



## Crying in borderline personality disorder patients

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### ABSTRACT

Emotion dysregulation and hyperreactivity are considered central features of Borderline Personality Disorder (BPD). We assumed that such emotion dysregulation is also reflected in increased crying behavior of these patients and, consequently, hypothesized that BPD patients ( $N = 62$ ), compared to Cluster C personality disorder patients (Cluster C-PD;  $N = 25$ ) and non-patients ( $N = 54$ ), would show higher scores on crying measures. To evaluate crying behavior, we used a set of specially designed tools. Compared to non-patients, BPD patients showed the anticipated higher crying frequency despite a similar crying proneness and ways of dealing with tears. They also reported less awareness of the influence of crying on others. However, Cluster C-PD patients showed a very similar pattern of findings. Overall, our results suggest that the increased crying of BPD patients likely results from environmental factors or the misperception of situations, rather than from stable traits. Remarkable is that the observed discrepancies in crying behavior compared to non-patients seem to be similar for Cluster-C PDs and BPD.

### 1. Introduction

In the clinical literature, Borderline Personality Disorder (BPD) patients are typically portrayed as being emotionally unstable and hyperreactive (Lobbestael and Arntz, 2015; Rosenthal et al., 2008). In fact, of all DSM-IV BPD criteria, affective instability appears to best differentiate patients with borderline personality disorder from other patients (Clifton and Pilkonis, 2007). Also according to the biosocial theory of Linehan (1993), emotion dysregulation in BPD comprises increased sensitivity to emotional stimuli, unusually strong emotional reactions, a relatively frequent occurrence of complex emotions (more than one emotion simultaneously), and problems in identifying emotions. This author even poses that emotional instability is at the basis of the development of this disorder and that BPD patients' emotional instability may indicate a more expansive style of affective expression (see also Capps et al., 2015).

Since it seems plausible that such emotional instability is also reflected in the patients' crying behavior, the current study focuses on several aspects of crying behavior of BPD patients as a specific operationalization of emotional instability and hyperreactivity. Specifically, we examined crying frequency, crying proneness in positive and negative situations, awareness of the impact of tears on other people, the degree of felt control over crying, and the felt inhibition of crying.

These aspects of crying in BPD patients were compared to non-patients and another patient group known for their emotional disturbances: Cluster C personality disorder patients. Until now, little is known about the crying behavior of BPD patients. To the best of our knowledge, only Capps et al. (2015) investigated crying specifically in interactions between patients and therapists in small samples of PD patients. However, their Cluster B group was small ( $N = 18$ ), the level of psychopathology was mild to moderate, there was no specific focus on BPD patients, and they did not address their more general and everyday crying behavior.

Despite the often postulated hyperreactivity in BPD (e.g., Linehan, 1993), empirical findings do not consistently support these claims. For example, several studies failed to demonstrate that BPD patients exhibit increased psychophysiological responses to negative pictures (Domes et al., 2009; Herpertz et al., 1999, 2000). For example, Herpertz et al. (1999) exposed BPD patients and healthy controls to affect-inducing pictures but failed to find any evidence of hyperreactivity among patients, neither concerning physiological indicators of emotion (e.g., heart rate, electromyogram, or skin conductance), nor regarding their subjective ratings of emotion. These results appear to be consistent with findings from most self-rating-based studies, which did not demonstrate significant group effects (e.g., Niedtfeld et al., 2010; Schulze et al., 2011) or even blunted responses when BPD patients were compared to non-patients (e.g., Hazlett et al.,

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2012). Several other studies using self-reports (Elices et al., 2012; Jacob et al., 2010; Kuo et al., 2009; Kuo et al., 2016) also suggested that BPD patients do not exhibit greater self-reported emotional reactivity than non-patients.

Support for the hyperreactivity is primarily found in a few studies that used multiple self-ratings (diaries) over time which reported a higher level of unpleasant affect in BPD patients, compared to a clinical control group (Stein, 1996) and psychologically healthy controls (Cowdry and Gardner, 1991; Stiglmayr et al., 2001). Also, experimental studies that applied emotion-inducing techniques observed greater hyperreactivity in BPD: Levine et al. (1997) elicited a heightened intensity of negative emotions in BPD patients, and Herpertz et al. (1997) provided evidence of elevated baseline emotional activation among patients engaging in self-injury as compared to healthy controls. Finally, in a meta-analysis of 19 functional neuroimaging studies, BPD patients, compared to healthy controls, showed relatively increased activation of the left amygdala and posterior cingulate cortex along with blunted responses of the bilateral dorsolateral prefrontal cortex during the processing of negative emotional stimuli (Schulze et al., 2016).

Occasionally, studies yielded seemingly discrepant findings when assessing emotions at different levels within the same participants. For example, in a study using functional MRI, Herpertz et al. (2001) found no differences in subjective emotions between BPD patients and controls, while their BPD participants did show elevated blood flow in the amygdala. Given this inconsistent pattern of findings, more research is needed with adequate attention for the different emotion induction methods and operationalizations of emotional hyperreactivity and emotional instability.

When other essential aspects of social cognition, such as the ability to correctly recognize other people's emotional expressions (Van Kleef, 2016), are considered, similar discrepancies have been reported. For example, results of studies examining BPD patients' emotion recognition were inconsistent as well, varying from less accurate recognition (Bland et al., 2004; Levine et al., 1997), no differences (Minzenberg et al., 2006), to more accurate recognition (Fertuck et al., 2007; Lynch et al., 2006; Wagner and Linehan, 1999) in BPD patients when compared to other groups.

One source of the unclear pattern of findings in previous studies may be the predominant use of artificial and/or context-free stimuli, often in a laboratory setting (for some exceptions, see, e.g., Cowdry and Gardner, 1991; Stein, 1996; Stiglmayr et al., 2001) that may not be specifically relevant for the daily functioning of these patients. We feel that the study of crying in daily life might yield new insights into BPD patients' emotional hyperreactivity. Below, we first discuss in more detail what is currently known about human emotional crying.

### 1.1. Human emotional crying: theoretical background

Human emotional crying can be described as the shedding of tears from the lacrimal apparatus in the absence of any irritation of the eyes, which is often accompanied by vocalizations, sobbing, and increased activity in some facial muscles (Patel, 1993). Only humans cry with tears in response to both positive and negative emotional events (Gračanin et al., 2018; Trimble, 2012; Vingerhoets, 2013). Human crying is hypothesized to serve both *intra-individual* and *inter-individual* functions (Vingerhoets and Bylsma, 2016). Intra-individual functions refer to the effects that crying may have on the crying individual themselves, such as catharsis, emotional recovery, or the experience of mood enhancement and relief that may follow crying (e.g., Breuer and Freud, 1955; Frey and Langseth, 1985). However, empirical data fail to provide strong support for this catharsis hypothesis as crying does not always lead to mood improvement and its effects seem to depend, among other, in particular on how others react to the tears (Cornelius, 1997; Rottenberg et al., 2008). To put it differently, the assumed benefits of crying may thus more likely result from positive reactions of

others than from the crying act itself. This is why it is also essential to evaluate the possible effects of crying on others: its inter-individual functions.

Theories that stress the importance of the inter-individual effects of crying (e.g., attachment theory; Bowlby, 1980; behavioral evolution theory; Hasson, 2009) emphasize the signal value of distress vocalizations and human tears. Attachment theory regards crying as an appeal of children to their mother or other caregivers for their presence and attention (Nelson, 2005, 2008). More recent findings emphasize that adult crying (or, more specifically, visible tears, because only their effects have been investigated) promotes not only the inhibition of aggressive impulses in observers, but also stimulates empathy and prosocial behavior in observers, including caregiving and protective responses, and consequently facilitates social bonding (Gračanin et al., 2018). Visible tears have a considerable impact on the evaluation of the crier, in particular the perceived need for support, and the self-reported willingness to provide assistance and comfort (Hendriks et al., 2008; Provine et al., 2009; Vingerhoets and Bylsma, 2016), even at the automatic, pre-attentive level (Balsters et al., 2013). However, especially if the crying is considered as manipulative or inappropriate, it may also elicit anger, irritation, frustration, and even aggression from others (Alexander, 2003; Vingerhoets, 2013). Currently, it is not yet fully understood which factors ultimately determine how others react to an individual's tears.

There is currently also some limited insight into (the background of) individual and group differences in crying. This concerns not only age and gender, but also personality, neurological condition, and psychopathology (Bylsma et al., submitted). Neuroticism, empathy, and anxious attachment are positively associated with crying frequency (Peter et al., 2001; Vingerhoets, 2013), whereas having an avoidant attachment style is linked with a low crying frequency (Laan et al., 2012).

Regarding depression, what we currently know (see Vingerhoets et al., 2007) suggests that the relationship is less clear than is often implicitly assumed. For example, in most screening and assessment tools, a greater tendency to cry or a higher frequency of crying is considered as an increased risk of depression. However, the frequently applied Beck Depression Inventory (Beck et al., 1996) attributes the highest score to the answer alternative "I used to be able to cry, but now I can't cry even though I want to," which suggests that the loss of the capacity to cry is the best indicator of severe depression. It is not clear how to explain these seeming discrepancies. Are crying and depression perhaps related in a non-linear manner so that moderate depression levels are characterized by the most excessive crying, while in the case of major depression the capacity for crying may become compromised? Or, as suggested by Keller and Nesse (2006), do the specific symptoms of depression depend on the nature of the primary etiologic factor? More precisely, do depressive patients whose illness is related to a loss cry more often, whereas in the case that the depression results from work-related stressors or a high workload, crying might be less prominent while symptoms like guilt, rumination, fatigue, and pessimism prevail? This example illustrates how complex the pattern of crying behavior can be in particular forms of psychopathology, and the same will likely be true for BPD patients.

### 1.2. The present study

The overall goal of this study is to obtain a better understanding of the emotional functioning of BPD patients. To that end, we investigated several aspects of the crying of BPD patients. We had two comparison groups: (1) patients with Cluster C personality disorder (Cluster C-PD) and (2) non-patients. The Cluster C-PD patient group consisted of patients with avoidant, dependent and obsessive-compulsive personality disorder. This group had the added advantage of attaining information on the specificity of possible differences in crying of BPD patients when compared to other PDs. Specifically, these patients also show heightened neuroticism and more negative affective responses (Saulsman and

Page, 2004), but are often described as *less* emotionally reactive (Koenigsberg et al., 2002).

We thus expected BPD patients to report a higher crying frequency than the comparison groups. The fact that BPD is associated with high levels of neuroticism (Samuel and Widiger, 2008) and high comorbidity of depressive disorders (e.g., Lieb et al., 2004), additionally makes it plausible that these patients cry more often than healthy controls. Further, if BPD patients would be characterized by emotional hypersensitivity, especially for negative cues, one could anticipate that, relative to the comparison groups, BPD patients would especially report a greater crying proneness in negative situations. We further investigated the control over and inhibition of their crying. Due to the characteristic problems with emotion regulation of BPD patients, we expected that BPD patients would report more difficulties in controlling crying. Besides the loss of control of emotions, inhibition of emotions is also a typical characteristic of BPD patients (Domes et al., 2006). We thus hypothesized that BPD patients would either report more inhibition of their crying or less control over their crying. We additionally explored the crying proneness in positive situations and the awareness of the effects of crying on others. However, it is not possible to formulate specific hypotheses regarding these variables, since, theoretically, one can expect both a higher awareness and crying proneness in positive situations, but also a lower awareness and crying proneness in positive situations.

The study of crying in these patients is interesting for several reasons. First, studies on self-reported crying address real-life situations and thus have a higher ecological validity than the previous (laboratory) studies which often apply rather artificial stimuli. Second, evaluating both real crying behaviour and crying proneness (response to hypothetical situations) might yield information to what extent environmental factors and genetic factors play a role, as previous research among twins showed that crying proneness could be considered as a more stable, genetically informed personality feature, whereas the reported actual crying frequency seems more environmentally determined (Vingerhoets, 2013). Finally, insight into the specific kinds of antecedents of crying may provide unique and clinically relevant information about the individual's socio-emotional development. We, therefore, feel that this novel approach may yield valuable new insights that might be helpful to better understand the emotional life of BPD patients. This, in its turn, may contribute to a better diagnosis and more effective treatments. This is particularly relevant because currently all of the major psychotherapeutic approaches used for BPD patients (i.e., Schema Therapy, Dialectical Behavioral Therapy, Transference-Focused Psychotherapy, and Mentalization Based Therapy) offer help with (hyperreactive) emotional problems (Peter et al., 2013).

## 2. Methods

### 2.1. Participants

The patient groups consisted of 62 patients (53 women: age range 22–54 years; 9 men: age range 28–51 years) diagnosed with BPD and 25 patients (15 women: age range 23–56 years; 10 men: age range 30–47 years) with Cluster C-PD: primary diagnoses: avoidant personality disorder ( $N = 14$ ), dependent personality disorder ( $N = 3$ ), and obsessive personality disorder ( $N = 8$ ). The patients were all waiting for outpatient treatment at the GGZ Breburg Mental Health Institute of Tilburg (The Netherlands). Acute and chronic psychotic disorders, as well as bipolar disorder, organic disorders, dissociative identity disorder, and mental retardation were exclusion criteria for both patient groups.

The non-patient control group consisted of 54 individuals (41 women: age range 20–60 years; 13 men: age range 19–62 years) who were matched with the BPD patient group for age and gender. The non-patients control group were recruited among and by acquaintances of psychology students. Although we did not conduct a formal assessment for the presence of psychopathology in the non-patient sample, an

inclusion criterion for this group was that participants had to report good mental health and no prior experience with mental health care.

### 2.2. Procedure

Written informed consent was obtained from all participants. DSM-IV classifications of the patient group were based on the Structured Clinical Interview for DSM-IV (SCID-II: First et al., 1997; Dutch version by Weertman et al., 2000), which is part of the standard intake procedure at GGZ Breburg. After the intake, patients were invited to participate in this study. This study was approved by the institute's Medical Ethics Review Committee (METIGG Kamer Zuid).

### 2.3. Measures

*Crying Frequency* was measured with two items: 'How often did you cry in the past four weeks?' and 'How long ago did you cry most recently?' The first question is an open question, whereas the latter question has a standard seven-point multiple-choice response format (i.e., 1 'cried less than a day ago' to 7 'cried more than one year ago') (Vingerhoets, 2013). The correlation between the two measures (typically in the 0.55–0.65 range) supports the assumption that those who reportedly cry more often also tend to report a more recent crying episode (Rottenberg et al., 2008).

*Crying Proneness*, as a more stable personality feature, was evaluated with the Crying Proneness Scale (CPS; Denckla et al., 2014). The 28-item CPS assesses crying proneness, taking into account both negative antecedents (14 items: e.g., 'someone dying', 'separation', 'defeat') and positive antecedents for crying (14 items: e.g., 'birth', 'reunion', 'victory'), which are measured with separate subscales. Item responses are recorded on a 7-point Likert scale ranging from 1 ('very unlikely') to 7 ('very likely'). This questionnaire uses the following instructions: 'How likely is it that you are touched to the point of tears when you see/read/hear the following events while you read a book or see a documentary/movie.' Participants are not directed to consider a specific period when responding. Higher scores indicate a higher crying proneness. The internal consistency of both subscales was excellent, as coefficient  $\alpha$ s were 0.92 for the negative crying proneness scale and 0.93 for the positive crying proneness scale. The correlation between both scales was 0.82.

*Awareness of the interpersonal impact of crying* was measured with the Crying and Coping questionnaire, which is part of the Adult Crying Inventory (ACI; Vingerhoets and Cornelius, 2001). This questionnaire contains a 7-item subscale Interpersonal crying, which measures the awareness that one's crying behavior may have a substantial impact on other people, and that it might be useful to cry in order to solicit attention and support from others (e.g., 'When one cries, it does not leave other people unaffected'). Higher scores indicate a greater awareness that crying can be used to elicit attention and support from others. Items are scored on a 7-point Likert scale, ranging from 'Strongly Agree' to 'Strongly Disagree.' Internal consistency of this scale was acceptable, with coefficient  $\alpha = 0.76$ .

*Inhibition and control of crying* were measured with an experimental questionnaire (Vingerhoets and Becht, 1997). Items are scored on a 4-point Likert scale, ranging from 'Strongly Disagree' to 'Strongly Agree.' Inhibition is assessed with six items: (e.g., 'I would like to cry, but I cannot') and control of crying with four items: (e.g., 'I can control my crying'). Internal consistency was acceptable, as coefficient  $\alpha = 0.77$  for the control subscale and 0.70 for the inhibition subscale. The inhibition scale measures difficulties with being able to cry and therefore refers to an inability rather than a conscious choice. The control scale measures an individual's control over crying. A high score on this scale indicates a higher control over one's crying, whereas lower scores refer to a lack of control over one's crying. Some items (e.g., 'It seems that I have no control over my tears') are reversely coded.

**Table 1**  
Means and standard deviations for age, and the dependent variables, and correlations between variables (pooled data of the three groups).

	M (SD)	Correlations between variables (Spearman's Rho) <sup>1</sup>							
		1	2	3	4	5	6	7	8
1. Frequency of crying (in the last four weeks)	6.83 (8.09)	–	–0.800***	0.244**	0.176*	0.018	–0.304***	–0.358***	–0.066
2. Time since last crying <sup>2</sup>	3.00 (1.78)		–	–0.364***	–0.253**	–0.111	0.342***	0.386***	0.002
3. Crying proneness negative antecedents	50.59 (16.97)			–	0.810***	0.287**	–0.457***	–0.388***	0.173*
4. Crying proneness positive antecedents	40.79 (17.18)				–	0.118	–0.379***	–0.377***	0.273**
5. Awareness of interpersonal effects	23.71 (6.46)					–	–0.244**	–0.138	–0.117
6. Inhibition of crying	12.20 (3.73)						–	0.464***	0.093
7. Control of crying	10.80 (3.39)							–	0.071
8. Age (in years)	34.70 (10.75)								–

Note. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

<sup>1</sup> Spearman's Rhos were used, because the use of these non-parametric correlations rather than Pearson correlations is recommended when  $n < 150$  (Schönbrodt and Perugini, 2013) as was the case in the current study.

<sup>2</sup> Time since last crying was measured on a 7-point scale, ranging from 'cried less than a day ago' to 7 'cried more than one year ago'.

### 3. Results

Before conducting the main analyses, we compared the three participant groups on relevant background variables. BPD patients, Cluster C-PD patients, and non-patients did not differ significantly in terms of age,  $F(2, 138) = 0.67$ ,  $p = 0.515$ , but the proportion of men and women was significantly different across these groups,  $\chi^2(2) = 6.463$ ,  $p = 0.041$ . Specifically, the proportion of men was considerably lower in the BPD group than in the Cluster C-PD patients. Also, Fisher's Exact Test demonstrated that the level of education differed between the three groups,  $\chi^2(16) = 65.733$ ,  $p < 0.001$ . Follow-up pairwise comparisons showed that the level of education was higher for non-patients when compared to Cluster C-PD patients and BPD patients, and higher for Cluster C-PD patients when compared to BPD patients.

Table 1 presents the descriptive statistics of the dependent variables as well as the correlations between the measures we included. The frequency of crying was positively associated with both the crying proneness to positive and to negative antecedents and negatively with the inhibition and control of crying scales. Time since the last cry was also significantly related to these scales but in an inverse way (i.e., negatively with both crying proneness scales and positively with the inhibition and control scales). Both the crying proneness to positive and negative antecedents were negatively associated with inhibition and control of crying. Awareness of the interpersonal effects of crying correlated positively with crying proneness to negative antecedents and negatively with inhibition of crying.

Furthermore, age, sex, and level of education were linked with the crying variables. Specifically, correlational analyses showed that age was significantly, and positively, associated with crying proneness to both negative and positive antecedents (see Table 1). Multivariate analyses of variance indicated that there were significant sex differences on the inhibition scale,  $F(1, 139) = 7.499$ ,  $p = 0.007$ , partial  $\eta^2 = 0.051$ , crying frequency,  $F(1, 137) = 4.568$ ,  $p = 0.034$ , partial  $\eta^2 = 0.032$ , and time since last cry,  $F(1, 137) = 13.329$ ,  $p < 0.001$ , partial  $\eta^2 = 0.089$ . These results thus suggest that men have higher scores on the inhibition scale, whereas they cried less often and had a less recent last crying episode. In addition, there were significant associations between educational level and crying frequency,  $F(8, 139) = 2.786$ ,  $p = 0.007$ , partial  $\eta^2 = 0.146$ . Higher educated individuals appear more aware of the interpersonal effects of crying while they reportedly cry less often than their less educated counterparts. Because age, sex, and educational level had an association with the dependent variables, we included these variables as covariates in the further analyses.

For the comparison of the three participant groups, we applied multivariate and univariate analyses of covariance ((M)ANCOVAs). For the follow-up post-hoc pairwise comparisons, we used a Bonferroni correction to minimize the chances for reporting false positive findings. Table 2 summarizes the relevant descriptive statistics. Since not

every participant completed all questionnaires, the  $N$ s differed across the different analyses.

#### 3.1. Crying frequency of and time since last crying

The analysis revealed a significant effect of group, Wilks  $\Lambda = 0.82$ ,  $F(4, 264) = 6.84$ ,  $p < 0.001$ , multivariate partial  $\eta^2 = 0.094$ . Follow-up univariate tests indicated that the three participant groups differed significantly on both crying frequency,  $F(2, 133) = 13.32$ ,  $p < 0.001$ , partial  $\eta^2 = 0.167$ , and time since their last crying,  $F(2, 133) = 7.417$ ,  $p = 0.001$ , partial  $\eta^2 = 0.100$ . Pairwise comparisons based on estimated marginal means showed that the BPD group and the Cluster C-PD group had significantly higher crying frequencies ( $ps \leq 0.004$ ) and had their last cry more recently ( $ps \leq 0.008$ ) than non-patients (see Table 2). The two patient groups (i.e., Cluster C-PD and BPD patients) did not differ significantly from each other on these two measures.

#### 3.2. Crying proneness

There was no significant multivariate effect of group (Wilks  $\Lambda = 0.82$ ,  $F(4, 264) = 0.98$ ,  $p = 0.512$ , multivariate partial  $\eta^2 = 0.012$ ), indicating that the groups did not significantly differ from each other on crying proneness due to positive or negative antecedents.

#### 3.3. Awareness of the interpersonal impact of crying

There was a significant effect of participant group on awareness of the interpersonal effects of crying,  $F(2, 117) = 4.386$ ,  $p = 0.015$ , partial  $\eta^2 = 0.070$ . Follow-up pairwise comparisons based on estimated marginal means showed that BPD patients had lower scores than the non-patient group ( $p = 0.014$ ), but there were no significant differences between the two patient groups and between the Cluster C-PD patients and the non-patient group ( $ps > 0.05$ ) (see Table 2).

#### 3.4. Inhibition and control of crying

Although there was a significant multivariate effect of group (Wilks  $\Lambda = 0.92$ ,  $F(4, 268) = 2.73$ ,  $p = 0.030$ , multivariate partial  $\eta^2 = 0.030$ ), follow-up univariate tests indicated no significant differences on inhibition of crying or control of crying subscales,  $F(2, 135) = 2.55$ ,  $p = 0.082$ , and  $F(2, 135) = 1.77$ ,  $p = 0.174$ , respectively.

We were not able to include enough male participants in our sample to draw definite conclusions regarding potential gender differences in our findings. Still, we did examine gender by group interactions in follow-up analyses as a robustness check. None of these effects were significant ( $ps \geq 0.442$ ).

To summarize, compared to non-patients, BPD patients reported a significantly higher crying frequency, more recent last cry, lower levels of awareness of the interpersonal effects of crying, but no significant

**Table 2**

Adjusted mean scores for the crying variables for non-patients, cluster C-PD-patients, and BPD-patients. standard errors are between brackets.

	Patient groups Non-patients $n = 39$ – $54$ <sup>1</sup>	Cluster C-PD $n = 24$ – $25$ <sup>1</sup>	BPD $n = 59$ – $62$ <sup>1</sup>
<b>Model 1</b>			
Frequency of crying (in the last four weeks)	2.39 (1.06) <sup>a</sup>	8.38 (1.50) <sup>b</sup>	10.17 (1.01) <sup>b</sup>
Time since last crying <sup>2</sup>	3.75 (0.24) <sup>a</sup>	2.49 (0.34) <sup>b</sup>	2.54 (0.23) <sup>b</sup>
<b>Model 2</b>			
Crying proneness negative antecedents	52.50 (2.47)	47.28 (3.40)	50.30 (2.31)
Crying proneness positive antecedents	42.75 (2.45)	40.11 (3.38)	39.37 (2.29)
<b>Model 3</b>			
Awareness of interpersonal effects	26.05 (1.08) <sup>a</sup>	24.75 (1.28) <sup>a,b</sup>	21.72 (0.89) <sup>b</sup>
<b>Model 4</b>			
Inhibition of crying	11.26 (0.53)	12.20 (0.74)	13.02 (0.50)
Control of crying	10.52 (0.50)	11.98 (0.69)	10.57 (0.47)

*Note.* Adjusted means based on (M)ANCOVAs with age, sex, and level of education as covariates. Cluster C-PD = Cluster C Personality Disorder; BPD = Borderline personality disorder. Group means with different superscript (i.e., <sup>a</sup> or <sup>b</sup>) are significantly different from each other ( $p < 0.05$ ). For example, the means for crying frequency differ between non-patients and Cluster C-PD patients (these groups have different superscripts), but not between Cluster C-PD patients and BPD patients (these groups have the same superscript). There were no significant differences between groups for subscales if no superscripts were used behind the group means for those subscales (e.g., for the control of crying score).

<sup>1</sup> For non-patients,  $n = 54$  in Models 1 and 4;  $n = 53$  in Model 2, and  $n = 39$  in Model 3. For Cluster C patients,  $n = 24$  for Model 1,  $n = 25$  for Model 2, 3, and 4. For BPD patients,  $n = 61$  in Model 1,  $n = 62$  in Models 2 and 4, and  $n = 59$  in Model 3.

<sup>2</sup> Time since last crying was measured on a 7-point scale, ranging from ‘cried less than a day ago’ to 7 ‘cried more than one year ago’.

differences in crying proneness and inhibition and control of crying. Additionally, BPD patients did not differ from the Cluster C-PD group on any of the studied crying measures. The Cluster C-PD group also reported a significantly higher frequency of crying and more recent last cry when compared to non-patients, but they did not significantly differ from non-patients in their awareness of the interpersonal effects of crying.

#### 4. Discussion

To the best of our knowledge, the present study is the first to examine general crying in BPD. As argued in the introduction, we feel that studying crying might offer a unique window to learn more about the emotional functioning of these patients in everyday life. To that end, we compared different aspects of crying between BPD patients, non-patients, and Cluster C-PD patients. The findings yielded partial support for our hypotheses. Generally, BPD patients differed from non-patients, but not from Cluster C-PD patients. As predicted, compared to non-patients, BPD patients reported a higher crying frequency but a similar proneness to crying in response to negative and positive stimuli, and similar levels of inhibition and control. BPD patients further reported a lower awareness of the interpersonal effects of crying than non-patients. Altogether, these results show an intriguing pattern in crying-related variables in BPD. The combination of a higher crying frequency with comparable levels of crying proneness and inhibition of crying might at first seem paradoxical because one would expect a high crying frequency to be accompanied by decreased inhibition and control as well as higher crying proneness. This specific pattern of findings suggests that BPD patients might be more often exposed to emotional situations or create emotional situations. Alternatively and/or additionally, they may perceive or experience emotional situations, including conflicts and other interpersonal situations, as less neutral and more intense. Our results are in line with the findings reported by Domes et al. (2009), who in their comprehensive narrative review on facial emotion perception in BPD, demonstrate that BPD patients not only show subtle impairments in recognizing emotions in faces but more relevant for the current study, also a tend to perceive emotionally ambiguous faces (i.e., neutral ones) more negatively. This also suggests a poor capacity to read social situations adequately, thus also having more triggers for crying in daily life. At the same time, these patients seem less aware of the effects of crying on others.

The other side of the coin is that, contrary to expectations, we did not find any significant differences between Cluster C-PD patients and

BPD patients. Based on the general idea of emotional hyperreactivity of BPD patients, we expected a higher crying frequency and crying proneness in BPD patients than in both comparison groups. However, both BPD patients and Cluster C-PD patients showed a higher crying frequency than non-patients did, whereas no differences were found between BPD patients and Cluster C-PD patients in crying frequency. This is in line with Stepp et al. (2009), who found no significant differences in interpersonal problems between BPD patients and patients with other personality disorders.

The differences between BPD patients and non-patients were thus partially according to expectations and seem to suggest that BPD patients might not necessarily be more emotionally reactive, but rather perceive situations as more distressing or threatening. Why Cluster C-PD patients showed a corresponding pattern of emotional reactivity asks for an explanation. Frequent crying seems more characteristic of a broader subset of personality disorders rather than of BPD specifically. A possible reason for our failure to find differences in crying between the patient groups, is the existence of one general psychopathology factor labeled the ‘p’ (for pathology) factor, rather than three high-order (spectral) factors (internalizing, externalizing, and thought disorder) (Caspi et al., 2014). As pointed out by Fonagy et al. (2017), several features linked with BPD, including emotional dysregulation, might also be associated with this general ‘p’ factor. Our findings seem to support this explanation, as the pattern of emotional dysregulation in our BPD group generalized to the Cluster-C group.

Concerning the participants’ awareness of the interpersonal effects of crying, our findings revealed significantly lower scores on this scale for BPD patients than for the comparison groups, which suggest that these patients might not realize how their crying can (negatively or positively) affect others. This finding thus challenges the popular notion that the crying of these patients is manipulative. Instead, it seems more likely that these patients lack the insight of how their crying is perceived.

Finally, also contrary to our expectations, BPD patients reported no more problems with controlling and inhibiting crying than both comparison groups. Again, the findings of no control and inhibition problems and an increased frequency of crying seem to suggest increased passive and active exposure to emotional situations, rather than poor emotional response regulation capacities. In other words, when applying the Gross and Munoz (1995) model, which makes a distinction between antecedent-focused emotion regulation and response-focused emotions regulation, our findings suggest that BPD patients specifically have problems with antecedent-focused emotion regulation. Response-

focused emotion regulation is relatively comparable in BPD patients compared to non-patients and other PD patients. Interestingly, it is precisely the antecedent-focused emotion regulation that is considered as par excellence adaptive, whereas the response-focused emotion regulation strategies are generally regarded as more maladaptive (Gross and Munoz, 1995).

As outlined in the introduction, evidence for the hyperreactivity theory seems mixed and not consistent, and it remains to be proven that BPD is characterized by general emotional hyperreactivity. Moreover, the seeming emotional hyperreactivity might be the result of very different underlying processes. For example, the inconsistency between self-report and physiological emotional responses in BPD (Daros et al., 2013; Ruocco et al., 2013; Schulze et al., 2016) may be the consequence of problems with understanding emotions. Previous research found that BPD patients have more problems in this regards than Cluster-C patients and non-patients (Peter et al., 2013).

This pattern of findings is thus partly in line with the schema therapy model of BPD (Arntz and Van Genderen, 2011; Young et al., 2003), which postulates that BPD patients can shift in different states/modes as a coping mechanism to deal with emotions. Schema therapy assumes that BPD patients are usually in a detached mode with blocked access to vulnerable emotions. However, when this detachedness has been broken down, other modes may facilitate the release of emotional expressions. In other words, the inhibition of crying might be a state-dependent phenomenon in BPD.

To date, little is known about the specific factors that ultimately affect how others react to an individual's crying, but it seems plausible that a variety of factors related to the crier, the observer, their mutual relationship, as well as characteristics of the crying and its perceived appropriateness may all play a role (Gračanin et al., 2018; Vingerhoets, 2013). Especially for BPD patients, the perceived appropriateness of the crying might be relevant. We postulate that observers consider themselves more or less as a gold standard to determine whether a crying episode of another individual is appropriate. In the case of a severe loss or a comparable situation, people can easily imagine that they themselves also cry in such a situation and therefore will generally react positively and empathically. However, in conditions in which observers might more likely differ in their tendency to shed emotional tears (e.g., failures, incompetence, rebuke; see Elsbach and Bechky, 2017), they also may be less prone to react positively to the tears of others. Therefore, we recommend for future research in this area to examine the crying antecedents of patients and controls and have independent judges rate them for their perceived appropriateness. In that way, it can be established whether patients and controls do not just cry for different reasons, but that the antecedents that make them cry also differ regarding their perceived appropriateness. Moreover, in that way, the hypothesis that BPD patients might more often than non-patients seek out, create, or be involuntarily exposed to situations that are intrinsically related to crying, can be evaluated.

#### 4.1. Limitations and future research

It is essential to be aware of the limitations of this study when interpreting the findings. A first limitation is that crying was assessed entirely by self-reports. Although the used frequency measures and the Crying Proneness Scale (Denckla et al., 2014) have demonstrated validity, it is also known that retrospective self-reports can be vulnerable to bias due to implicit theories or memory failures (Van Tilburg et al., 2003). Thus, in future research, the current findings need to be cross-validated with observations and other methodology to assess crying, such as exposing patients and controls to emotional movies (Van der Veen et al., 2012) or using daily diary measures of crying (Bylsma et al., 2011). Alternatively, one might consider asking people in the social environment of the patient (friends, relatives) about the patient's crying behavior. However, also with such a method, caution is needed because the system around BPD patients can be invalidating and also show

psychopathology, which may compromise the validity of such data (Bandelow et al., 2005). Further, additional characteristics of the crying itself (e.g., intensity, duration, vocalizations) may be important to consider in addition to the aforementioned perceived appropriateness.

Second, there were more men included in the Cluster C-PD group than in the BPD group, which could have affected the interpretation of our results, despite that we controlled for gender effects. Generally, including larger patient groups would have allowed us to better match these groups on demographic characteristics. However, recruiting large personality disorder patients groups is challenging, and the prevalence of specific diagnoses is often related to demographic characteristics such as gender (Cold et al., 2006).

Third, like in any correlational study, third variables might play a role. For the present study, a potential third variable could be the use of medication, which is prevalent in the current patient groups. The type of medication that BPD patients typically use (e.g., antidepressants, antipsychotics) might significantly interfere with emotional reactivity and the ability to cry (Price et al., 2009). We had no information available on the use of medication, but in future research, the potential effects of medication usage should be accounted for. However, given that one might expect suppression of crying rather than facilitation when using anti-depressive medication, it is unlikely that such effects have played a decisive role in our study.

Fourth, future studies on crying in BPD should also explicitly differentiate between intra-individual (e.g., cathartic) and inter-individual (e.g., social) functions of crying and explore whether BPD patients mainly cry for intra-individual or inter-individual reasons, and whether they cry in more intense, uncontrolled ways, which could influence how they are perceived.

Finally, the non-patient group did not complete a structured diagnostic interview, which means that psychopathology in this group cannot be excluded. However, severe psychopathology in this non-patient group is unlikely given that previous contact with mental health care institutions was used as an exclusion criterion for this group.

## 5. Conclusion

The current study is the first to evaluate crying in BPD patients, and to compare it to crying behavior in another PD-pathology (i.e., Cluster C patient) group, and a non-patient group. The general picture across our findings is that BPD patients cry more often than non-patients, whereas their general crying threshold seems similar, and no differences between the groups were found in the degree of control of crying or of inhibition of crying. This suggests that BPD patients are not more susceptible to cry but likely are more often confronted with situations that trigger crying or urges them to cry. The BPD patient group additionally reported a lower awareness of the interpersonal effects of crying than non-patients. However, these findings were not unique to BPD patients, since Cluster C-PD patients showed comparable crying behavior, although to a lesser degree. We feel that more extensive future studies on crying will contribute to a better understanding of the emotional life of patient groups and can potentially assist in further developing treatments for BPD patients as well as other groups of patients that show similar patterns of emotional reactivity.

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## Declaration of interest

None to declare.

## Supplementary materials

Supplementary material associated with this article can be found, in

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