esaminate l'affettività implicita e quella esplicita in pazienti con DBP confrontati con soggetti sani di controllo. **Materiali e metodi.** Hanno partecipato allo studio 35 donne con DBP e 35 donne di controllo. L'affettività implicita è stata valutata con l'Implicit Positive and Negative Affect Test (IPANAT) e sono stati utilizzati test per il rilevamento dell'affettività esplicita di stato e di tratto. **Risultati.** Le donne con DBP avevano punteggi di affettività positiva esplicita (di stato e di tratto) più bassi e punteggi di affettività negativa esplicita (di stato e di tratto) più alti rispetto al gruppo di controllo. Le pazienti avevano anche meno stati emotivi positivi impliciti, ma non venivano rilevate differenze tra i gruppi rispetto allo stato emotivo negativo implicito. Il numero delle diagnosi aggiuntive sull'Asse I correlava sia con lo stato emotivo negativo implicito sia con lo stato emotivo positivo implicito. **Discussione e conclusioni.** Secondo i nostri risultati, pazienti con DBP mostrano ridotto stato emotivo positivo a livello esplicito e implicito rispetto a soggetti sani. I pazienti con DBP sembrano caratterizzati da una disposizione normale a sviluppare reazioni affettive negative che corrisponde a risultati ottenuti da studi psicofisiologici. Il self-report di stato emotivo negativo in pazienti con DBP può essere distorto da bias cognitivi negativi.

**PAROLE CHIAVE:** disturbo borderline di personalità, affetto implicito, affetto esplicito, test indiretto, bias negativo.

## INTRODUCTION

Borderline personality disorder (BPD) is a severe and debilitating chronic mental condition that includes, among other symptoms, instability of moods. Typically, patients with BPD manifest intense episodic dysphoria or despair, states of panic and anxiety, and periods of intense, inappropriate anger<sup>1</sup>. Vulnerability to falling into negative moods could be linked to the frequent co-occurrence of mood disorders and anxiety disorders in BPD<sup>2</sup>.

Typically, state (actual) and trait (habitual) affects are measured by means of questionnaires. The Positive and Negative Affect Schedule (PANAS)<sup>3</sup> assessing the intensity or frequency of experience of positively and negatively valenced affects has been repeatedly administered to assess state and trait affectivity in BPD. As could be expected from clinical observation, patients with BPD were found to exhibit more negative state affects and less positive state affects<sup>4</sup>. Moreover, there is also evidence that BPD patients obtain higher negative trait affect scores and lower positive affect

scores than healthy people<sup>5,6</sup>. Findings from research assessing frequency of specific affects are consistent with the latter results and indicate that BPD patients less frequently experience joy and interest and more frequently negative affects such as anxiety, sadness, or shame compared to healthy controls<sup>7</sup>.

The above-mentioned data suggesting that individuals with BPD feel more unpleasant affects conflict to some extent with findings from psychophysiological studies showing that reactivity to negative stimuli appears not to be enhanced in BPD<sup>8,9</sup>. Moreover, it remains unclear whether reports of subjective affective experiences could be distorted by a general negative response style in BPD<sup>10</sup>. It has been pointed out that BPD patients show negative distortion with exaggeration of problems and symptoms in the self-report as a cry for help with an appellative function leading to elevated scores on many indicators of psychopathology and discomfort<sup>11,12</sup>. Against this background, there is a need to evaluate self-reports of pathological affects or negative feelings with some caution in this population.

Using direct assessment procedures such as the PANAS, conscious affective experience is assessed which has been termed *explicit affect*. Explicit affect is thought to build on propositionally organized memory that is subject to conscious reflections and comparisons between affective episodes<sup>13</sup>. In contrast, *implicit affect* relates to processes of the impulsive, intuitive system and represents an automatic activation of cognitive representations of affective experiences. The Implicit Positive and Negative Affect Test (IPANAT)<sup>13</sup> has been developed to assess implicit affectivity. In the IPANAT, the extent to which nonsense words express certain moods has to be evaluated. The IPANAT is a reliable and valid instrument for the assessment of implicit affect and captures much variance from a stable psychological disposition<sup>14</sup>. This procedure turned out to be a valid instrument for the assessment of positive and negative affect in more than 10 languages and has been applied worldwide<sup>15</sup>.

Interestingly, the IPANAT has been found to predict spontaneous psycho-physiological or stress reactions above and beyond measures of explicit affect. Low implicit positive affectivity predicted circadian cortisol release and high implicit negative affectivity predicted cortisol response to acute stress<sup>16</sup>. Similarly, it was observed that implicit positive affect was negatively associated with cortisol levels in daily life<sup>17</sup>. Moreover, implicit affectivity as measured by the IPANAT was found to be related to recovery from stress-contingent blood pressure increases<sup>18</sup>. Not least, IPANAT negative affect predicted neural responses to threatening stimuli in areas related to fear and flight behavior<sup>19</sup>. Thus, it seems that implicit affectivity as assessed by the IPANAT is associated with spontaneous psychophysiological reactions to affective stimuli or situations. Based on these findings, it can be hypothesized that implicit affectivity could capture spontaneous affective reactions and be particularly useful in gathering information on dispositions to affective reactions in the absence of conscious self-reflection.

The aims of the present study were to examine for the first time implicit (and explicit) affectivity in patients suffering from BPD as compared to healthy individuals and to investigate the relationship of implicit (and explicit) affectivity with specific borderline symptoms and comorbidity. As BPD is diagnosed predominantly (about 75%) in women<sup>1</sup> only

women participated in the current study. On the basis of previous findings for explicit affectivity it was expected that BPD patients would manifest higher negative state and trait affect scores and lower positive state and trait affect scores on the PANAS than healthy individuals. It was explored whether BPD patients exhibit also heightened negative implicit affect and reduced positive implicit affect compared to controls.

## METHODS

### Participants

Thirty-five women of the Department of Psychosomatic Medicine of the University hospital meeting DSM-IV criteria for BPD and 35 healthy women participated in the present study. The Structured Clinical Interview for DSM-IV (SCID-I and SCID-II)<sup>20,21</sup> was used for establishing psychiatric (DSM-IV Axis I and Axis II) diagnoses of patients and for screening of healthy volunteers. The majority of the included patients had additional Axis I disorders (SCID-I). Seven patients had evidence of affective disorders, fourteen suffered from anxiety disorders, nine had somatoform disorders, and eight suffered from bulimia nervosa. The mean number of additional diagnoses was 1.1 (SD: 0.8). The great majority of patients were taking antidepressants (selective serotonin reuptake inhibitors).

General exclusion criteria were current substance abuse or dependence and bipolar disorders, psychotic disorders and neurological diseases (actual or lifetime). Participants' first language had to be German. Healthy subjects were free of any lifetime history of psychiatric disorders.

BPD women did not differ from healthy women with regard to age ( $t(68)=1.25, p=.22$ ). However, patients were less educated than controls ( $t(68)=-3.82, p<.01$ ). Moreover, patients were less frequently married or had stable non-marital partners compared to controls ( $\chi^2(1)=9.78, p<.01$ ) (see Table 1 for demographic data of study participants).

The present study was carried out according to the Declaration of Helsinki<sup>22</sup>. Written informed consent was obtained from all study participants. The study was approved by the competent ethics committee of the University.

### Psychometric instruments

The Implicit Positive and Negative Affect Test<sup>13</sup> was applied to assess implicit positive and negative affectivity. The IPANAT measures affect indirectly by asking to evaluate to what extent artificial words express certain moods. Six artificial words (e.g., TUNBA and BELNI) are presented along with three positive (cheerful, energetic, and happy) and three negative mood words (helpless, tense, and inhibited). Assessments are made on a 4-point scale [from 1 (*doesn't fit at all*) to 4 (*fits very well*)]. Factor analysis has yielded two orthogonal factors that can be interpreted as positive affect and negative affect<sup>13</sup> (see also Quirin et al.<sup>15</sup> for a replication in 10 different languages). For each scale, Cronbach's alphas were found to be above .80, whereas 1-year test-retest reliability was about .60. The latter finding suggests that the IPANAT captures much variance from a stable affective disposition.

To measure state and trait positive affect (P) and negative affect (N) the short form of the Positive and Negative Affect Schedule (PANAS)<sup>23</sup> was administered. The short form of the PANAS

*Implicit affectivity in patients with borderline personality disorder*

consists of 5 negative (e.g., upset) and 5 positive (e.g., inspired) mood items, rated on a 5-point scale (1=not at all, 5=extremely).

Depressed mood and trait anxiety were measured by administering the Beck-Depression Inventory (BDI-II)<sup>24</sup> and the State-Trait-Anxiety Inventory (STAI)<sup>25</sup>.

Intelligence was assessed by the Multiple choice vocabulary test (MWT-B)<sup>26</sup>. The items of the MWT-B consist of lines, each comprising one real word and four pronounceable pseudo-words (the four distracters are fictitious words). The subject is asked to find the correct word and to underline it. Each word correctly recognized gives a point, which is added to the total score.

In the patient sample, to assess borderline-typical symptomatology the Borderline Symptom List (BSL) was applied<sup>27,28</sup>. The BSL comprises the following subscales: self-perception, affect regulation, self-destruction, dysphoria, loneliness, hostility, and intrusions. The BSL has shown good psychometric properties in several studies<sup>27,28</sup>.

**Statistical analyses**

Internal consistencies of the IPANAT scales were determined by computing Cronbach's  $\alpha$ . *t*-tests for independent samples were conducted to determine between-group differences with regard to measures of implicit and explicit affectivity and intelligence. Product-moment (*r*), Spearman rank (*r<sub>s</sub>*) and point-biserial correlation analyses (*r<sub>pb</sub>*) were performed to investigate the relationships between implicit and explicit affectivity and borderline symptoms, presence and number of comorbid disorders. Results were considered significant at *p*<.05, two-tailed.

**General procedure**

At the beginning of the study, a clinical diagnostic interview was conducted administering the SCID I and SCID II. Demographic data were registered and patients filled out the BSL. A few days later in a second session participants were given the IPANAT, PANAS-S, MWT-B, BDI-II, STAI, and PANAS-T. All participants were tested individually and received a financial compensation for taking part in the study.

**RESULTS**

**Reliability of the IPANAT**

The IPANAT negative affect score manifested satisfactory reliability for BPD patients (Cronbach's  $\alpha$ =.76), and control participants (Cronbach's  $\alpha$ =.78). The IPANAT positive affect score showed good reliability for BPD patients (Cronbach's  $\alpha$ =.81), and lower reliability for control participants (Cronbach's  $\alpha$ =.65).

**Between-group comparison: measures of affectivity and intelligence**

BPD patients had lower implicit positive affect as assessed by the IPANAT than healthy controls (*t*(68)=-2.41, *p*<.05, *d*=0.58), but they did not differ from healthy women

regarding implicit negative affect (*t*(68)=-0.87, *p*=.38). Healthy controls showed descriptively higher implicit negative affect scores than BPD patients (Table 1). The IPANAT scores of our healthy women were very similar to those reported previously for university students<sup>13,19</sup>.

BPD patients had lower positive state affectivity as measured by the PANAS-S (*t* (68)=-3.05, *p*<.01, *d*=0.75), but higher negative state affectivity than healthy controls (*t*(68)=5.52, *p*<.001, *d*=1.38). Moreover, BPD patients reported less positive (*t*(68)=-6.20, *p*<.001, *d*=1.49) and more negative trait affectivity (PANAS-T) compared to healthy women (*t*(68)=6.09, *p*<.001, *d*=1.54) (Table 1).

Table 1. Demographic characteristics, intelligence, and affectivity of study groups and borderline symptomatology of patients.

Variable	BPD patients (n=35) Mean (SD)	Healthy women (n=35) Mean (SD)
Age (years)	27.7 (5.5)	26.2 (4.5)
Education (years)	11.4 (1.6)	12.5 (0.6)
Married/partnership (%)	26	63
Intelligence (MWT-B IQ)	105.8 (10.5)	107.6 (10.1)
Depression (BDI-II)	20.8 (10.5)	6.7 (3.5)
Trait anxiety (STAI trait)	63.6 (8.8)	38.6 (9.4)
IPANAT-PA	2.13 (0.38)	2.33 (0.29)
IPANAT-NA	1.80 (0.29)	1.87 (0.38)
PANAS-S P	15.9 (3.5)	18.0 (2.3)
PANAS-S N	9.3 (2.7)	6.5 (1.4)
PANAS-T P	14.7 (3.1)	18.9 (2.5)
PANAS-T N	11.9 (3.7)	7.7 (1.8)
BSL*		
Self-perception	1.0 (0.9)	
Affect regulation	1.7 (0.8)	
Self-destruction	1.1 (1.1)	
Dysphoria	2.7 (0.6)	
Loneliness	1.2 (0.8)	
Hostility	1.3 (0.7)	
Intrusions	0.6 (0.6)	
Total	1.4 (0.7)	

\*mean item score

Note. MWT-B IQ= Intelligence Quotient assessed by the Multiple choice vocabulary test MWT-B; BDI-II= Beck Depression Inventory; STAI-trait= State-Trait Anxiety Inventory, trait version; IPANAT-PA= Positive affect scale - Implicit Positive and Negative Affect Test; IPANAT-NA= Negative affect scale - Implicit Positive and Negative Affect Test; PANAS-S P= Positive affect scale of the Positive and Negative Affect Schedule state version; PANAS-S N= Negative affect scale of the Positive and Negative Affect Schedule state version; PANAS-T P= Positive affect scale of the Positive and Negative Affect Schedule trait version; PANAS-T N= Negative affect scale of the Positive and Negative Affect Schedule trait version; BSL= Borderline Symptom List.

As could be expected, BPD patients had higher depression scores ( $t(68)=7.57, p<.001, d=2.02$ ) and higher trait anxiety scores ( $t(68)=11.47, p<.001, d=2.74$ ) than healthy controls. The study groups did not differ concerning intelligence ( $t(68)=-0.71, p=.48$ ) (Table 1).

**Relationships between implicit and explicit affectivity: results from the patient and the control sample**

In the patient sample, implicit positive and negative affectivity did not correlate with explicit positive and negative affectivity (trait or state) as assessed by the PANAS. For patients, no significant correlation was found between implicit positive affect (IPANAT-PA) and implicit negative affect (IPANAT-NA) ( $r(35)=.20; p=.11$ ). In the patient sample, implicit positive affect was not related to trait anxiety (STAI) and depression (BDI). However, implicit negative affect was significantly correlated with depression (BDI) ( $r(35)=.38; p<.05$ ) (Figure 1) but not trait anxiety (STAI).

In the control sample, implicit positive affectivity was significantly correlated with explicit positive state affectivity ( $r(35)=.50; p<.01$ ). No other significant correlation between implicit and explicit (state and trait) affectivity was observed. For healthy women, there was also no significant correlation between implicit positive affect and implicit negative affect ( $r(35)=.07; p=.67$ ). Moreover, implicit positive and negative affectivity did not correlate with depression (BDI) or trait anxiety (STAI).

**Relationships of implicit affectivity with borderline symptomatology and comorbidity**

Product-moment correlation analysis showed a negative correlation between implicit positive affect and the BSL dys-

phoria score ( $r(35)=-.44; p<.01$ ). Thus, BPD patients with more dysphoric mood reported less implicit positive affect (Figure 2). No other significant correlations were observed between implicit affectivity and borderline symptomatology.

Presence of bulimia was related to more implicit positive affect ( $r_{pb}(35)=.37, p<.05$ ) (Figure 3). No other correlations were observed between implicit affectivity and comorbidity (presence of bulimia, affective, anxiety or somatoform disorders). Total number of disorders was positively correlated with implicit positive affect ( $r_s(35)=.62, p<.001$ ) and implicit negative affect ( $r_s(35)=.34, p<.05$ ). Interestingly, neither ex-

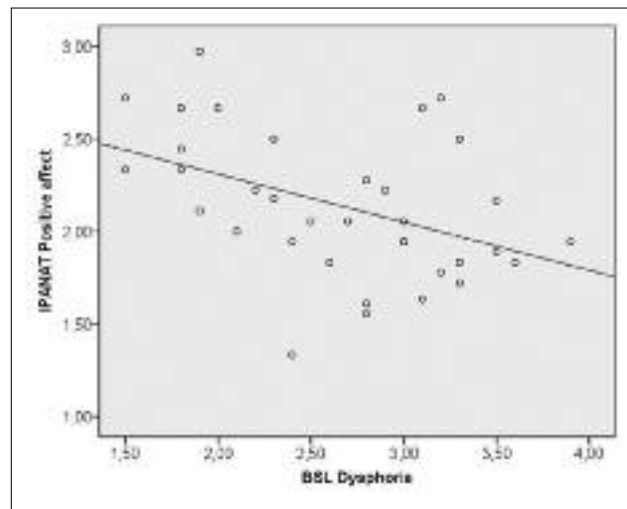


Figure 2. The scatter plot depicts the negative correlation between implicit positive affect (IPANAT; mean item score) and the dysphoria mean item score of the Borderline Symptom List (BSL) in our patient sample ( $r=-.44, p<.01$ ).

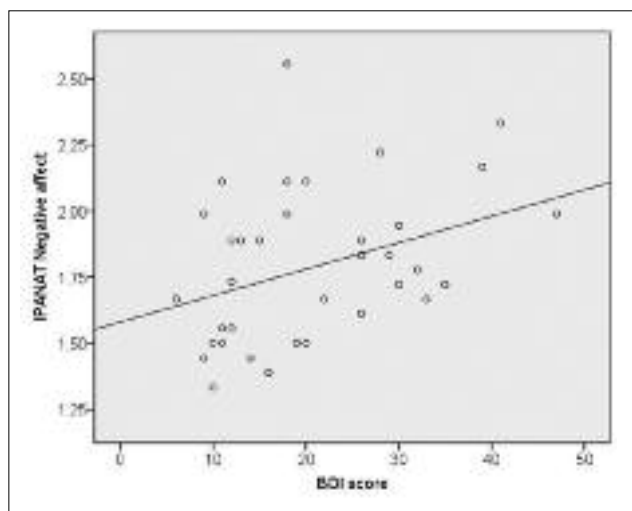


Figure 1. The scatter plot depicts the positive correlation between implicit negative affect (IPANAT; mean item score) and the sum score of the Beck Depression Inventory (BDI) in our patient sample ( $r=.38, p<.05$ ).

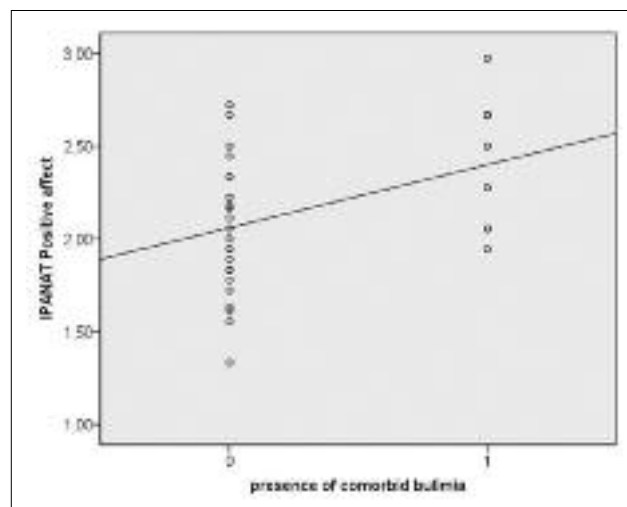


Figure 3. The diagram depicts the positive correlation between implicit positive affect (IPANAT; mean item score) and presence of bulimia (0=no comorbid bulimia, 1=comorbid bulimia) in our patient sample ( $r_{pb}=.37, p<.05$ ).

### *Implicit affectivity in patients with borderline personality disorder*

PLICIT state nor explicit trait affectivity was correlated with number of comorbid disorders ( $p > .37$ ).

## **DISCUSSION AND CONCLUSIONS**

In accordance with our hypothesis, we found evidence in the present study that BPD patients are characterized by increased negative state and trait affectivity and reduced positive state and trait affectivity when directly asked about their feelings compared to healthy individuals. These data confirm results from previous research on self-reported, explicit affect indicating that experience of negative affects is enhanced and experience of positive affects is decreased in BPD<sup>4-7</sup>.

The focus of the present investigation was to examine implicit affectivity in BPD. According to our data the assumption was corroborated that BPD patients exhibit reduced positive implicit affect compared to healthy subjects. However, no evidence was obtained that negative implicit affect is heightened in BPD. Women with BPD did not differ from healthy women on the implicit negative affect score of the IPANAT – on a descriptive level implicit negative affect scores of BPD patients were actually lower than those of controls. The latter result suggests that BPD patients could be characterized by a normal disposition to develop negative affective reactions which seems to contrast with the observation of an enhanced explicit negative affectivity in BPD.

However, negative affectivity directly reported by BPD patients in questionnaires or time sampling devices may not represent intensity and frequency of actually experienced negative affects but could be the result of negative distortion or negative coloration of experience<sup>11,29</sup>. BPD patients are known to manifest exaggeration of problems and symptoms in the self-report of psychopathology and endorse easily negative symptoms<sup>12</sup>. Against this background, it is quite possible that the explicit affect scores of BPD patients are less informative about spontaneous affective responsivity and experiences than implicit affect scores. In particular, the finding of increased explicit but not implicit negative affect scores might function as an indicator of a (typically unreflected) strategy to obtain affirmation from others and thus serves as an appellative function. By contrast, increased implicit negative affect (which was not found here) might indicate that the individual actually suffers from a state of basic insecurity.

As pointed out in the introduction, negative implicit affect as assessed by the IPANAT has been shown to be a significant predictor of cortisol response to acute stress<sup>16</sup> and prolonged cardiovascular stress recovery<sup>18</sup>. It appears that the implicit affect scales of the IPANAT convey important information on the disposition to spontaneous physiological reactions to affective stimuli in healthy persons. Interestingly, in many psycho-physiological studies BPD patients were found to have a normal (or even reduced) reactivity to stressors and negative stimuli<sup>8,9,30,31</sup>. Thus, the present finding of normal negative implicit affect in BPD appears to be consistent with physiological data suggesting no hyper-reactivity of BPD patients to negative stressors.

Unlike with negative affectivity, we found evidence for lower positive affect in BPD compared to healthy persons irrespective of direct and indirect measurement approach. Implicit and explicit positive affect scores were, however, not

related to each other in BPD. It appears that individuals with BPD are characterized by low positive affect responsivity which operates basically at a preconscious level and at the same time by low positive affect at a conceptual or conscious processing level. It is likely to assume that the often-reported feeling of internal emptiness reflects a fundamental lack of positive affect that might best be measured implicitly. It has also been suggested that anhedonia, reduced feelings of joy and interest in BPD may be an expression of impaired activity of the endogenous opioid system<sup>32</sup>.

These considerations are compatible with findings showing that implicit positive affect functions as a marker of the ability to intuitively regulate one's emotions and thus of basic trust and security<sup>33</sup>. As such, impaired emotion regulation as one criterion of BPD might be indicated by low levels of implicit positive affect. Evidence suggests<sup>33</sup> that implicit positive affect as a marker of emotion regulation can derive from accessibility of the integrated self, a neuropsychological structure that integrates negative with positive experiences<sup>34,35</sup>. This function is typically impaired in BPD as reflected in the symptom of splitting<sup>36</sup>. Accordingly, impaired ability to access the integrated self (and thus the dissociation between negative and positive representations) disables patients with BPD to intuitively retrieve positive representations in response to negative experiences that would put connect them in perspective. In the patient sample, low implicit positive affect was associated with dysphoria as assessed by the BSL. No other correlation of the IPANAT scores with borderline symptoms (such as affect regulation, loneliness, hostility, or intrusions) was observed. Thus, depressed mood was found to be related to a decreased disposition to automatic positive affective reactions. There is evidence from neuroimaging studies that depression reduces brain response to subliminally presented positive stimuli<sup>37,38</sup>.

Interestingly, there was a correlation between implicit positive affect and presence of bulimia nervosa in BPD. Patients with bulimia had higher implicit positive affect scores. As Davis and Woodside<sup>39</sup> have noticed, bulimia nervosa patients tend to be relatively hedonic, as reflected in their strong approach to food. As mentioned, implicit positive affect has been found to be negatively associated with cortisol levels in daily life in healthy persons<sup>17</sup>. In this context, it is a consistent finding that women with bulimia nervosa have blunted neuroendocrine stress reactivity<sup>40,41</sup>.

Finally, in our study, both implicit positive affect and implicit negative affect (but not explicit affect) was positively related to the total number of comorbid disorders in BPD patients. Thus, patients with comorbid disorders tended to have more implicit affects. It appears plausible that patients suffering from additional mental disorders could exhibit a broadened or more generalized responsiveness to affective stimuli compared to those without other mental disorders and might therefore develop more affective reactions in everyday life. In particular depression and anxiety disorders might increase or broaden vulnerability to negative affective reactions whereas bulimia nervosa could enhance the propensity to react with positive affect in BPD.

The findings of our study provide first evidence that the IPANAT can be applied successfully and with sufficient reliability to patients with BPD. The IPANAT is an economic measure of implicit positive and negative affectivity<sup>13</sup>. Interestingly, the IPANAT procedure has been recently extended

to the assessment of discrete affects such as happiness, anger, fear, and sadness. In healthy individuals, the IPANAT has shown predictive value for spontaneous psychophysiological stress reactivity<sup>16,18</sup> and perceptual sensitivity to negative affective stimuli<sup>19</sup> beyond and above direct measures of affectivity. Against this background, it appears promising to administer the IPANAT in future psycho-physiological research on affective responsivity in BPD or other clinical disorders. As it can be assumed that this indirect measure of affectivity is less biased by negative distortion tendencies it appears to be a potentially helpful instrument to better understand affectivity and its perception and cognitive representation in BPD.

In sum, the present data indicate that BPD patients exhibit reduced positive implicit affect as well as reduced positive explicit affect compared to healthy persons. As could be expected, we found evidence for heightened explicit negative affects but not for increased implicit negative affect in BPD. Enhanced self-reported negative affectivity could be due to negative distortion that does not reflect the actual need for security but a (not necessarily conscious) appellative strategy to obtain external affirmation. According to our IPANAT data, BPD patients are characterized by a normal disposition to develop negative affective reactions which is in line with psycho-physiological research suggesting a normal (or even reduced) reactivity to stressors and negative stimuli in BPD. Given the specific characteristics of our sample, our conclusions are preliminary and cannot be generalized to male BPD patients or those who are without comorbidities or who do not take antidepressant medication. However, given that BPD typically presents comorbidities and many BPD patients receive pharmacological treatment<sup>42</sup>, our findings with patients receiving naturalistic care could provide relevant information on affectivity in BPD.

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*Implicit affectivity in patients with borderline personality disorder*

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