Assessing self-reported empathy and altruism in patients suffering from enduring borderline personality disorder

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ABSTRACT

Self-report studies on empathy in adults with borderline personality disorder (BPD) have based upon the Interpersonal Reactivity Index (IRI) and generally identified deficits in perspective taking abilities in this group, but indicated less coherent results regarding empathic concern. These two constructs are considered sub-components of cognitive (CE) and affective empathy (AE), respectively. However, the IRI does not enable for valid investigation of overall levels of these empathy types. Surprisingly, although some findings from the general population suggest that empathy types may be positively related to altruism, neither this link nor general altruism have been examined in BPD. Additionally, these constructs have not been sufficiently studied in this group in the context of alexithymia or potential clinical confounders. Hence, women with BPD ($N = 30$) and healthy women ($N = 38$) completed, i.a., the Questionnaire of Cognitive and Affective Empathy, Self-Report Altruism Scale, TAS-20, STAI, and CESD-R. Patients with BPD reported significantly decreased overall CE (including worse online simulation abilities – conceptually similar to perspective taking from the IRI), but a similar level of overall AE. They also demonstrated lower altruism. Taken together, these results suggest that BPD patients have difficulties with imagining what emotions others are feeling and with altruistic responding to their needs.

1. Introduction

Borderline personality disorder (BPD) is characterized by chronic and marked instability of emotions, self-image, and interpersonal relationships (American Psychiatric Association, 2013). One of the factors that may underlie these interpersonal disturbances is a dysfunctional ability to empathize with others, which is posited by the mentalization theory of BPD (see Fonagy and Luyten, 2016; Gunderson et al., 2018) and by the alternative DSM-5 model for personality disorders (see American Psychiatric Association, 2013) as well as suggested by the results of empirical research (see Miano et al., 2017).

Contemporary theoretical models of empathy distinguish its affective (emotional) and cognitive types (Ilgunaite et al., 2017). According to Reniers et al.'s (2011) model, affective empathy refers to the ability to *feel* other people's emotions and cognitive empathy is thought of as the *understanding* of others' emotions. Several other contemporary models of empathy conceptualize it in a similar manner (cf. Jolliffe and Farrington, 2006; Vachon and Lynam, 2016). Cognitive empathy is

sometimes regarded as equivalent to theory of mind (ToM) abilities, although, according to Reniers et al. (2011), the former concerns emotions and the latter pertains to cognitive processes. A large number of authors divide ToM into cognitive and affective components and equate affective ToM with cognitive empathy (e.g., Dvash and Shamay-Tsoory, 2014; Stone et al., 1998; Thoma et al., 2013). Yet other researchers extend the meaning of cognitive empathy to the comprehension of not only emotions, but of mental states in general, and equate it with both types of ToM (see, e.g., Herpertz and Bertsch, 2013). However, neuroimaging findings do not support the legitimacy of such a conceptual combination, because partially distinct neural substrates seem to be involved in cognitive empathy and ToM (Eres et al., 2015).

Although both cognitive and affective empathy play an important role in establishing and maintaining social relationships (Stern and Cassidy, 2018), research on these two general empathy types is not extant with regard to BPD (for reviews considering broader conceptualizations of empathy in BPD, see Dinsdale and Crespi, 2013; Jeung and Herpertz, 2014; Lazarus et al., 2014; Ripoll et al., 2013;

Roepke et al., 2013; Thoma et al., 2013). To the best of our knowledge, all such cross-sectional self-report studies pertaining to BPD in adults have based on Davis's (1983) four-factor empathy conceptualization, operationalized by the Interpersonal Reactivity Index (IRI), which consists of four subscales: Perspective Taking, Fantasy, Empathic Concern, and Personal Distress. However, the results of factor analysis from a recent study suggest that arbitrary combination of the IRI original four subscales into cognitive and affective empathy is not psychometrically justified (see Chrysikou and Thompson, 2016). Moreover, the Empathic Concern subscale "imprecisely assumes that empathy and sympathy are interchangeable constructs and primarily measures emotional reactions to the negative experiences of others rather sharing specific affective states" and the Personal Distress subscale "assesses self-oriented feelings of anxiety rather than the other-oriented processes involved in sharing others' emotions" (Michaels et al., 2014, p. 804). In addition, the Fantasy subscale measures primarily the ability to feel the emotions of fictitious characters in books, movies, and play, therefore, it does not seem to measure a component of cognitive empathy but rather that of affective empathy. Together, these weaknesses of the scale suggest that it does not conform to updated theoretical models of empathy. However, based on such models, researchers developed self-report measures enabling for valid investigation of cognitive vs. affective empathy, such as the Questionnaire of Cognitive and Affective Empathy (QCAE; Reniers et al., 2011) or Basic Empathy Scale (BES; Jolliffe and Farrington, 2006). Yet, surprisingly, a tool of this type (specifically, the BES) has been so far employed merely in one study on empathy in BPD and did not involve adults, but adolescents (see Kalpakci et al., 2016). Experimental studies have not allowed for gaining a comprehensive view of cognitive or affective empathy in adult BPD either, because they have typically examined merely one subcomponent of an empathy type in a given study.

When it comes to the BES, it cannot be inferred whether female adolescent inpatients with BPD manifested deficits in any of the empathy types, because the study by Kalpakci et al. (2016) involved peers with other mental disorders as a comparison group and not healthy controls (HCs). However, the results of studies using the IRI in adult patients with BPD generally point to deficits in combined perspective taking and fantasy constructs – termed together by some researchers as *cognitive empathy* (see Harari et al., 2010; Martin et al., 2017) – as well as in perspective taking alone (see Flasbeck et al., 2017[1]; Guttman and Laporte, 2000; Homan et al., 2017; Martin et al., 2017; New et al., 2012; Petersen et al., 2016; Ritter et al., 2011; for exceptions suggesting no deficits, see Dziobek et al., 2011; Matzke et al., 2014). The Perspective Taking subscale from the IRI measures "the tendency to spontaneously adopt the psychological point of view of others" (Davis, 1983, pp. 113–114). On the other hand, the results on the Fantasy subscale did not differ significantly between the BPD group and HCs in any of the available studies. Deficits in general cognitive empathy and, specifically, in perspective taking (in a similar meaning as in the IRI) in BPD are also supported by the results of some experimental studies (e.g., Haas and Miller, 2015), but not by findings from others (e.g., Niedtfeld, 2017; Wingenfeld et al., 2018), which may point to the importance of taking the characteristics of manipulation into account when assessing cognitive empathy in BPD.

The findings concerning the remaining subscales are, however, less consistent. Although most results indicate no differences between individuals with BPD and HCs on the Empathic Concern subscale (see Flasbeck et al., 2017; Martin et al., 2017; Matzke et al., 2014; New et al., 2012; Petersen et al., 2016), some findings point to higher level of empathic concern (see Guttman and Laporte, 2000; Homan et al., 2017)

and yet others suggest its lower level (see Dziobek et al., 2011; Ritter et al., 2011). On the other hand, findings concerning individuals with BPD quite consistently indicate higher results on the Personal Distress subscale (see Dziobek et al., 2011; Flasbeck et al., 2017; Guttman and Laporte, 2000; Martin et al., 2017; Matzke et al., 2014; New et al., 2012; Petersen et al., 2016; for an exception suggesting no differences, see Homan et al., 2017). In addition, one study showed no deficits in combined empathic concern and personal distress, which are referred together by the authors as *affective empathy* (see Harari et al., 2010), yet another study indicated their higher level (see Martin et al., 2017). In contrast to the results concerning cognitive empathy, the results of experiments demonstrated heightened (Flasbeck et al., 2017; Niedtfeld, 2017), intact (Wingenfeld et al., 2018), or lowered (Niedtfeld, 2017; Flasbeck et al., 2017; Wingenfeld et al., 2018) emotional empathy, which may suggest different findings depending on a specific context.

In addition, findings generally indicate moderate positive relationships between cognitive and affective empathy in the general population (measured with the QCAE; see Michaels et al., 2014; Reniers et al., 2011; or with the BES; see Jolliffe and Farrington, 2006) and in female adolescents with BPD (measured with the BES; see Kalpakci et al., 2016). This points to certain common features of these two empathy types, but also justifies their theoretical differentiation.

Another important factor putatively related to abnormal empathizing in BPD is dysfunctional altruism. Altruism may be defined as being selflessly generous, helpful, and kind to others (Rushton et al., 1981), although the operationalization of this construct – similarly as in the case of empathy – largely depends on specific theoretical models and self-report tools (Feigin et al., 2014; see also Szuster, 2016). Therefore, terminology used in research on empathy (for reviews, see Ilgunaite et al., 2017; Neumann et al., 2015) and altruism (for a review, see Feigin et al., 2014) is vague and can differ across studies, which may to some extent explain inconsistencies in findings across them. The results of numerous studies conducted with the general population demonstrate a positive link between affective empathy (including especially empathic concern) and prosocial behavior, including altruism (e.g., Edele et al., 2013; Eisenberg and Miller, 1987; Persson and Kajonius, 2016), which comports with the empathy-altruism hypothesis (see Batson et al., 2015), although some other findings do not support this view (e.g., Waytz et al., 2012). The results on the relationship between cognitive empathy and altruism are also mixed, ranging from no link between them (e.g., Edele et al., 2013; Persson and Kajonius, 2016) to a positive one (e.g., Waytz et al., 2012). Yet another study demonstrated a greater involvement of cognitive empathy in altruistic behavior in certain individuals, but a greater engagement of affective empathy in others, thus suggesting individual differences in the impact of these empathy types on altruism (see Tusche et al., 2016).

Of note, altruism has not been extensively examined in clinical populations (for exceptions, see, e.g., Fujiwara, 2007; Oakley et al., 2011; Pulcu et al., 2014). Although we found only three published articles in which this issue was investigated in BPD, reduced ability for altruistic behavior may be another factor leading to problems with interpersonal functioning in individuals with this disorder. In an experiment by Saunders et al. (2015), participants with BPD involved with the Prisoner's Dilemma Game manifested diminished reciprocal altruism compared to HCs. On the other hand, findings from an experiment consisting in taking part in an economic game revealed that patients with BPD manifested a similar level of altruistic behavior as HCs, but their motivation differed (Wischniewski and Brüne, 2013). The authors suggest, however, that a similar level of altruism may have resulted from the relatively low emotional arousal the game elicited in participants. Similarly, Thielmann et al. (2014) reported that the severity of BPD features was not related to altruistic behavior in an experimental study involving the dictator game. This result was coherent with an insignificant association between BPD traits and a personality trait of honesty-humility (Thielmann et al., 2014), which, according the the HEXACO model of personality structure, concerns some other forms of

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[1] The results from this study are almost identical to those described in another article by the same authors (see Flasbeck et al., in press) and so seem to come from almost the same samples. Therefore, we are not referring to the findings from that paper in the main text.

prosocial proclivities, such as sincerity, fairness, greed avoidance, and modesty (Ashton and Lee, 2007). However, BPD features did predict decreased altruism during the ultimatum game when individuals with BPD subjectively perceived that they had been treated unfairly by the other player (Thielmann et al., 2014). This link was mediated by low agreeableness, a personality trait refering to such aspects of prosociality as forgiveness, gentleness, flexibility, and patience (Ashton and Lee, 2007). As the authors conclude, these findings indicate the importance of addressing the issue of forgiveness in interventions aimed at improving cooperativeness in BPD (Thielmann et al., 2014). Although altruism has not yet been investigated in individuals with BPD with the use of a self-report tool, a recent study conducted on a cohort of managers indicated that self-reported BPD symptoms turned out to be negatively related to self-reported altruism (see Furnham et al., 2016). When it comes to the interdependencies between empathy and altruism in BPD, we found no studies examining them.

Alexithymia, a personality trait characterized by the sub-clinical inability to identify, describe, and refer to emotions in the self (Parker et al., 1993; Taylor et al., 2016), is another factor that may underlie certain deficits in empathy – both in the general and clinical populations (see Aaron et al., 2015; Goerlich-Dobre et al., 2015; Grynberg et al., 2010; Hoffmann et al., 2015; for reviews, see Bird and Viding, 2014; Valdespino et al., 2017). Individuals with BPD are characterized by a high level of alexithymia, especially of its two components: difficulty identifying feelings and difficulty describing feelings (for a meta-analysis, see Derks et al., 2016). However, the interrelations between alexithymia and empathy have been investigated in BPD merely in one study (see Flasbeck et al., 2017), in which negative correlations of difficulty identifying and describing feelings with perspective taking were identified in both cohorts (BPD and HCs). The third alexithymia component, externally oriented thinking, was negatively related not only to perspective taking, but also to fantasy and empathic concern (Flasbeck et al., 2017). The relationship between alexithymia and altruism has been examined in the general population (yielding a negative value; see FeldmanHall et al., 2013), but not in individuals with BPD.

In addition, to the best of our knowledge, no study has examined the differences both in empathy and altruism between individuals with BPD and HCs with particular emphasis on depressive symptoms, state and trait anxiety, and alexithymia, although they are considerably related to BPD and, as findings from previous studies suggest, may influence such aspects of psychological functioning as at least certain dimensions of cognitive or affective empathy (e.g., for a review on the influence of depressive symptoms, see Schreiter et al., 2016) or altruism (see, e.g., Pulcu et al., 2014).

Taking into consideration the limitations of and gaps in the previous research, the purpose of the current study was to assess whether patients with BPD manifest abnormal levels of cognitive vs. affective empathy and altruism as well as to evaluate the relationships between them and with important clinical constructs (i.e., state and trait anxiety and depressive symptoms) with the use of relevant self-report measures. We have selected the above-mentioned QCAE, because this tool is based on a contemporary theoretical model of empathy (see Reniers et al., 2011) and enables for comprehensive assessment of its types. Although the Perspective Taking subscale from the IRI is not a measure of overall cognitive empathy level, the conceptualization of perspective taking in this measure is, although slightly broader, relatively similar to that of the online simulation construct constituting a subcomponent of cognitive empathy in the QCAE. Therefore, based on the results of available research, we hypothesized that **(H1)** patients with BPD would report a lower level of cognitive empathy and that **(H2)** cognitive empathy would be positively related to affective empathy in both groups. We also hypothesized that **(H3)** alexithymia would be negatively linked to cognitive empathy in both cohorts and that **(H4)** patients with BPD would manifest decreased altruism in comparison with HCs. Yet, given the inconsistencies in the results from the general population and

because no study has hitherto examined the interdependencies between empathy types and altruism in BPD, no specific hypothesis can be set in this case. We also predicted that **(H5)** alexithymia would be negatively related to altruism in both cohorts and that **(H6)** depressive symptoms, state anxiety, and trait anxiety would relate with empathy and altruistic behavior in both groups. By including a measure of intelligence, we aimed at controlling for the influence of intellectual abilities on possible differences in empathy and altruism across groups.

2. Method

2.1. Participants

Participants from the clinical group were 30 women ranging from 18 to 50 years old ($M = 27.30$, $SD = 6.12$) with a diagnosis of BPD, set according to DSM-5 (American Psychiatric Association, 2013) and ICD-10 (World Health Organization, 1998) criteria. Patients were recruited from an inpatient ward at the Department of Neuroses, Personality Disorders, and Eating Disorders at the Institute of Psychiatry and Neurology in Warsaw, Poland, and via the internet with the use of a project advert. The HCs group consisted of 38 women ranging from 18 to 45 years old ($M = 25.60$, $SD = 5.87$) and was recruited from a community setting that included, among others, students of the University of Warsaw. For detailed information on diagnostic procedure, exclusion criteria, comorbidity, and medication doses, see Pluta et al. (2018).

2.2. Procedure

Study approval was obtained from the Faculty of Psychology's Research Ethics Committee at the University of Warsaw (no. 29/11/ 2016) and from the Bioethical Committee at the Institute of Psychiatry and Neurology (no. 9/2016). After getting acquainted with the study description, all participants signed the informed consent sheet, which was prepared to conform to the latest version of the Declaration of Helsinki. Subsequently, subjects completed a battery of psychological assessments described below.

2.3. Measures

2.3.1. Psychiatric diagnoses

The Structured Clinical Interview for DSM-IV-TR Axis II Disorders (SCID-II) (First et al., 2010) is a clinical interview for the assessment of DSM-IV-TR personality disorders. The SCID-II was employed to diagnose BPD in our patient sample. The remaining measures were used in both groups.

2.3.2. Clinical measures

The Borderline Personality Inventory (BPI) (Leichsenring, 1999; Polish validation by Cierpiałkowska, 2001; psychometric data in Andrałojć and Suchańska, 2013) is a self-report questionnaire of borderline personality organization specific for BPD and was used to measure BPD traits. The BPI consists of 53 true-false items based on Kernberg's (1984) structural theory of personality organization as well as on DSM-IV criteria for BPD. The suggested cut-off score for the full version of the measure is 20 and 10 for its short version (Cut-20). The Polish version of the BPI generally demonstrated acceptable reliability in the validation study for the full version of the scale ($\alpha = 0.86$), its subscales (Identity Diffusion: $\alpha = 0.68$, Primitive Defenses: $\alpha = 0.66$, Fear of Closeness: $\alpha = 0.61$, Impaired Reality Testing: $\alpha = 0.55$), as well as for the short version (Cut-20: $\alpha = 0.74$) (Andrałojć and Suchańska, 2013).

The State–Trait Anxiety Inventory (STAI) (Spielberger et al., 1983; Polish validation by Spielberger et al., 2012; Wrześniewski et al., 2011) was employed to examine anxiety. The STAI is a self-report scale comprising two 20-item separately calculated subscales: STAI-State

(measuring state anxiety) and STAI-Trait (assessing trait anxiety). Answers are marked on a 4-point Likert scale. Higher scores mean a higher level of anxiety. The Polish version of the STAI showed very high alpha coefficients in the validation study (e.g., for women from 21 to 40 years of age: STAI-state: $\alpha = 0.89$ and STAI-trait: $\alpha = 0.85$; for women from 41 to 54 years of age: STAI-state: $\alpha = 0.92$ and STAI-trait: $\alpha = 0.90$) (Wrześniewski et al., 2011).

The Center for Epidemiologic Studies Depression Scale – Revised (CESD-R) (Eaton et al., 2004; Polish validation by Koziara, 2016) was used to assess depressive symptoms. The CESD-R is a self-report measure consisting of 20 items. Participants are asked to mark their answers on a 5-point Likert scale. High scores indicate a higher level of depressive symptoms. The Polish version of the CESD-R demonstrated excellent reliability: $\alpha = 0.95$ (Koziara, 2016).

2.3.3. Intelligence

The standard version of the Raven's Progressive Matrices (RPM) (Raven et al., 2004, updated 2004; Polish validation by Jaworowska and Szustrowa, 2000) was administered to measure fluid intelligence. The RPM consists of 60 items grouped in 5 series with 12 increasingly difficult items in each set. Each of the sets assesses a different component of intelligence and the total score is the sum across all items. Higher total scores represent a higher level of intelligence. The Polish version of the test has satisfactory reliability (Jaworowska and Szustrowa, 2000).

2.3.4. Alexithymia

The Toronto Alexithymia Scale (TAS-20) (Parker et al., 1993) was employed to evaluate alexithymia. The TAS-20 is a 20-item self-report scale consisting of three subscales: Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DDF), and Externally-Oriented Thinking (EOT). Items are rated on a 5-point Likert scale and higher total scores mean higher alexithymia. The cut-off score for alexithymia is 61 and a score between 52 and 60 indicates possible alexithymia, however, the authors suggest that it is best to conceptualize this construct dimensionally. The TAS-20 showed very good internal reliability in the original validation study both for the overall scale ($\alpha = 0.81$) and for its subscales (DIF: $\alpha = 0.78$, DDF: $\alpha = 0.75$, EOT: $\alpha = 0.66$) (Bagby et al., 1994).

2.3.5. Empathy

The Questionnaire of Cognitive and Affective Empathy (QCAE) (Reniers et al., 2011) was used to measure empathy. This instrument enables for the assessment of both cognitive and affective empathy and their subcomponents. The QCAE is based upon 31 items derived from other empathy questionnaires: the Interpersonal Reactivity Index (IRI; items 1–6), Impulsiveness Venturesomeness Empathy Inventory (IVE; items 7–14), Empathy Quotient (EQ; items 15–29), and Hogan Empathy Scale (HES; items 30–31). The authors of the scale classified the items as measuring either cognitive or affective empathy on the basis of their definitions. The Cognitive Empathy (CE) scale comprises two subscales: Perspective Taking (PT) (e.g., 'I am good at predicting how someone will feel') and Online Simulation (OS) (e.g., 'I find it easy to put myself in somebody else's shoes'). As Michaels et al. (2014) underscore, the PT subscale "assesses imagination about future experiences" and the OS subscale "focuses more on others' emotions in the moment they are happening" (p. 808). Hence, despite its name, it is *not* the PT subscale, but the OS subscale from the QCAE that measures a conceptually relatively similar construct as the PT subscale from the IRI. The Affective Empathy (AE) scale consists of three subscales: Emotion Contagion (EC) (e.g., 'It worries me when others are worrying and panicky'), Proximal Responsivity (PrR) (e.g., 'I often get emotionally involved with my friends' problems'), and Peripheral Responsivity (PeR) (e.g., 'I often get deeply involved with the feelings of a character in a film, play, or novel') (see Reniers et al., 2011). Items are rated on a 4-point Likert scale. Higher total scores on a given scale or subscale indicate greater empathy. In the original validation study on a large non-clinical sample, the CE and AE scales moderately correlated with each other ($r = 0.31$). All subscales correlated strongly with the scale to which they belong, yielding the following correlations with the CE scale: PT: $r = 0.85$ and OS: $r = 0.84$ and with the AE scale: EC: $r = 0.73$, PrR: $r = 0.80$, and PeR: $r = 0.73$ (Reniers et al., 2011). The QCAE subscales demonstrated also high reliability (for cognitive empathy subscales: PT: $\alpha = 0.85$ and OS: $\alpha = 0.83$, for affective empathy subscales: EC: $\alpha = 0.72$, PeR: $\alpha = 0.65$, PrR: $\alpha = 0.70$). The instrument demonstrated also strong convergent and divergent validity in the general population (Reniers et al., 2011) and has already been employed to study empathy in another clinical population (i.e., outpatients with schizophrenia; see Horan et al., 2015; Michaels et al., 2014).

2.3.6. Altruism

The Self-Report Altruism Scale (SRA Scale) (Rushton et al., 1981) was employed to investigate altruism. This 1-factor tool consists of 20 items that are rated on a 5-point Likert scale. Exemplary items include: 'I have given money to a charity' or 'I have offered my seat on a bus or train to a stranger who was standing'. Higher scores mean a higher level of altruism. Reliability in the original validation study ranged from $\alpha = 0.78$ to 0.87 in five samples from the general population (Rushton et al., 1981) and this scale has since been widely used in research on altruism, although merely once in another clinical group (i.e., patients with schizophrenia; see Tsang et al., 2013).

2.4. Statistical analyses

Before conducting the main analyses, we assessed normality of distribution of the variables with the Shapiro–Wilk test. Subsequently, we tested the effect of psychiatric medicines on the differences in the results between medicated and unmedicated patients.

T-tests were used to analyze demographic data, depressive symptoms (CESD-R), state and trait anxiety (STAI-State, STAI-Trait), BPD features (BPI), and intelligence level (RPM). The significance threshold was corrected for multiple comparisons with Bonferroni procedure, i.e., 0.05/7 (number of dependent variables, excluding subscales), resulting in a $p \leq 0.007$. To facilitate comparisons of findings across different measures, we have provided an estimate of effect size (Cohen's *d*). We used the metric of small: $d = 0.2$–0.49, medium: $d = 0.50$–0.79, and large: $d \geq 0.8$ effect sizes.

A multivariate analysis of variance (MANOVA) or the Kruskal–Wallis test (if the data were skewed) were performed on the QCAE, TAS-20, and on the SRA Scale to compare the groups. Subsequently, a multivariate analysis of covariance (MANCOVA) was employed with the RPM as a covariate to check whether the differences between the BPD group and HCs persisted after controlling for differences in intelligence level. We employed the metric of small: $\eta^2 = 0.01$–0.05, medium: $\eta^2 = 0.06$–0.13, and large: $\eta^2 \geq 0.14$ effect sizes for the results of the MANOVA. For the results of the Kruskal–Wallis test, the effect sizes were computed according to the following formula for chi-square statistics that have 1 degree of freedom: $r = \frac{\chi^2}{\sqrt{N}}$, where N denotes the whole sample size (based on Field, 2018). We used the metric of small: $r \leq 0.29$, medium: $r = 0.30$–0.49, and large: $r \geq 0.50$ effect sizes.

To investigate the relationships between performance on the SRA Scale, QCAE, STAI-State, STAI-Trait, CESD-R, TAS-20, and RPM, Spearman's rho correlations were computed. We employed the metric of small: $r_s = 0.10$–0.29, medium: $r_s = 0.30$–0.49, and large: $r_s \geq 0.50$ effect sizes. Because we expected to observe different patterns of relationships between variables within groups, correlation analyses were performed separately for each of them.

Table 1
Group differences in sociodemographic and clinical data and intelligence, based on the results of t-tests.

	HCs group (N = 38)		BPD group (N = 30)		test		
	Mean	SD	Mean	SD	t	p-value	Cohen's d
Sociodemographic data							
Age	25.60	5.87	27.30	6.12	−1.16	0.25	0.28
Education (in years)	16.11	2.35	15.96	2.67	−0.25	0.80	0.05
Anxiety							
STAI-State	34.03	9.00	50.30	11.62	−6.50	< 0.001	1.56
STAI-Trait	38.74	9.38	58.97	8.57	−9.16	< 0.001	2.25
Depression							
CESD-R	13.55	11.37	39.43	15.43	−7.68	< 0.001	1.90
BPD features							
BPI	8.61	5.86	28.33	8.18	−11.58	< 0.001	2.77
ID	1.47	1.35	5.60	2.20	−9.00	< 0.001	2.26
PD	1.39	1.55	5.10	1.64	−9.51	< 0.001	2.32
FoC	1.39	1.53	5.37	2.00	−9.24	< 0.001	2.23
IRT	0.03	0.16	1.17	1.74	−3.57	0.001	0.92
Intelligence							
RPM	54.26	3.63	50.04	4.98	4.04	< 0.001	0.96

Note. STAI – State-Trait Anxiety Inventory; CESD-R – Center for Epidemiologic Studies Depression Scale – Revised; BPI – Borderline Personality Inventory; ID – Identity Diffusion; PD – Primitive Defenses; FoC – Fear of Closeness; IRT – Impaired Reality Testing; RPM – Raven Progressive Matrices, standard version.

3. Results

All statistical analyses were run with IBM SPSS Statistics 25 software. Data from Table 1 can also be found in our previous article on a study with the same samples (see Pluta et al., 2018).

No significant differences between medicated (N = 18) and unmedicated (N = 12) patients were found (all $ps > 0.05$), therefore, the results of each dependent variable concern the whole BPD group. However, the comparison subgroups were small, so it is possible that some significant differences could be detected with a larger sample of medicated vs. unmedicated patients with BPD.

3.1. Group differences in cognitive and affective empathy and altruism

The analyses yielded that women with BPD reported significantly lower scores on the Cognitive Empathy scale, $F(1, 66) = 7.67$, $p = 0.007$, $\eta^2 = 0.10$, and its OS subscale, $F(1, 66) = 11.54$, $p = 0.001$, $\eta^2 = 0.15$, but not on any other empathy subscale or on the Affective Empathy scale, $p > 0.05$ (see Table 2). Patients with BPD obtained also lower results on the SRA scale, $F(1, 66) = 2.37$, $p = 0.02$, $\eta^2 = 0.07$. When the RPM was included in the model as a covariate, all the differences listed above remained significant.

3.2. Correlations

Because several variables were not normally distributed, Spearman's rho correlations were performed. Although the clinical measures as well as trait anxiety and alexithymia were correlated relatively similarly in both groups, the overall pattern of relationships between variables across groups was different (see Table 3). In HCs, there was a moderate negative link between alexithymia and altruism ($r_s = -0.41$, $p = 0.01$). Out of alexithymia components, merely the negative link of difficulty identifying feelings with altruism was also moderate and significant ($r_s = -0.38$, $p = 0.02$). This correlation was also stronger than in the BPD group (Fisher's $z = -2.25$, $p = 0.02$). The negative relationship of difficulty describing feelings with altruism was also moderate, but at the verge of significance ($r_s = -0.30$, $p = 0.07$), although stronger than in the BPD group (Fisher's $z = -2.15$, $p = 0.03$). The association between externally oriented thinking with altruism was low and not significant ($r_s = -0.24$, $p = 0.16$). We also found a moderate positive correlation between cognitive empathy and altruism ($r_s = 0.33$, $p = 0.04$), however, the positive link between affective empathy and altruism was low and not significant ($r_s = 0.11$, $p = 0.50$).

Table 2
Group differences in cognitive and affective empathy, altruism, and alexithymia, based on the results of a MANOVA and Kruskal–Wallis test.

	HCs group (N = 38)		BPD group (N = 30)		test		
	Mean	SD	Mean	SD	F or χ²	p-value	η² or r
Empathy							
QCAE_CE	59.39	7.47	53.37	10.47	F = 7.67	0.007	$\eta^2 = 0.10$
PT	31.37	4.04	29.57	5.46	F = 2.45	0.12	$\eta^2 = 0.04$
OS	28.08	4.08	23.80	6.27	F = 11.54	0.001	$\eta^2 = 0.15$
QCAE_AE	35.24	6.09	37.37	4.96	F = 2.41	0.13	$\eta^2 = 0.04$
EC	12.11	3.62	15.90	18.65	χ² = 1.48	0.22	r = 0.18
PrR	12.08	2.01	12.73	2.36	χ² = 2.10	0.15	r = 0.26
PeR	11.39	2.37	12.03	2.28	F = 1.26	0.27	$\eta^2 = 0.02$
Altruism							
SRA Scale	40.34	9.62	34.13	12.61	F = 5.31	0.02	$\eta^2 = 0.07$
Alexithymia							
TAS-20	38.68	12.91	58.60	12.84	χ² = 28.97	< 0.001	r = 3.57
DIF	13.55	5.55	25.17	6.40	χ² = 32.22	< 0.001	r = 3.97
DDF	9.97	3.89	17.30	4.86	χ² = 27.15	< 0.001	r = 3.34
EOT	13.58	3.80	16.07	5.10	χ² = 4.24	0.04	r = 0.52

Note. QCAE – Questionnaire of Cognitive and Affective Empathy; CE – Cognitive Empathy scale; AE – Affective Empathy scale; PT – Perspective Taking; OS – Online Simulation; EC – Emotion Contagion; PrR – Proximal Responsivity; PeR – Peripheral Responsivity; SRA Scale – Self-Report Altruism Scale; TAS-20 – Toronto Alexithymia Scale-20; DIF – Difficulty Identifying Feelings; DDF – Difficulty Describing Feelings; EOT – Externally Oriented Thinking.
In the case of the Cognitive Empathy scale and its Online Simulation subscale, Levene's test was significant, so the results should be interpreted with caution.

There were also moderate positive relationships between state anxiety and alexithymia ($r_s = 0.49$, $p = 0.002$) and between depressive symptoms and alexithymia ($r_s = 0.49$, $p = 0.002$), with the latter being stronger than in the BPD group (Fisher's $z = 2.33$, $p = 0.02$). Trait anxiety positively and moderately correlated with affective empathy in HCs, but was at the verge of significance ($r_s = 0.34$, $p = 0.07$). The negative association of alexithymia with cognitive empathy was almost moderate, but also at the verge of significance ($r_s = -0.29$, $p = 0.08$). However, when it comes to alexithymia components, the negative link of externally oriented thinking with cognitive empathy was moderate and significant in HCs ($r_s = -0.42$, $p = 0.01$). On the other hand, the negative relationships of difficulty identifying feelings and difficulty describing feelings with cognitive empathy were low and not significant ($r_s = -0.24$, $p = 0.15$; $r_s = -0.22$, $p = 0.20$, respectively). Correlational analyses demonstrated also a positive link between trait anxiety

Table 3

Spearman's rho correlations between the main variables: cognitive and affective empathy, altruism, alexithymia, intelligence, and clinical variables in HCs and in the BPD group (in italics).

	QCAE_CE	QCAE_AE	SRA Scale	TAS-20	RPM	STAI-State	STAI-Trait	CESD-R
1. QCAE_CE	–							
2. QCAE_AE	0.14/*0.18*	–						
3. SRA Scale	0.33*/*0.30*	0.11/*0.28*	–					
4. TAS-20	−0.29/*−0.43**	0.01/*−0.04*	−0.41*/*−0.03*	–				
5. RPM	−0.12/*0.13*	−0.25/*−0.19*	−0.22/*−0.34*	0.01/*−0.21*	–			
6. STAI-State	−0.06/*0.05*	0.20/*0.32*	−0.24/*0.27*	0.49*/*0.29*	−0.02/*−0.36**	–		
7. STAI-Trait	−0.26/*−0.03*	0.37*/*0.34*	−0.40*/*0.20*	0.54**/*0.43**	0.18/*−0.22*	0.45*/*0.79***	–	
8. CESD-R	0.004/*0.17*	0.19/*0.23*	−0.21/*0.22*	0.49*/*−0.07*	0.04/*−0.24*	0.64**/*0.44**	0.63**/*0.57**	–

Note. QCAE – Questionnaire of Cognitive and Affective Empathy; CE – Cognitive Empathy scale; AE – Affective Empathy scale; SRA Scale – Self-Report Altruism Scale; TAS-20 – Toronto Alexithymia Scale-20; RPM – Raven's Progressive Matrices, standard version; STAI – State-Trait Anxiety Inventory; CESD-R – Center for Epidemiologic Studies Depression Scale – Revised.

* $p < 0.05$.
** $p < 0.001$.

and affective empathy ($r_s = 0.37$, $p = 0.02$), and a moderate negative correlation between trait anxiety and altruism ($r_s = -0.40$, $p = 0.01$), which was stronger in healthy women than in those with BPD (Fisher's $z = -2.43$, $p = 0.02$).

In the BPD group, the analysis revealed moderate negative links between state anxiety and intelligence ($r_s = -0.36$, $p = 0.05$) as well as between alexithymia and cognitive empathy ($r_s = -0.43$, $p = 0.02$). The negative link of externally oriented thinking with cognitive empathy was strong and significant ($r_s = -0.50$, $p = 0.01$), however, the negative relationships of difficulty identifying and difficulty describing feelings with cognitive empathy were low and not significant ($r_s = -0.20$, $p = 0.29$; $r_s = -0.25$, $p = 0.19$, respectively). The moderate positive association of cognitive empathy with altruism was not significant ($r_s = 0.30$, $p = 0.11$) and the positive link between affective empathy and altruism was almost moderate, but not significant either ($r_s = 0.28$, $p = 0.13$). The correlation between alexithymia and altruism was low and insignificant ($r_s = -0.03$, $p = 0.89$). Out of alexithymia components, merely the negative association of externally oriented thinking with altruism was moderate and significant ($r_s = -0.46$, $p = 0.01$). However, the links of difficulty identifying feelings and difficulty describing feelings with altruism were positive, low, and not significant ($r_s = 0.18$, $p = 0.35$; $r_s = 0.24$, $p = 0.21$, respectively). In addition, the positive relationship between cognitive and affective empathy was low and not significant both in HCs ($r_s = 0.14$, $p = 0.41$) and in the BPD group ($r_s = 0.18$, $p = 0.34$).

Subsequently, partial correlations were calculated. After controlling for depressive symptoms, state anxiety, and trait anxiety as possible confounders, the relationships between cognitive empathy and altruism as well as between alexithymia and altruism changed from moderate and significant to low and insignificant ($r_s = 0.24$, $p = 0.16$; $r_s = -0.25$, $p = 0.16$, respectively) in the HCs group (see Table 4). When it comes to alexithymia components, the relationship of difficulty identifying feelings with altruism changed from moderate and significant to low and insignificant ($r_s = -0.25$, $p = 0.15$) and the link of

difficulty describing feelings with altruism changed from moderate but at the verge of significance to low and insignificant ($r_s = -0.18$, $p = 0.31$). On the contrary, the association of externally oriented thinking with affective empathy changed from low and insignificant to moderate and significant ($r_s = -0.39$, $p = 0.02$). Additionally, the link between intelligence and affective empathy changed from low and insignificant to moderate and significant ($r_s = -0.34$, $p = 0.04$) and the correlation between affective empathy and altruism changed from low and insignificant to moderate and at the verge of significance ($r_s = 0.33$, $p = 0.06$). Finally, the relationship between alexithymia and cognitive empathy remained low but changed from at the verge of significance to insignificant ($r_s = -0.24$, $p = 0.17$). In the BPD group, the relationship between alexithymia and cognitive empathy remained moderate and significant ($r_s = -0.40$, $p = 0.04$). The link between intelligence and altruism changed from moderate but at the verge of significance to low and insignificant ($r_s = -0.25$). However, out of alexithymia components, the relationships of externally oriented thinking with altruism and cognitive empathy changed from moderate to strong ($r_s = -0.51$, $p = 0.01$) and from strong to moderate ($r_s = -0.48$, $p = 0.01$), respectively. Additionally, the association of difficulty describing feelings with affective empathy changed from low to moderate, although remained insignificant ($r_s = -0.31$, $p = 0.11$).

4. Discussion

The current study aimed at examining cognitive vs. affective empathy and altruism in BPD as well as the relationships between them and with clinically relevant constructs (i.e., alexithymia, state and trait anxiety, and depressive symptoms). As far as the first hypothesis is concerned, statistical analyses revealed lower levels of cognitive empathy and its online simulation subcomponent in the BPD group, which is in line with the assumptions of the mentalization theory of BPD (see Fonagy and Luyten, 2016) and with most previous results on perspective taking from the IRI (see, e.g., Flasbeck et al., 2017; New et al.,

Table 4

Partial Spearman's rho correlations for the main variables: cognitive and affective empathy, altruism, alexithymia, and intelligence in HCs and in the BPD group (in italics), after controlling for depressive symptoms, state anxiety, and trait anxiety.

	QCAE_CE	QCAE_AE	SRA Scale	TAS-20	RPM
1. QCAE_CE	–				
2. QCAE_AE	0.29/*0.19*	–			
3. SRA Scale	0.24/*0.27*	0.33/*0.22*	–		
4. TAS-20	−0.24/*−0.40**	−0.27/*−0.21*	−0.25/*−0.06*	–	
5. RPM	−0.06/*0.21*	−0.34*/*−0.10*	−0.17/*−0.25*	−0.06/*−0.25*	–

Note. QCAE – Questionnaire of Cognitive and Affective Empathy; CE – Cognitive Empathy scale; AE – Affective Empathy scale; SRA Scale – Self-Report Altruism Scale; TAS-20 – Toronto Alexithymia Scale-20; RPM – Raven's Progressive Matrices, standard version.

* $p < 0.05$.

2012), because these constructs – as mentioned before – are conceptually similar. However, no between-group differences in affective empathy or in any of its dimensions were identified, which comports with most earlier findings on the IRI's empathic concern (see, e.g., Matzke et al., 2014; New et al., 2012), a construct conceptually similar to emotion contagion from the QCAE. Taken together, these results suggest therefore that individuals with BPD have difficulties with imagining what emotions others are feeling, but not with experiencing their emotions. Although almost all previous studies based on the Personal Distress subscale from the IRI suggest higher distress experienced in interpersonal situations by individuals with BPD, this subscale seems not to measure affective empathy, but rather personal reactions to emergency situations (Jolliffe and Farrington, 2004). The Fantasy subscale from the IRI seems, however, not to measure cognitive empathy, but rather emotional empathy, because it is conceptually similar to the Peripheral Reactivity subscale from the QCAE. Therefore, the comparison of our findings on overall cognitive and affective empathy with those from studies involving the IRI (see Harari et al., 2010; Martin et al., 2017) would not be justified.

Interestingly, we identified low and insignificant links between cognitive and affective empathy in both groups. This is in contrary to previous findings (cf. Kalpakci et al., 2016; Michaels et al., 2014; Reniers et al., 2011), although after controlling for possible clinical confounders, the positive relationship between empathy types became almost medium in HCs. The correlation coefficient in that group reached an almost identical value to that in the original validation study of the QCAE (cf. Reniers et al., 2011), but was lower than in another study employing that scale (cf. Michaels et al., 2014) and still not significant. In the BPD group, the link between empathy types remained low and insignificant even after controlling for potential confounders. Taking into consideration the findings indicating individual differences in the relationship of cognitive versus affective empathy with altruism in the general population (see Tusche et al., 2016), our results may likewise testify to individual differences in the link between empathy types within both groups in our study. Namely, it may be possible that cognitive empathy is not significantly related to affective empathy in certain healthy individuals due to even low levels of depression and anxiety and such subjects might have prevailed in our study in that sample. In the BPD group, however, individual differences in the relationship between cognitive and affective empathy seem not to depend on the level of these potential confounders. On the other hand, the still low correlations between cognitive and affective empathy in both groups are not surprising in the light of neuropsychological and neuroimaging findings, which show that those two systems of empathy rely predominantly on distinct neural substrates. Emotional empathy seems to be associated primarily with inferior frontal gyrus and cognitive empathy depends to a great extent on ventromedial prefrontal cortex (Dvash and Shamay-Tsoory, 2014; Shamay-Tsoory et al., 2009). The dissociation of cerebral underpinnings of emotional and cognitive empathy is also consistent with lesion data showing that patients with brain lesion of ventromedial prefrontal cortex (VMPFC) or inferior frontal gyrus (IFG) manifest different patterns of empathy deficits (Shamay-Tsoory et al., 2009). Hence, future research should look for potential differences in neural connectivity of these brain structures between individuals with BPD and HCs.

When it comes to the interdependencies between the other examined constructs, overall alexithymia significantly and moderately negatively correlated with cognitive empathy in the BPD group. However, a closer inspection of the data separately for each alexithymia component revealed a similar (and even strong) relationship only in the case of externally oriented thinking, which merely partially corroborates the findings by Flasbeck et al. (2017), because they reported such a pattern of correlations with the IRI's perspective taking also for difficulty identifying and describing feelings. Future studies should therefore determine whether such discrepancies result from differences in empathy questionnaires. In addition, although Flasbeck et al. (2017)

found a similar pattern of relationships between the above-mentioned constructs in HCs, the link of overall alexithymia with cognitive empathy was almost medium and at the verge of significance in that group in our study. However, the negative link between externally oriented thinking and cognitive empathy was significant and moderate also in HCs. Possibly confounding clinical factors did not have an influence on the relationship of overall alexithymia or any of its components with cognitive empathy in either of the groups. Therefore, our findings add support for consideration of alexithymia (and especially of its component of externally oriented thinking) as a factor contributing to cognitive empathy impairment in BPD.

We also demonstrated that female patients suffering from BPD reported significantly lower altruism compared to HCs, which accords with the results of one experimental study (see Saunders et al., 2015), but not with those of two others (see Thielmann et al., 2014; Wischniewski and Brüne, 2013). However, findings from these two studies pointed to situational context of intact altruism in BPD, therefore, it may still be assumed that individuals with this disorder generally do demonstrate decreased altruism.

The positive relationship between cognitive empathy and altruism was moderate and insignificant in BPD, but moderate and significant in HCs, although became low in both cases after controlling for potentially confounding factors. However, it is probable that those interdependencies would have been significant with a larger sample. This suggests the necessity of conducting further studies on the interrelations between these constructs, especially taking into account the results reported by FeldmanHall et al. (2013) based on an fMRI experiment with HCs. Specifically, the authors found a relationship between higher alexithymia and decreased altruism in HCs via reduced distress experience (which can be considered a part of emotion contagion, a subcomponent of affective empathy) and perspective taking (a subcomponent of cognitive empathy). In line with these findings, we also found a significant and moderately negative link of overall alexithymia and altruism in HCs, yet it became low after controlling for clinical variables. However, again, the strength of the association indicated that it could have become significant with a larger sample. In the BPD group, the relationship between overall alexithymia and altruism was not significant and remained so after controlling for potential clinical confounders. Nonetheless, based upon the interpretation provided by FeldmanHall et al. (2013) with reference to HCs, our results concerning BPD may suggest that the self-focus featuring high alexithymia may limit patients' capability to comprehend mental states of others (as demonstrated by a negative relationship of alexithymia with cognitive empathy), which may subsequently lead to impaired altruism – as suggested by a negative correlation between cognitive empathy and altruism. However, because the latter correlation in the BPD group – although almost moderate – was not significant and because we did not employ an experimental or longitudinal design, the above-described potential mechanism should be regarded cautiously and needs confirmation in future research. Interestingly, in this group, the negative association of externally oriented thinking with altruism was moderate and significant and even increased to a strong one after controlling for clinical variables, thus suggesting that this specific alexithymia component may contribute to altruism deficits in BPD. This means that the lack of interest in one's own emotional life in individuals with BPD may translate into the lack of interest in others' needs and thus into failure in appropriate responding to them.

In addition, in HCs, considering the clinical confounders made the relationships between intelligence and affective empathy as well as between affective empathy and altruism moderate. Both links might have turned out significant, again, with a larger sample, which, in the case of the second association, would have yielded support for the empathy-altruism hypothesis (see Batson et al., 2015). The previously moderate but finally low link of difficulty identifying feelings with altruism might have become significant in like manner. However, a substantial contribution of externally oriented thinking to affective

empathy was identified, thus suggesting that this alexithymia component contributes to deficits in both empathy types in HCs. In the BPD group, controlling for possibly confounding clinical factors made the moderate negative link between intelligence and altruism low, but made the low negative relationship of difficulty describing feelings with affective empathy moderate, although that association remained insignificant. However, if it turns out significant in a future study with a larger sample, this will point to a differential influence of alexithymia components on empathy types in BPD.

Based on the results of a questionnaire study conducted with a general sample, Lockwood et al. (2014) reported a positive correlation between affective empathy and prosocial behavior in individuals characterized by a low or average propensity to use cognitive reappraisal but not in those with a high tendency to do it. The authors explain these findings in such a way that a greater ability to alter one's appraisal of the situation at hand may be conducive to easier recognition of the need for altruistic behavior even without experiencing affective empathy (Lockwood et al., 2014). On the other hand, the relationship between cognitive empathy and altruism was not moderated by cognitive reappraisal, which may testify to an overlap in processes involved in this emotion regulation (ER) strategy and in those that play a part in cognitive empathy (Lockwood et al., 2014). Of note, the results of self-report studies suggest a less frequent use of reappraisal by individuals with BPD (e.g., Sauer et al., 2016). However, the findings of a recent daily diary study indicate a higher frequency of employing both maladaptive and adaptive ER strategies and point to difficulties merely with effective implementation of the latter (including cognitive reappraisal) in individuals high in BPD features (see Fitzpatrick et al., 2018). Therefore, future research should investigate the relationship between both empathy types and altruism in BPD as moderated by the frequency and effectiveness of reappraisal in a daily diary or experience sampling study or in experiments allowing for free use of various ER strategies across tasks.

The relatively sparse literature in the area under investigation suggests taking a cautious approach to the impact of our findings when considering implications for therapeutic management. However, there is a potential overlap with several components of dialectical behavior therapy (DBT; Linehan, 1993), recognized as having efficacy for the treatment of BPD (National Collaborating Centre for Mental Health, 2009). Alexithymia appears to be negatively related to the demonstration of cognitive empathy in BPD and depression and anxiety seem to be positively linked to affective empathy in this disorder. These interdependencies seem to have important implications for treatment, because such pathological emotionality is a central tenet within DBT practice, specifically within skill-based behavioral training components of *emotion regulation* and *distress tolerance*; two of three fundamentals of this intervention. Similarly, DBT techniques of *mindfulness* and awareness of emotional reactivity through *behavior chain analysis* aim to reduce the impact of depression and anxiety on daily functioning. This, in turn, may have implications also for emotional empathy, considering that we found a moderate (although insignificant) positive correlation of anxiety with this empathy type and that a slight decrease in its level might be even beneficial for BPD patients, given recent reports of detrimental consequences of high emotional empathy (see Bloom, 2016). Our findings on the deficits in cognitive empathy buttress also the mentalization-based therapy (MBT) approach (Bateman and Fonagy, 2016), which lays emphasis on developing understanding of others' emotions and cognitive mental states. Additionally, the need for clarification of the precise role of anxiety, depression, and alexithymia may be facilitated through study of how they may be affected within BPD cohorts successfully completing a DBT or MBT program. If we acclaim that relatively separate neural mechanisms underpin the two types of empathy, therapeutic interventions should be adjusted in a type-specific way to remediate empathy deficits.

Given the current and previous findings, future research is needed to identify factors that may underlie the discrepancies across results, such

as the severity of BPD symptoms and comorbid psychopathology, especially other personality disorders. Taking into consideration the heterogenous nature of BPD and cross-sectional self-report character of our study, future research should likewise involve larger samples and experimental or experience sampling methodology (ESM). It is also important to measure gender differences in empathy and altruism with regard to BPD with the use of various methodologies, given that findings on empathy in the general population slightly differ for men and women (see, e.g., Reniers et al., 2011) and may depend on the method used to assess this construct (Eisenberg and Lennon, 1983). Further exploration of psychometric properties of the QCAE is likewise needed, because findings from studies based on several other language versions of this scale suggest better fit indices for a five- than two-factor solution (see Di Girolamo et al., in press; Myszkowski et al., 2017; Quéiros et al., 2018). Future research with larger samples should also test the effect of medicines on potential differences in the results between medicated and unmedicated patients with BPD.

To sum up, impairments in cognitive empathy and altruism testify to worse psychosocial functioning of patients with BPD and may play a significant role in the prognosis and clinical outcome throughout the recovery process from this disorder. Our findings from this study and from the previous one based on the same sample (see Pluta et al., 2018) confirm deficits both in cognitive empathy and ToM abilities in BPD despite a partially different conceptualization of the first construct than in the studies by Harari et al. (2010) and Martin et al. (2017). However, cognitive empathy impairment, as opposed to deficits in ToM abilities, seems to be substantially positively related to the overall level of alexithymia, which, in turn, is positively linked to state and trait anxiety. Future research should further explore these issues in order to better adjust psychotherapy to the needs of individuals with BPD.

Competing interests

The authors declare that they have no competing interests.

Authors' contribution

PG was involved in the recruitment process and data acquisition, conducted the statistical analyses, and drafted the manuscript. MK contributed to the study design, was involved in the recruitment process and data acquisition, and conducted the statistical analyses. AP contributed to the study design, supervised the project, conducted the statistical analyses, and was involved in manuscript preparation. ZI was involved in manuscript preparation. KK contributed to the study design, supervised the project, and was involved in manuscript preparation. All authors have read and approved the final version of the paper.

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