

RESEARCH ARTICLE

Self- but not other-mentalizing moderates the association between BPD symptoms and somatic complaints in community-dwelling adolescents

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Abstract

Objectives: The aim of this study was to evaluate the potential moderator role of poor mentalization in the association between borderline personality disorder (BPD) traits and somatization, specifically focusing on the polarities of self- and other-mentalizing.

Design: This is a cross-sectional, general population study evaluating adolescents ($n = 162$, 61.3% female; ages 12–18, $M = 14.63$, $SD = 1.02$). The relationship between BPD traits and somatization was evaluated with self-mentalization (attention to emotions and clarity of emotions) and other-mentalizing as moderator variables.

Methods: One hundred sixty-two adolescents without serious mental health disorders were evaluated using self-report measures for borderline personality disorder traits (screening questionnaire for the Structured Clinical Interview for DSM-IV Personality Disorders (SCID-II)), somatic symptoms using the Somatic Symptoms Questionnaire (SSQ), self-mentalizing using the Trait Meta-Mood Scale-24 (TMMS) and other-mentalizing using the Adolescent Mentalizing Interview (AMI). Linear regressions were conducted to test the moderation effects of self- and other-mentalizing in the relationship between BPD symptoms and

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somatic complaints, controlling for age and sex. Moderation analysis was conducted using PROCESS version 3.5.

Results: The association between BPD symptoms and somatic complaints was moderated by a self-mentalizing dimension (emotional clarity) ($b = -0.019$, 95% CI = -0.0379 to -0.0002 , $p = .0476$), but not other-mentalizing ($b = 0.027$, 95% CI = 0.000 to 0.053 , $p = .051$). The effect of BPD symptoms on somatization disappears when emotional clarity is high, regardless the level of attention to emotions.

Conclusions: Self-mentalizing appears to be an adaptive skill as it attenuates the relationship between BPD traits and somatization. Specifically, emotional clarity rather than simple attention to emotions is the aspect of self-mentalizing attenuating this association. These results support that self-mentalization is an important function in the management of body-associated emotions even in non-clinical levels of BPD traits. Findings suggest that strengthening self-mentalizing skills across development might contribute to resilience and salutogenesis.

KEYWORDS

BPD traits, emotional clarity, mentalization, resilience, self-other polarities, somatization

INTRODUCTION

Borderline personality disorder (BPD) is a prevalent disorder characterized by omnipresent difficulties in interpersonal relationships, emotional dysregulation, mood instability, self-harm and impulsivity (American Psychiatric Association, 2013a). In the general population, rates of BPD range from 0.5% to 5.9% (Grant et al., 2008; Lenzenweger et al., 2007; Quirk, Berk, et al., 2016a), though these rates are higher in primary care (6.4%) (Gross et al., 2002), and even more so in psychiatric inpatient samples (15%) (Widiger & Trull, 1993).

BPD is complex and affects individuals not only emotionally (with high rates of psychological comorbidities) but also physically (Gunderson et al., 2018). For example, individuals with BPD report higher rates of poor physical health and having multiple illnesses compared with controls (41.3% vs. 15% and 19.95% vs. 9%, respectively) (Fok et al., 2014; Quirk, Stuart, et al., 2016b). Higher rates of physical problems could be explained by the difficulty to psychologically cope or *mentalize* intense emotions (Busch & Sandberg, 2014; Mitrani, 1993; Waller & Scheidt, 2006), as though the body is utilized as a so-called 'dumping ground' to discard difficult emotions (see Mitrani, 1993). Accordingly, two common components of all BPD models are emotional dysregulation, or heightened emotional sensitivity, and problems with mentalization (D'Agostino et al., 2018), which is defined as the capacity to be aware of the internal world or, in other words, to notice and clarify the mental states (emotions, feelings, desires and thoughts) that underpin behaviour (Fonagy & Luyten, 2009). The mentalization-based approach to BPD, in fact, suggests that problems with this capacity are the base of BPD symptoms both in the

disorder and its preclinical forms (Bateman & Fonagy, 2008; Bateman & Fonagy, 2009; Bateman & Fonagy, 2010; Fonagy & Luyten, 2009; Raffagnato et al., 2020). In this context, self-harm, drugs, promiscuous sexual activity, or even physical aggression towards others could serve as body-based coping mechanisms for painful feelings when mentalization fails (Busch & Sandberg, 2014; Mitrani, 1993; Waller & Scheidt, 2006).

Similar to the maladaptive coping mechanisms mentioned above, somatization could also be an expression of emotional 'dumping' into the body rather than facing emotional distress directly, which could feel unpleasant, unsafe or even impossible. Problems with mentalizing emotions have been found to be associated with somatization in its different forms (Andrei & Petrides, 2013; Ballespí et al., 2019; De Gucht & Heiser, 2003; Karvonen et al., 2005; Mattila et al., 2008; Raffagnato et al., 2020). In the light of this, higher proneness to somatization could be expected in BPD. Accordingly, BPD has strong associations with frequent somatic complaints lacking a medical explanation (Chen et al., 2009) and somatic disorders (Schmaling & Fales, 2018). Individuals with BPD experience higher comorbidity with somatic disorders compared with other personality disorders (20% vs. 6%) and higher rates than the general population (20–30% vs. 1–19%, respectively) (American Psychiatric Association, 2013b; Chen et al., 2009; Schmaling & Fales, 2018; Zimmerman & Mattia, 1999). Additionally, increased somatic symptoms have been shown to be associated with BPD symptoms even in non-clinical samples (Schmaling et al., 2020).

While several studies have explored the mediational role of emotional dysregulation in the association between BPD symptoms and somatization (Ballespí et al., 2019; Bateman & Fonagy, 2008; Bateman & Fonagy, 2010; Mattila et al., 2008), the role of mentalization in this relationship is relatively under-studied. There is no evidence that allows researchers to conclude that mentalization problems are a consequence of BPD symptoms. Cross-sectional research supports a non-causal association (the two features co-exist) (McWilliams & Higgins, 2013), and another research body suggests that mentalization issues predate BPD (e.g. Fonagy & Luyten, 2009). Because it cannot be assumed that BPD symptoms lead to mentalization difficulties, and in turn, beget somatic complaints (i.e. directionality), we cannot conclude that mentalization mediates the role between BPD and somatization, and instead, must evaluate mentalization as a moderator of the relationship. Thus, this study investigates the moderator role of mentalization in the relationship between BPD symptoms and somatic complaints, assuming that mentalization could attenuate this association.

Mentalization is an umbrella paradigm used to refer the multidimensional capacity to notice one's own and other's mental states (Luyten & Fonagy, 2019). Based on advances in neuroscience, mentalizing is structured in four polarities or dimensions: cognitive- vs. affective-, automatic- vs. controlled-, based on internal- vs. external- cues, and referred to one's own (self-) or to others' mental states (Luyten et al., 2020). Self-other polarities of mentalizing are recently gathering attention because of their possibly distinct contributions to mental health. While other-mentalizing seems to be especially important for navigating the social world, self-mentalizing can play a special role in coping with suffering and emotional regulation (Ballespí et al., 2021). Considering that we hypothesized that mentalization of the self would play a stronger role as moderator of the association between BPD symptoms and somatic complaints than the ability to mentalize about others.

Furthermore, self-mentalizing or the capacity to be aware of one's own mental states can be subdivided into two dimensions: attention to one's own emotions and emotional clarity regarding them (Mayer & Salovey, 1995; Salovey et al., 1995). While attention to emotions refers to the degree to which one is prone to pay attention to their feelings, emotional clarity refers to a more nuanced approach to emotionality, whereby emotions are further elucidated or understood (Mayer & Salovey, 1995; Salovey et al., 1995).

Previous research suggests that attention to emotions does not necessarily contribute to salutogenesis and can even be painful. For instance, attention to emotions can aggravate anxious reactions (Gross, 2002; Gross & John, 2003; Mansell et al., 1999) or somatization (Schmaling & Fales, 2018). In contrast, emotional clarity is the dimension more consistently associated with resilience (Boden & Thompson, 2017). Emotional clarity involves a reflective ability to prolong positive emotional states

and reduce negative ones (Gorostiaga et al., 2011), suggesting that clear awareness or understanding of one's own feelings may assist in deeper emotional regulation (Díaz & García, 2018; Guerra-Bustamante et al., 2019). Accordingly, we further hypothesize that emotional clarity will yield a stronger moderation of the association between BPD symptoms and somatization than simple attention to emotions, which is sometimes associated with aggravated symptoms.

Furthermore, most studies have explored the different contribution of attention to emotions and emotional clarity regarding psychopathology, but very few studies have explored their combined effect, especially in the context of moderation of another association. Consequently, we thirdly aim to explore how the association between BPD traits and somatic complaints changes at different levels of low, moderate or high attention to emotions combined with different levels of low, moderate or high emotional clarity. The lack of literature regarding this topic prevents formulation of a solid hypothesis, but based on the evidence supporting a stronger role of emotional clarity than of attention to emotions, we expect that combinations of these two dimensions including high levels of emotional clarity will more readily attenuate the association between BPD traits and somatic complaints than other combinations.

BPD is associated with very high treatment-seeking and service utilization (Quirk, Stuart, et al., 2016b) and, despite high treatment-seeking, full symptom remission is difficult to achieve (Ng et al., 2019; Zanarini et al., 2010) and the degree of recovery is widely heterogeneous. Consequently, BPD is often regarded as difficult-to-treat, perhaps also due to its far-reaching nature, which has led to increased interest in subclinical manifestations of BPD (e.g. D'Agostino et al., 2018; Luyten & Fonagy, 2019), and in looking towards addressing BPD earlier and in potentially less pervasive forms. In this context, although BPD can be identified in adolescence (Bo et al., 2017; Bondurant et al., 2004; Kongerslev et al., 2015; Sharp et al., 2012), premorbid forms are more relevant than clinical manifestations from perspectives of development and prevention (Bo et al., 2017; Bondurant et al., 2004; Winograd et al., 2008).

Given that premorbid traits of BPD are already present in adolescence, along with high rates of somatic complaints (Bor et al., 2014) and a relatively well-developed mentalizing capacity, we focused the study on a non-clinical adolescent sample to ascertain differences early in the developmental course of symptomatology. Very few studies have analysed physical health issues in adolescents with personality disorders (e.g. 12), and no study, to date, has analysed the association between BPD and somatization in adolescence, nor the potential moderation role of mentalization. In fact, to our knowledge, no study has analysed whether self-mentalizing moderates this association in any stage of life.

METHODS

Participants

This sample consists of 162 adolescents (61.3% female), aged 12 to 18 years old ($M = 14.64$, $SD = 1.83$) in the general population, who were recruited for a wider project about psychopathology, personality and coping strategies in adolescents. To be included in this research, participants were required to be between the age of 12 and 18, and to speak Spanish or Catalan (the languages of the questionnaires involved). Individuals were excluded from participation if they had a diagnosis of psychosis, autism spectrum disorder or intellectual disability, or if they did not complete one or more scales. Participants were invited from five out of ten originally contacted schools with similar characteristics such as socioeconomic status, size and degree of urbanicity. From the 1735 eligible families, 177 (10%) agreed to participate and 162 provided full data for this study. Refusal for participation was primarily for reasons such as low interest, being too busy and not wanting to provide data about family mental health.

Measures

Borderline personality traits

To measure borderline personality traits using a questionnaire, we utilized the screening questionnaire for the Structured Clinical Interview for DSM-IV Personality Disorders (SCID-II) (First et al., 1997). This is a self-administered questionnaire utilized as a preliminary screen for personality disorders, which is typically expanded upon in the more thorough SCID interview (Gómez-Beneyto et al., 1994). In a non-clinical sample, internal consistency of the borderline subscale was adequate (Kuder–Richardson coefficient = 0.55) (Ouimette & Klein, 1995). Subscales for traits of several personality disorders are included in the full version of the questionnaire, though this research only utilized the borderline personality subscale. The fifteen items of the subscale are reported in various manners depending on the population—the traditional version used as a preamble to the SCID interview uses yes/no questions, while the English version operates on a 3-point Likert scale rating the degree of trueness of each item. Items include questions such as, ‘Have you all of a sudden changed your sense of who you are and where you are headed?’ and ‘Do you often have temper outbursts or get so angry that you lose control?’. There is moderate agreement between categorical and dimensional evaluation using the SCID-II questionnaire versus interview, and kappa for agreement between the two tools ranges from 0.69 to 0.78 (Ekselius et al., 1994; Gómez-Beneyto et al., 1994). As such, the questionnaire is a relatively good measure for screening personality disorder traits. The original version shows adequate psychometric properties both in adult (van Alebeek et al., 2015) and adolescent samples (Eppright et al., 1993) and the internal consistency of the Spanish version was adequate (kappa value of 0.64) for BPD screening in the general population (Gómez-Beneyto et al., 1994). The internal consistency in the current sample was good (Cronbach's $\alpha = 0.83$).

Somatic symptoms

The Somatic Symptoms Questionnaire (SSQ) measures the frequency of somatic complaints common to childhood and adolescence, including headache, dizziness, stomach pain, fatigue and muscle pain. It is a retrospective survey and calls for participants to recall the frequency of somatic complaints in the three months leading up to questionnaire administration. It can be answered by caregivers (e.g. parents and teachers) (Domènech-Llaberia et al., 2004) or self-reported by children and adolescents (Potrebny et al., 2017). The Spanish version of the questionnaire has good psychometric properties in both child and adolescent samples (Domènech-Llaberia et al., 2004; Serra et al., 2011). Internal consistency in the present study was sufficient (Cronbach's $\alpha = 0.71$).

Self-mentalizing

The Trait Meta-Mood Scale (TMMS)-24 (Fernández-Berrocal et al., 2004; Salovey et al., 1995) was utilized to measure self-mentalization. This questionnaire measures attention to emotions, emotional clarity and repair, that is attitude towards emotional regulation. The first two dimensions (attention and clarity) were used as an operationalization of self-mentalizing. The TMMS-24 is a shorter version of the original 48-item questionnaire developed for Americans. The 24-item version is widely used within Spanish-speaking populations (Valdivia Vazquez et al., 2015), and items are measured on a 5-point Likert scale, evaluating the level of agreement with each statement. It yields a total score along with three dimensions: *Attention* to one's own emotions and feelings, which indicates the simple tendency to notice that there is an emotion or feeling present; *Clarity* about what exactly is happening, which measures further comprehension of what an individual is feeling; and

Repair, which evaluates the attitudes to regulation of those emotions. Given that the first two scales refer to a different aspect of an individual's self-mentalizing (simple awareness about one's own reactions and further understanding), they were utilized for the purposes of this research. The Spanish language version of the questionnaire has good internal consistency (Cronbach's alpha range 0.86 to 0.90) and adequate test–retest reliability (ICC range 0.60 to 0.83). The current sample demonstrates excellent internal consistency both for the total score (Cronbach's $\alpha = 0.92$), and the two subscales used ($\alpha = 0.90$ for attention and $\alpha = 0.93$ for clarity).

Other-mentalizing

The Adolescent Mentalization Interview (AMI) (Ballespí & Pérez-Domingo, 2015) is a semi-structured interview designed to measure mentalization abilities during adolescence. This interview consists of seven questions, which are scored from 0 (no mentalizing) to 4 (sophisticated mentalizing) according to the level of mentalizing expressed in each answer. This provides a total score ranging from 0 to 28. The AMI is structured in two parts: the first evaluates mentalization by asking about mental states beyond social behaviour of 3 characters in a picture story. This is a short story based on a typical interaction in adolescence. The second part evaluates the ability to mentalize using 'demand' questions (Fonagy et al., 1998), which are designed to elicit mentalization, and refer to two very close others or attachment figures (Bartholomew & Horowitz, 1991) selected by the participant (e.g. parents, boyfriend/girlfriend and siblings). The scale boasts excellent internal consistency (Cronbach's $\alpha = 0.90$) and good inter-rater reliability (ICC between 0.79 and 0.88). Evidence for concurrent validity is provided by positive correlations with other measures of the same construct (r ranged between .21 and .47 with the Mentalization Questionnaire (Hausberg et al., 2012) and the Brief Reflective Function Questionnaire (Ballespí & Pérez-Domingo, 2015). Internal consistency in the current sample is excellent ($\alpha = 0.90$).

Procedure and statistical analysis

After obtaining ethical approval to conduct this research according to the Declaration of Helsinki and the Ethics Committee of a European university, potential participants were informed about aims, relevance and implications of a broad research project entitled 'Personality, psychopathology, and coping strategies in adolescence' through a letter distributed by schools. Eligible families were further invited to attend a meeting to resolve any concerns regarding their participation and were provided with an email to address any doubts. After obtaining informed consent from families and adolescents who agreed to participate, data were recruited in the school setting to simplify logistics. Participants received all materials in closed envelopes with their identities encrypted using alphanumeric codes and were contacted later only to resolve missing or out-of-range values. Data collection took place within a 5-week span for data collection in each school between January and June of 2014 and 2015.

Sample size was calculated using G*Power 3.1.9 (Faul et al., 2007). For a small-to-medium size effect ($f^2 = 0.08$, $\alpha = 0.05$, power $(1-\beta) = 0.8$, four explanatory variables and two control variables (age and sex), the sample needed was 155. Linear regressions were conducted using IBM SPSS Statistics v25.0 to test the moderation effects of self- and other-mentalizing on the relationship between BPD symptoms and somatic complaints. Four explanatory variables were included in the model: BPD symptoms, attention and clarity—that is self-mentalizing dimensions—and other-mentalizing. Age and sex were controlled for in light of their possible influence on the relationships intended to be studied (Frith & Frith, 2003; Karvonen et al., 2007; Klindt et al., 2017; Van Wijk & Kolk, 1997). Variables involved in moderation were mean centred. Moderation analyses were probed using PROCESS version 3.5 (Hayes, 2017). All models tested met the assumptions of normality, independent errors, homoscedasticity and absence of

TABLE 1 Descriptive statistics, correlations and sex effects^a

	1-BPD symptoms	2-Somatic complaints	3-Self-mentalizing (Attention)	4-Self-mentalizing (Clarity)	5-Other-mentalizing	6-Age
Descriptives						
M (SD)	9.09 (5.25)	7.04 (5.23)	23.48 (6.97)	24.16 (7.62)	14.61 (4.80)	14.64 (1.83)
Correlations						
1	1					
2	.360**	1				
3	.252**	.099	1			
4	-.283**	-.265**	.320**	1		
5	.048	.212**	.115	-.036	1	
6	.174*	.213*	.221**	-.199*	.267**	1
Sex						
Males—M (SD)	8.32 (5.52)	5.63 (4.68)	22.76 (6.54)	27.71 (7.34)	13.63 (4.75)	14.28 (1.77)
Females—M (SD)	9.57 (5.04)	7.91 (5.39)	23.93 (7.21)	21.96 (6.96)	15.20 (4.75)	14.86 (1.84)
T (p)	1.48 (.140)	2.75 (.007)	1.04 (.299)	5.01 (<.000)	2.03 (.044)	1.99 (.048)

^aN = 162 (100 females, 62 males). Mean (M) and Standard Deviation (SD). Pearson's linear correlations: *p < .05, **p < .005. Student Fisher's T-test.

multicollinearity. Results are presented as linear regression coefficients (b), reporting 95% confidence intervals (95% CI), and P-values (p).

RESULTS

Descriptive statistics

Table 1 presents correlations and descriptive statistics of the variables involved. BPD symptoms positively correlate with somatization ($r = .360$) and attention to emotions ($r = .252$), while they correlate negatively with emotional clarity ($r = -.283$). Somatic complaints are negatively correlated with emotional clarity ($r = -.265$) and positively with other-mentalizing ($r = .212$), though this last association disappears in the regression analysis once all mentalizing variables are included in the model and after controlling for age and sex. There are significant mean-differences between males and females in somatization, emotional clarity, other-mentalizing and age.

Moderation analysis

The model including all moderators showed a non-significant moderator effect of mentalizing regarding others ($b = 0.027$, 95% CI = 0.000 to 0.053, $p = .051$), so mentalizing regarding others was excluded from the model. The final model, which includes both self-mentalizing predictors (i.e. attention and clarity), shows that the effect of BPD on somatic complaints is statistically significant ($b = 0.291$, 95% CI = 0.1273 to 0.4543, $p = .0006$). This $b = 0.291$ is the expected effect per one unit increase in BPD when attention to emotions and emotional clarity are held at their respective mean values (Attention $M = 23.48$, $SD = 6.97$; Clarity $M = 24.16$, $SD = 7.62$), since moderators were mean centred.

The model also shows that the association between BPD symptoms and somatic complaints is significantly moderated by clarity ($b = -0.019$, 95% CI = -0.0379 to -0.0002 , $p = .0476$), but not by attention ($b = -0.007$, 95% CI = -0.0131 to 0.028 , $p = .476$). The negative value of the moderation term (clarity) implies that the effect of BPD on somatization is lowered or buffered as clarity increases. This is also depicted in Figure 1, which shows that while somatic complaints increase as BPD increases, this effect is buffered as clarity increases. As it can be seen in Figure 1, this effect is independent of the level of attention, since the effect of BPD symptoms on the frequency of somatic complaints decreases as clarity increases, following the same pattern regarding all levels of attention.

Table 2 shows the conditioned effect of BPD according to different combinations of emotional clarity and attention to emotions. For every level of emotional attention, the effect of BPD is only statistically significant when emotional clarity is low or average, with the exception of the combination of low level of attention and average level of clarity, where the value is at the verge of significance ($p = .0541$). This pattern implies that when clarity is high, the slope that represents the effect of BPD is statistically not different from zero, so, at high levels of clarity, BPD symptoms cease to be associated with an increase in somatic complaints independently of the levels of attention (see also Figure 1).

DISCUSSION

The aim of this study was to evaluate to what extent the potential association between BPD traits and frequency of somatic complaints was moderated by the capacity to mentalize. Given the role of self-mentalizing in one's own emotional regulation, it was hypothesized that this polarity would be a stronger moderator than other-mentalizing. Consistently, our findings supported that self- but not other-mentalizing moderates the association between BPD symptoms and somatic complaints. Thus, this research provides evidence that self-mentalizing or the capacity to be aware of one's own emotional

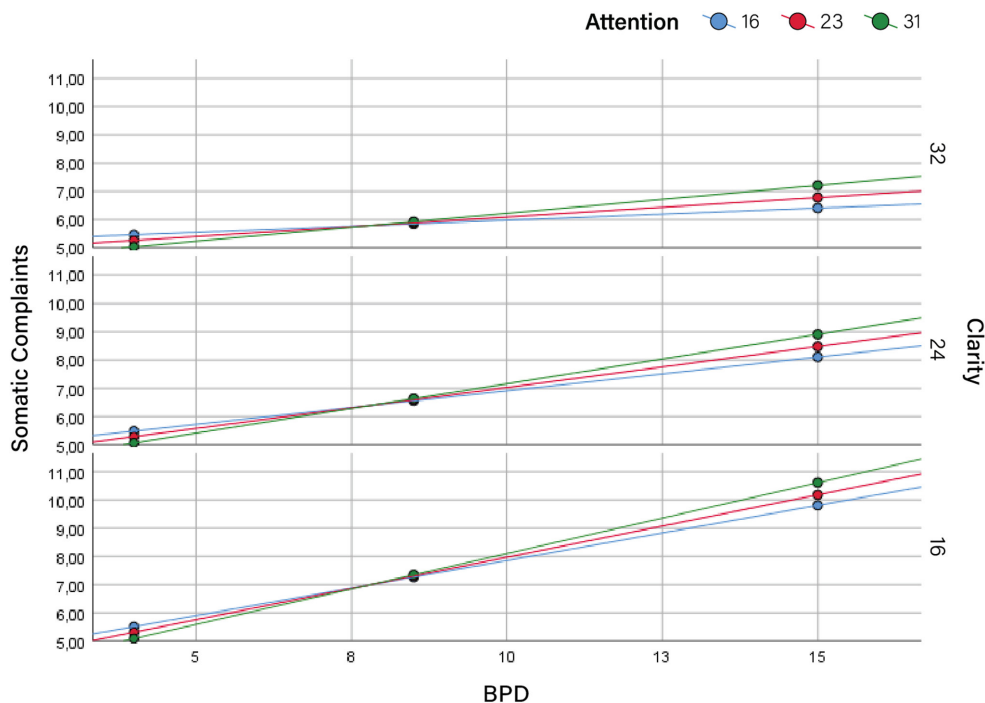


FIGURE 1 Effects of BPD symptoms on somatic complaints by level of attention and clarity

TABLE 2 Conditional effects of BPD at different levels of emotional attention and emotional clarity

Emotional attention	Emotional clarity ^a	<i>b</i>	<i>p</i>	95% CI
Low	Low	.3905	.0059	[0.114–0.67]
	Average	.2383	.0541	[–0.004–0.481]
	High	.0860	.5645	[–0.208–0.380]
Average	Low	.4426	.0003	[0.208–0.677]
	Average	.2903	.0007	[0.125–0.456]
	High	.1380	.2021	[–0.075–0.351]
High	Low	.5020	.0006	[0.217–0.787]
	Average	.3497	.0010	[0.144–0.555]
	High	.1975	.0792	[–0.023–0.418]

^aLow: 16th percentile; Average: 50th percentile; High: 84th percentile.

reactions is an adaptive skill since it attenuates the association between BPD symptoms and somatization. This is consistent with the idea of mentalizing as an active ingredient in the treatment of BPD (Bateman & Fonagy, 2016) and supports the idea that mentalizing can be used to cope with emotional distress and reduce maladaptive coping (e.g. somatization).

It was expected that self-mentalizing would be a stronger moderator than other-mentalizing, but not that other-mentalizing would be an insignificant moderator. Hypermentalizing, or the tendency to attribute implausible mental states to others—in other words, excessive theory of mind (Sharp & Vanwoerden, 2015)—has been found to be the most frequent mentalizing error associated with BPD (Sharp et al., 2013; Sharp et al., 2011) and corresponds not to self-mentalizing, but to other-mentalizing. Thus, it could be speculated that hypermentalizing about others' mental states (i.e. misunderstandings about—or wrong attributions of—others' intentions, thoughts or feelings) could be a reason for intense

emotional disturbance and therefore higher risk for somatic complaints. However, this describes an indirect connection between other-mentalizing and somatic complaints in BPD, which would still be moderated by the ability to self-mentalize. The loose connection between other-mentalizing and somatization, along with the more clear role of self-mentalizing, could explain the lack of moderation of other-mentalizing. Furthermore, this result supports the idea that self-mentalizing is particularly important for self-functioning in terms of mental health (Ballespí et al., 2021; Markowitz et al., 2019). While somatization has been conceptualized as a maladaptive coping mechanism to drain or metabolize emotional distress (Compas et al., 2006; Katon et al., 1984; Waller & Scheidt, 2006), our results suggest an important function of self-mentalization in the management of body-associated emotions. This is consistent with the model of Luyten and colleagues for the mentalization-based conceptualization of somatic disorders (Luyten et al., 2012). In fact, these authors show that people with functional somatic disorders might suffer specific impairments in embodied mentalizing or the ability to interpret physical sensations as emotional states, rather than general deficits in emotional awareness. This context-specific impairment in (embodied) mentalizing, or the inability to see the body as the seat of emotions, is consistent with models supporting less interoceptive accuracy in patients who somatize (Bogaerts et al., 2008). More specific measures of embodied mentalizing and interoceptive accuracy might shed new light on the interplay of these factors in future studies.

In accordance with previous research, we also hypothesized that between the two dimensions of self-mentalizing, clarity about one's emotions would more strongly moderate the association between BPD symptoms and somatization than simple attention to one's emotions. Accordingly, emotional clarity but not simple attention showed a buffering effect on the association between BPD symptoms and frequency of somatic complaints in the present study. It is important to note that the moderator effect is not merely stronger, but is *only* present in the case of clarity, not in attention to emotions. These findings support that simple attention to emotions is not sufficient in ameliorating the effect of BPD symptoms on somatization, because emotional clarity is required to moderate this effect. This is even clearer when combining both dimensions to explore how their combination affect the association between BPD symptoms and somatic complaints: When exploring this combined effect (see Figure 1 and Table 2), it can be seen that attention to emotions does not contribute to the moderator effect of self-mentalizing, because the effect of clarity is independent from the level of attention; in other words, high clarity always buffers the effect of BPD symptoms on somatic complaints, compared with moderate or low clarity, independent of the level of attention to emotions.

As shown by the results, BPD traits promote the presence of somatic complaints for all cases of low or moderate clarity, independent of the level of attention (low, moderate or high; see Table 2 and Figure 1), but consistently stop fostering somatization (i.e. the association disappears or stops being significant) in all cases with high clarity, independent of the level of attention (low, moderate and high). Thus, when clarity is high, the association between BPD symptoms and somatic complaints is no longer significant, suggesting that high clarity buffers the effect of BPD symptoms on somatic complaints, independent of the level of attention (i.e. for any level of attention: low, moderate or high).

There is only one exception to this consistent result. Beyond high clarity, the only case in which an *average* level of clarity also attenuates the effect of BPD on somatic complaints is when attention to emotions is low. Even so, since *average* instead of high clarity buffers the association only when attention is low, this exception is also consistent with the literature, which supports that high clarity and low attention is what most benefits mental health (Balluerka et al., 2013; Extremera & Fernández-Berrocá, 2006; Salguero et al., 2012), while the opposite (i.e. a negative imbalance composed by high attention but low clarity) is what most impairs (Boden & Thompson, 2017).

This is fascinating when one considers the debate as to whether high clarity best facilitates mental health: when it is paired with high attention (as a sort of full or explicit mentalizing) or when it is paired with low attention to emotions (i.e. as a sort of low-flying or implicit mentalizing). Literature does report findings for the negative imbalance between these dimensions such that high attention combined with low clarity is invariably associated with more severe symptoms, possibly because it signifies attention to emotions without the ability to process or understand them (Ballespí et al., 2019; Boden &

Thompson, 2017; Vives et al., 2021). However, whether the positive imbalance (i.e. low attention and high clarity) could have the opposite effect and be even more beneficial than balance (high attention and high clarity) is an interesting question yet to be discovered.

Above all, this research benefits from its novelty. To our knowledge, no paper before has evaluated the moderation effect of mentalization on the association between BPD traits and somatic complaints, and further still, the discrete effects of two aspects of self-mentalization: attention to emotions and emotional clarity. By evaluating these effects in an adolescent non-clinical sample, we ascertained risk and protective associations earlier in the developmental course of BPD. It is attractive to speculate that in a clinical population comparing cases to controls, the significant differences found in the present study could be even greater.

Nonetheless, this paper is limited in scope by its relatively small, self-selected sample which may introduce bias into the results. There is possibly a healthy bias within the sample since voluntary participation is more usual among healthy families, who worry about and care for their health, than from families with issues—one of the reasons to refuse involvement was not wanting to provide data about family mental health. Thus, it could be speculated that more representative samples of the non-clinical population could provide stronger results. Next, the measures utilized for the purposes of this research also face limitations. First, they are predominantly self-report and retrospective, and as such, findings may not be indicative of participants' BPD traits over time, but only as a snapshot of them at the given moment of response. Furthermore, self-mentalizing is difficult to assess. Beyond the TMMS-24, self-mentalizing can only be measured with a similar scale (*Levels of Emotional Awareness Scale* or LEAS (Lane et al., 1990)) or with an attachment interview and the subsequent application of the Reflective Function Scale (Ensink et al., 2015; Fonagy, 1993), in which case a) roughly 4 hours per participant are required for the interview, transcription and to obtain a score with a 10-point range; b) our understanding of self-mentalization may not be more consistent with participants' daily-life mentalizing activity than in the case of a self-report; and c) it could be more difficult to distinguish between self-mentalizing dimensions (attention to emotions and emotional clarity), which would be scored again based on the subjective impression of the interviewer. These limitations should be improved in future studies. Before drawing certain conclusions from the results of this research, replication should be conducted.

Overall, this research demonstrated, to our knowledge, the first results a) for moderation of the association between BPD symptoms and somatic complaints, b) showing that self- but not other-mentalizing moderates this association, c) showing a stronger moderating effect of emotional clarity above simple attention to emotions in an adolescent non-clinical sample, and from a dimensional or spectrum-based perspective. To date, hypermentalizing—an other-oriented mentalization process—was the most prominent mentalizing difficulty associated to BPD. The current study stresses the importance of self-mentalizing and highlights its role in the moderation of the impairment, in this case, in the proneness to somatization. Furthermore, it was established that clarity, but not attention to emotions, is the more crucial protective factor against somatic complaints even when exploring the combination of both dimensions, that is independently of the level of attention.

This research has implications for the different aspects of self-mentalization—underestimated in mentalization research—and their buffering effect against poor mental health. Mentalization is not only a therapeutic factor (Allen et al., 2008) but also a universal human skill innate to the human brain (Frith & Frith, 2003) which can be naturally fostered in general population. The current findings suggest that fostering self-mentalizing could serve as a pertinent protective factor for individuals early in development by either buffering the negative effects of risk factors on outcomes, or the association between psychopathological conditions and impairment. This is especially important regarding BPD, a disorder in which full recovery is often perceived as difficult to reach. In accordance with the Heckman Equation (Heckman, 2012; Heckman, 2021), the return of any effort to treat BPD could be higher the earlier (in life and in the continuum mental health-illness) the 'intervention' is carried out. This study suggests that good self-mentalizing in adolescence and in premorbid stages of the disorder attenuates the association between BPD traits and somatic complaints.

AUTHOR CONTRIBUTIONS

Sergi Ballespí: Conceptualization; data curation; formal analysis; investigation; methodology; project administration; resources; visualization; writing – original draft; writing – review and editing. **Jacqueline Nonweiler:** Investigation; validation; writing – original draft; writing – review and editing. **Carla Sharp:** Conceptualization; supervision; validation; writing – review and editing. **Jaume Vives:** Formal analysis; methodology; visualization; writing – review and editing. **Neus Barrantes-Vidal:** Funding acquisition; resources; supervision; validation.

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CONFLICTS OF INTEREST

All authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in Figshare at <https://doi.org/10.6084/m9.figshare.14878134>.

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