Mindreading abilities and borderline personality disorder: A comprehensive assessment using the Theory of Mind Assessment Scale

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ABSTRACT

Numerous studies have examined mindreading in borderline personality disorder (BPD). However, the empirical data obtained to date have not facilitated the development of a clear clinical profile of mindreading impairment in BPD due to a lack of consistency or incongruence across studies.

One possible explanation for these inconsistencies and divergences in the current literature may lie in the multidimensional character of the mindreading construct; moreover, the heterogeneity of the experimental measures used to assess individuals with BPD mindreading skills may also need to be taken into account. The aim of the present study is to investigate mindreading skills and impairments in patients with BPD through direct comparison of a wide range of mindreading dimensions using a comprehensive semistructured interview, the Theory of Mind Assessment Scale (Th.o.m.a.s.) (Bosco et al., 2009). Our results show that the performance of patients with BPD differs from that of healthy controls only in certain specific dimensions of mindreading. The difficulties encountered by the patients with BPD typically emerge when mindreading tasks require them to disentangle their own subjective mindreading from that of another person, in other words, when they were required to assume an allocentric perspective.

1. Introduction

Borderline personality disorder (BPD) is characterized by impairments in important mental functions such as affect regulation (Glenn and Klonsky, 2009; Linehan, 1993), the ability to construct a coherent self-image and a stable sense of identity, and the ability to regulate social interactions on the basis of a coherent representation of interpersonal relationships (APA, 2013; Clarkin et al., 1999; Jørgensen, 2010).

Evidence in the literature showed that individuals with BPD may exhibit difficulties at different levels (Choi-Kain and Gunderson, 2008; Semerari et al., 2014;) of theory of mind (ToM) ability, which is the capacity that allows us to make sense of others' minds and to think about our own thoughts and feelings (Premack and Woodruff, 1978). According to Fonagy (1991), such difficulties might be due to the instability of identity and the interpersonal difficulties that characterize patients with BPD.

Mindreading abilities have attracted considerable attention in the growing field of empirical research into BPD and personality disorders

(PD) in general (Choi-Kain and Gunderson, 2008; Dimaggio and Lysaker, 2010; Semerari et al., 2007). Authors use different terminology even when they refer to substantially the same set of cognitive skills. Fonagy (1991) used the term *mentalization* when studying these competencies in BPD. *Theory of Mind* or *mindreading* has been originally used by some authors such as Baron-Cohen (Baron-Cohen et al., 1985). *Metacognition* is another term used by some authors with a specific focus on personality disorders (Semerari et al., 2005). Despite that several distinctions exist between the constructs (see Choi-Kain and Gunderson, 2008), the terms 'mentalization', 'ToM/mindreading', and metacognition are often used interchangeably (Sharp et al., 2011a,b); we will refer to all of these concepts with the general term of ToM/mindreading in this paper.

The investigation of ToM competences in BPD has yielded inconsistent results. A plausible explanation can be sought in the multidimensional nature of the concept itself (Bosco et al., 2009; Semerari et al., 2014; Brizio et al., 2015). Moreover, the heterogeneity of the tests and tasks used to assess and profile the mindreading skills of groups of patients may offer a possible explanation for the inconsistency.

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Theory of Mind ability, indeed, can hardly be considered unitary, and it has been broken down into several subcomponents. A first distinction refers to *first- and third-person ToM*, meaning the ability to understand one's own beliefs and those of another person (Nichols and Stich, 2003). Additionally, *affective and cognitive ToM* (Tager-Flusberg and Sullivan, 2000) refer to the capacity to attribute emotions or intentions and beliefs to ourselves or others.

Regarding the first-person dimension (intrapersonal), a number of studies have focused on the ability to identify one's own emotions in BPD, first person/self-dimension (Domes et al., 2008; McMain et al., 2013; Wagner and Linehan, 1999). Certain studies identified alexithymia as a hallmark issue in BPD (Lysaker et al., 2017; New et al., 2012), where alexithymia is defined as the inability to feel and identify one's own feelings (Parker et al., 1993). However, in other studies, alexithymia was observed mainly in conjunction with traits typical of avoidant personality disorder rather than BPD (Nicolò et al., 2011; Johansen et al., 2013). A recent study showed that after controlling for depressive symptoms and the state and trait of anxiety, BPD and healthy controls (HCs) present similar levels of alexithymia (Pluta et al., 2018).

Moreover, the majority of the studies investigating mindreading in BPD have focused specifically on the third-person dimensions of ToM (interpersonal). In particular, some of these studies have examined affective ToM, investigating the understanding of others' emotions and the facial expression of emotion. Other studies have prioritized testing the cognitive component of ToM.

A typical task of third-person affective ToM regards facial emotion recognition. Different studies focusing on emotion recognition showed that the performance of BPD patient groups was less accurate than that of the HC groups, specifically when required to identify negative facial emotions (Bland et al., 2004; Levine et al., 1997). A negative bias in the appraisal of neutral or ambiguous facial expressions has also been demonstrated in BPD groups (Domes et al., 2008; Meyer et al., 2004; Minzenberg et al., 2006; Murphy, 2006; Daros et al., 2013). More complex tasks were designed to assess the comprehension of emotion in other individuals, such as the dynamically changing face recognition task (Lowyck et al., 2016) or revealing images of the eye region only, as in the Reading the Mind in the Eyes Test (RMET) (Baron-Cohen et al., 2001). However, even these tasks have produced variable findings. Two clinical studies found that adults with BPD performed significantly better than healthy controls on the RMET (Fertuck et al., 2009; Frick et al., 2012). However, in other studies, similar performance was observed in BPD and control groups (Arntz et al., 2009). A third group of studies found that patients with BPD performed worse on emotion-recognition tasks, which would suggest a possible basic deficit in emotion recognition (Daros et al., 2013; Lowyck et al., 2016).

The second aspect of the third person ToM capacity of BPD, which has been largely investigated, regards the cognitive component (i.e., the ability to attribute intentions and beliefs to others). Additionally, the results of these studies appear to vary considerably according to the test or the type of task used. The majority of empirical studies have tested the ToM in BPD with "offline tasks", in which people are asked to attribute the correct mental state to the character of the story (through written vignettes, stories or cartoons) without any direct involvement of the participants themselves in the social interaction proposed. This is the case, for example, with the Strange Stories task (Happè, 1994) or the Faux Pas task (Stone et al., 1998), where the performance of the BPD patients was comparable to that of HCs (Arntz et al., 2009; Tay et al., 2017). In two other studies, the BPD groups were performing at an even higher level than healthy controls (Fertuck et al., 2009; Ghiassi et al., 2010).

Differences between BPD groups and controls have emerged, however, in those studies that use off-line ToM tasks but require more complex ToM competencies. These off-line experimental tasks typically involved real-life scenarios or more realistic contextual cues (Harari et al., 2010; Brune et al., 2016; Pluta et al., 2018). In these studies, the Movie for the Assessment of Social Cognition has been used as an evaluation tool (MASC; Dziobek et al., 2006). This mindreading tool requires the participant to watch a short movie of four people in an interaction and to answer different questions about intentions, emotions or beliefs of one of them in specific moments of the movie. Preißler et al. (2010) showed that patients with BPD exhibited marked difficulties in both emotion and cognitive mindreading. Similarly, in two other studies using the MASC, Sharp et al. (2011a,b, 2016) highlighted that borderline traits in a clinical group of adolescents in an inpatient unit strongly correlated with the tendency to over interpret other people's mental states and, as a consequence, misinterpret the mental states of others (hypermentalization). In other words, the evidence suggests that the task complexity for individuals with BPD increases significantly when they have to deal with off-line ecologically valid stimuli and more articulated social interactions. In these particular circumstances, patients with BPD appear to be challenged since they are asked to interpret social interactions from the integration of a variety of different social cues.

The degree of personal involvement required can be considered a key aspect that may contribute to task complexity for individuals with BPD. Recent studies have drawn attention to the fact that engaging in direct personal interactions may elicit very different levels of mindreading abilities (Schilbach, 2016).

Considering the role that the direct interpersonal involvement might have on an individual's performance, some studies have explored these diverse levels of ToM competence in patients with BPD by analyzing transcripts of therapy sessions or by using semistructured interviews that investigate mindreading through direct personal involvement of the subject (Semerari et al., 2014, 2015; Outcalt et al., 2016). Semerari et al. (2014). Some studies investigated several aspects of mindreading in BPD and in other personality disorders (PD) using a semistructured interview (MAI; Semerari et al., 2012). Their results showed that patients with BPD obtained significantly lower scores than patients with other PDs in specific areas of first- and third-person mindreading abilities. Limited understanding of the minds of others also emerged in other studies that analyzed transcripts of patients' narratives (Semerari et al., 2005; Dimaggio et al., 2009). In these studies, the BPD patients manifested a specific mindreading difficulty; they found it hard to understand the mental states of other individuals as distinct mental states unrelated to their own thoughts and feelings.

Engaging directly with the lived experience of the experimental subject, these studies underline the importance of a third mindreading component that extends across both first- and third-person ToM; namely, the ability to evaluate the mental states involved in a specific interaction from a different perspective; i.e., my own *egocentric* perspective, or those of the other person involved in the interaction, i.e., *allocentric* perspective (Frith and de Vignemont, 2005). This distinction between allocentric and egocentric mindreading has rarely been considered in studies focused on clinical samples. In some studies, the distinction is made but different terminology is used (Semerari et al., 2014; Bosco et al., 2009). We can illustrate these two distinct perspectives with an imaginary example of two people interacting with a third subject named Mike. Both understand perfectly that Mike is angry. The first person may remain within an egocentric perspective, interpreting Mike's emotions only in relationship to himself and responding without empathy. In contrast, the second person may be able to explain Mike's anger in terms of his character or other external factors, which have nothing to do with their mutual relationship. In other words, he assumes an allocentric perspective. In the studies by Semerari and colleagues. this difficulty in assuming an allocentric perspective is discussed in terms of impairment of decentering (Semerari et al., 2014; Dimaggio et al., 2009). Other studies with a focus on these aspects of mindreading have used the terminology of hypermentalization. A tendency towards suspiciousness and a hostile attribution bias has been observed in patients with BPD (Sharp et al., 2016). Indeed, individuals with a diagnosis of BPD typically tend to overinterpret social interactions, basing their interpretations upon their own interpersonal expectations rather than from objective observable data. In this sense, the tendency to hypermentalize reflects a lack of allocentric mindreading capacity.

Together with the egocentric vs allocentric distinction, there is a further distinction which has been little studied in the clinical literature: the difference between first and second-order ToM (Wimmer and Perner, 1983); the former requires one to understand the beliefs held by others about a specific state of the world, (for example, their false beliefs about something). The latter, which is more sophisticated, depends upon accurate attribution of nested mental states to other minds; that is, we must be able to understand their beliefs about the beliefs of another person (as in X believes that Y believes something – A – about a specific circumstance). This double embedded type of mental states attribution appears to be a form of mindreading, which poses difficulties during early childhood (e.g., Perner and Wimmer, 1985; Bosco and Gabbatore, 2017) as well as in some severe clinical disorders (Bosco et al., 2009; Mazza et al., 2001).

In short, there is evidence that suggests that the difficulties encountered by researchers attempting to construct a clear and coherent profile of the specific mindreading strengths and challenges of patients with BPD may be ascribable to two fundamental factors. The first is linked to the fact that the majority of the studies currently available focus on specific disparate mindreading abilities without providing an articulated overview of the different components involved (e.g., self vs. other dimensions; emotion vs. cognitive components; egocentric vs. allocentric perspective).

The second factor is linked to the type of experimental procedure adopted. While the performance of patients with BPD does not appear to be particularly compromised in classic experimental off-line tests of mindreading ability, their deficits emerge clearly when tested with off-line experimental procedures that represent real-life situations or when they are being assessed on the basis of their own real-life social experiences.

It is also conceivable that the mindreading ability of individuals with BPD may be affected by a further element, namely, comorbidity with symptom disorders. Confounding variables such as depression, anxiety and trauma have been consistently hypothesized to be negatively related to mentalizing (Fonagy and Bateman, 2008). However, most studies of mindreading in BPD have not systematically controlled for these possible confounding variables. Social cognition research across various diagnostic groups indicates a complex array of diagnostic effects along with the severity of the disorder and comorbidity-related effects (Lee et al., 2005; Richman and Unoka, 2015; Semerari et al., 2014; Tay et al., 2017; Wang et al., 2008). One factor that appears to be particularly relevant for the understanding of patients with BPD is the presence of mood disorders (MDD), given that MDD commonly co-occurs with BPD (Chanen et al., 2007; Zimmerman and Mattia, 1999) and taking into account the impact of depressive mood on ToM performance. In fact, depressive symptoms have been emphasized by some authors as a factor affecting the ToM performance of patients with BPD. These studies have also produced divergent results. Tay et al. (2017) compared the mindreading performance of a group of young patients with BPD with that of another group diagnosed with mood disorders and found that the BPD group was less competent in both the cognitive and emotional aspects of ToM. Semerari et al. (2015) showed that patients with BPD scored lower on tests for specific mindreading abilities than patients with symptomatic disorders, even when depression and distress were controlled.

Overall, the mindreading capacities of patients with BPD seem to be subject to fluctuations. Factors such as the experimental measures that are used to assess those abilities, the level of distress, depression or severity of the personality disorder may all influence the performance of patients with BPD in mindreading tasks. (e.g., Semerari et al., 2014; Sharp et al., 2011a,b).

1.1. Aim of the study

The present study aims to further investigate the specific profile of mindreading abilities of patients with BPD compared to that of HCs, using a semistructured interview, namely, the Theory of Mind

Assessment Scale (Th.o.m.a.s.) (Bosco et al., 2009; Bosco et al., 2016). The Th.o.m.a.s is designed to evaluate a wide range of aspects of mindreading ability in such a way that these aspects can be directly compared with each other, i.e., first- vs. third-person, allocentric vs. egocentric perspective, and first- vs. second-order ToM. Additionally, the Th.o.m.a.s. has the advantage of being more firmly-based in real-life experiences than many other ToM tests. The semistructured interview format permits interviewers to explore diverse aspects of ToM directly, linking their enquiries to real-life experiences and social interactions of the interviewee. Therefore, the Th.o.m.a.s was selected with the aim of gaining a better understanding of the inconsistencies discussed above.

Specifically, we expect that the BPD group will perform at a lower level of competence when tested on the more complex aspects of mindreading. In other words, their difficulties will emerge in those test situations that require them to think about the mental states of others from an allocentric perspective, discounting their own personal points of view. Moreover, considering the different degree of embedding, we also expect that patients with BPD will perform at a lower level on second-order mental state attribution tasks, where they are required to reason about someone else's thoughts about their own mental states.

Finally, measures will be used to assess the connection of certain psychopathological elements (such as the severity of depressive symptoms or impulsiveness) on patients' performance across the different subscales of the Th.o.m.a.s. Specifically, we expect to find a significant correlation between depressive symptoms and mindreading competence in BPD.

2. Methods

2.1. Participants

Twenty individuals (6 males and 14 females) meeting the DSM-IV diagnostic criteria for borderline personality disorder (BPD) (APA, 1994) participated in the present study. The diagnosis was made via a clinical interview based on the Structured Clinical Interview for Personality Disorders Axis II (SCID-II) (First et al., 1997a). The diagnosis was subsequently confirmed after consultation with a senior psychiatrist. Therefore, patients from this sample had a well-established diagnosis of BPD fulfilling the DSM-5 criteria (American Psychiatric Association, 2013).

All patients required treatment or were seeking consultation in an Italian outpatient department of mental health at a local health unit ASL of Torino. The mean age was 39.35 years (SD = 10.11) with a range from 20 to 60 years of age, and the level of education ranged from 8 to 18 years of schooling (M = 10.20 years; SD = 2.98). All the participants were Italian native speakers. We also recruited a group of 20 healthy individuals matched with the clinical sample for sex (6 males and 14 females), age (M = 40.10 years; SD = 10.16), and years of schooling (M = 10.65 years; SD = 3.13).

Exclusion criteria that were adopted for both the clinical and the control groups included the presence of neurological disorders via clinical neurological and psychiatric examinations and the Structured Clinical Interview for Axis I Disorders (SCID I) (First et al., 1997b). The Public Health Ethics Committee approved the diagnostic assessment.

2.2. Measures and procedures

The Theory of Mind Assessment Scale (Th.o.m.a.s.) (Bosco et al., 2009, 2016) is a semistructured interview made of 37[1] open-ended questions structured to leave the interviewees free to explain their own thoughts. The subjects are required to express their understanding of their own and others' mental states (e.g., *When the others feel bad, does that make any difference to them? What differences does it make?*). A particular attention is dedicated to the individual's ability to refer to

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[1] Previous versions of the tool included 39 questions; in the final version, two were eliminated because they were redundant.

Table 1
Brief description of each of Th.o.m.a.s. scales.

Scale A (I- Me)	The scale investigates the individuals' knowledge of their own mental states. The questions' viewpoint is centered on the interviewee (I) reflecting on her own mental states (Me), (e.g., "Do you happen to have wishes and know what you want?"). This scale assesses first-person ToM in an egocentric perspective.
Scale B (Other-Self)	The scale investigates the knowledge that, according to the interviewee, the other individual have of their own mental states, independently of the subject's perspective. The viewpoint of the questions is centered on the other persons (Other) reflecting on their own mental states (Self), (e.g., "Do the others happen to experience emotions that make them feel bad?"). This scale assesses third-person ToM in an allocentric perspective.
Scale C (I–Other)	The scale investigates the knowledge the interviewee has of the others' mental states. The questions' viewpoint is centered on the interviewee (I) reflecting on the others' mental states (Other) (e.g., "Do you think you understand the others' wishes?"). This scale is similar to scale B, since they both assess third-person ToM; however, here the perspective is centered on the interviewee (egocentric perspective), while in the previous scale it is centered on the other.
Scale D (Other–Me)	The scale investigates the knowledge that, from the interviewee's viewpoint, the others have of her mental states. The questions' viewpoint is centered on the other persons (Other) reflecting on the mental states of the interviewee (Me) (e.g., "Do the others notice it when you feel bad?"). This scale can be compared with a second-order ToM task, since the form of the questions is: "What do you think the others think that you think?". As for scale C this scale assesses ToM from an allocentric perspective.

real-world experiences and examples to contextualize the answers (e.g., *Can you give an example of how they act or think, or of things happening to them when they feel bad?*). Nevertheless, please note that to obtain the maximum score to a question, it is sufficient to provide meaningful and well contextualized examples, where the appropriate differentiations among mental states are well specified. The questions composing the interview are organized along four scales, each focusing on one of the knowledge domains in which a person's ToM may manifest itself. See Table 1.

In turn, each scale is organized into three subscales, exploring the following:

Awareness: the capacity to perceive and differentiate beliefs, desires and emotions in oneself and in the others;
Relation: the ability to recognize causal relations between different mental states and between them and the resulting behaviors;
Realization: the ability to adopt effective strategies to achieve a desired state.

On the basis of the most relevant and basic types of mental states conceivable (Tirassa et al., 2006a,b), the Th.o.m.a.s. questions focus on four dimensions that refer to *cognitive* (interviewee's perspectives on beliefs and desires) and *affective* (positive and negative emotions) ToM. For a more detailed description of the Th.o.m.a.s., see Bosco et al. (2009, 2014).

The psychometric proprieties of the Th.o.m.a.s showed a good interrater agreement and internal consistency (Bosco et al., 2016). The Th.o.m.a.s. has proven to be a useful clinical tool in the assessment of mindreading ability of several populations of adolescent participants (Bosco et al., 2014), individuals with alcohol use disorder (Bosco et al., 2013), patients with congenital heart disease (Chiavarino et al., 2015), sex offenders (Castellino et al., 2011), nonsuicidal self-injury adolescents (Laghi et al., 2016), adolescents with bulimia (Laghi et al., 2014) and opiate-dependent patients (Gandolphe et al., 2018).

The patients were also administered the following series of tests aimed at identifying their profile of clinical impairment:

- The *Brief Psychiatric Rating Scale* (BPRS 4.0) (Overall and Gorham, 1962) assesses positive, negative, and affective symptoms of individuals with psychotic disorders; the scale investigates 24 symptoms in particular (e.g., guilt, hostility, grandiosity, conceptual disorientation), each scored 1–7 (total range 0–168). Internal consistency in the present study was good ($\alpha = 0.91$) for this measure.
- The *Global Assessment of Functioning Scale* (GAF) (Derogatis, 1994) has been used together with the *Global Assessment of Relational Functioning Scale (GARF)* and the *Social and Occupational Functioning Assessment Scale* (SOFAS) to measure relational, social and occupational functioning more in detail. GAF, GARF and SOFAS are numeric scales in which scores range from 100 (extremely high functioning) to 1 (severely impaired). Correlation r values among the three scales, which provide a comprehensive measure of global functioning, are $0.62 < r < 0.77$; $0.001 < p < 0.004$.

- The *Quick Inventory of Depressive Symptomatology* (QUIDS-16) (Rush et al., 2003) is aimed at detecting depressive symptomatology. QUIDS-16 is a self-report measure comprised of 16 items (range 0–27). Cronbach's alpha for this measure was 0.74.
- The *Baratt Impulsiveness Scale* (BIS-11) (Patton et al., 1995) is aimed at detecting the occurrence of impulsive behavior. BIS-11 is composed of 30 items scored on a 4-point scale (range 0–120). Cronbach's alpha for this measure was quite low ($\alpha = 0.52$).
- The *Borderline Personality Disorder Severity Index* (BPDSI) (Giesen-Bloo et al., 2010) was used to determine the severity of the borderline symptomatology. This index consists of 70 items rated on an 11-point scale (total range 0–90). In the present sample, Cronbach's alpha for this measure was 0.86.

2.3. Experimental and coding procedures

All the assessment sessions took place individually. All the participants (clinical and control samples) gave their written informed consent to participate in the study and to allow the assessment procedure to be audio-recorded.

The Th.o.m.a.s. interviews were transcribed to enable offline scoring by two independent judges, blind with respect to the aims of the study and the group allocation of the assigned transcripts. Each judge assigned each answer a score ranging from 0 to 4 according to the given rating criteria, and the scores were inserted into the relevant cell of the coding grid. The interrater reliability among the scores assigned by the two independent judges was calculated using the Intraclass Correlation Coefficient (ICC) on the total Th.o.m.a.s. score. The ICC was 0.78 (ranging from 0.67 to 0.79 when considering each Th.o.m.a.s. scale), indicating a good agreement (Altman, 1991).

3. Results

To investigate and compare the performance of BPD individuals and healthy individuals on the tasks composing the scales of the Th.o.m.a.s. instrument, we performed a repeated measures ANOVA with a two-level between-subjects factor (BPD vs. control group) and a four-level within-subjects factor (Th.o.m.a.s. scales: A (I-Me), B (Other-Self), C (I–Other), and D (Other–Me)). The analysis revealed an effect of the group ($F_{1,38} = 8.83$; $p = 0.005$; $\eta_p^2 = 0.19$) and an effect of the scale ($F_{3,114} = 11.57$; $p < 0.001$; $\eta_p^2 = 0.23$); the interaction *Group × Scale* was not significant ($F_{3,114} = 1.90$; $p = 0.13$; $\eta_p^2 = 0.05$). See Fig. 1. To better explore such a result, we ran a series of t-tests (Bonferroni correction for multiple comparisons: alpha ≤ 0.012), which revealed that the performance of the BPD patients was significantly worse than that of the control group on scale B (Other-Self) ($t_{(38)} = 2.812$; $p = 0.009$; $d = 0.898$) and scale D (Other-Me) ($t_{(38)} = 3.182$; $p = 0.004$; $d = 1.006$), while no differences were detected in the performance of the patients and control subjects on scales A (I-Me) ($t_{(38)} = 2.394$; $p = 0.023$; $d = 0.757$) and C (I-Other) ($t_{(38)} = 2.510$; $p = 0.018$; $d = 0.794$).
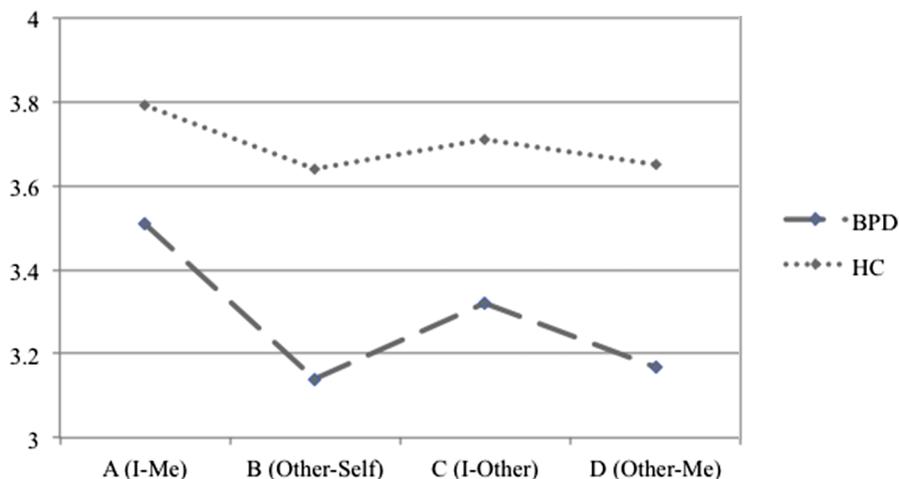
Fig. 1. BPD vs. controls: Mean scores at Th.o.m.a.s. scales.

We also investigated the performance of the two groups on the subscales of the Th.o.m.a.s., running a repeated measures ANOVA with a two-level between-subjects factor (BPD vs. control group) and a three-level within-subjects factor (Th.o.m.a.s. Subscales: Awareness, Relation, and Realization). The analysis revealed an effect of the group ($F_{1,38} = 8.27$; $p = 0.007$; $\eta_p^2 = 0.18$) and an effect of the subscale ($F_{2,76} = 4.99$; $p = 0.009$; $\eta_p^2 = 0.12$); the interaction *Group × Subscale* was also significant ($F_{2,76} = 4.22$; $p = 0.02$; $\eta_p^2 = 0.11$). See Fig. 2. To better explore such a result, we ran a series of *t*-tests (Bonferroni correction for multiple comparisons: alpha ≤ 0.017) which revealed that the performance of the BPD patients was significantly worse than that of the control group on the Relation ($t_{(38)} = 3.492$; $p = 0.001$; $d = 1.104$) and Realization subscales ($t_{(38)} = 2.507$; $p = 0.017$; $d = 0.793$) but not on the Awareness subscale ($t_{(38)} = 2.297$; $p = 0.027$; $d = 0.727$).

We finally investigated the performance of the two groups on the dimension of the Th.o.m.a.s., investigating cognitive and affective ToM. The *t*-test analysis revealed significant differences between the BPD and HC groups at both the affective ToM ($t_{(38)} = 2.958$; $p = 0.005$; $d = 0.935$) and cognitive ToM ($t_{(38)} = 2.910$; $p = 0.006$; $d = 0.9201$) (Fig. 3).

To better explore and further detail such a result in light of the different patterns of performance displayed by the individuals with BPD on the Th.o.m.a.s. scales described above, we also analyzed their performance at the dimensions of cognitive and affective ToM using a within approach, considering each single scale of the Th.o.m.a.s. instrument separately. Therefore, we ran a repeated measures ANOVA with a four-level within-subjects factor (Affective ToM in each Th.o.m.a.s. scale: A (I-Me), B (Other-Self), C (I–Other), and D (Other–Me)). The analysis revealed an effect of the scale ($F_{3,57} = 7.49$; $p < 0.001$; $\eta_p^2 = 0.28$). This result was further analyzed with a post hoc Bonferroni comparison, revealing that participants with BPD performed significantly better in affective ToM tasks within scale A (I-Me) than within scale B (Other-Self) ($p = 0.014$) and scale D (Other-Me) ($p = 0.009$). The comparison of the performance on affective ToM within the other scales revealed similar performances ($0.08 < p < 1.0$). See Fig. 4.

The same analysis was performed for cognitive ToM. We ran a repeated measures ANOVA with a four-level within-subjects factor (Cognitive ToM in each Th.o.m.a.s. scale: A (I-Me), B (Other-Self), C (I–Other), and D (Other–Me)). The analysis revealed an effect of the scale ($F_{3,57} = 3.71$; $p = 0.017$; $\eta_p^2 = 0.16$). Additionally, this result was further analyzed using a post hoc Bonferroni comparison and revealed that participants with BPD performed significantly better in affective ToM tasks within scale A (I-Me) than within scale D (Other-Me) ($p = 0.022$) only. The comparison among the groups in the performance of cognitive ToM within the other scales revealed similar performances ($0.08 < p < 1.0$). See Fig. 4.

3.1. Correlation analyses

We investigated the correlation between the individuals with BPD scores on the Th.o.m.a.s. and those of the self-report measures used to identify their profile of clinical impairment. Descriptive statistics for each self-report measure are presented in Table 2.
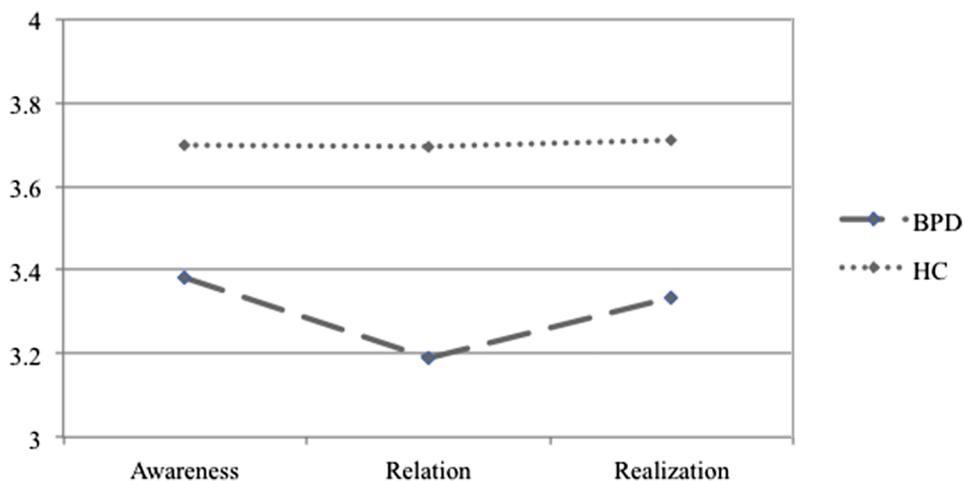

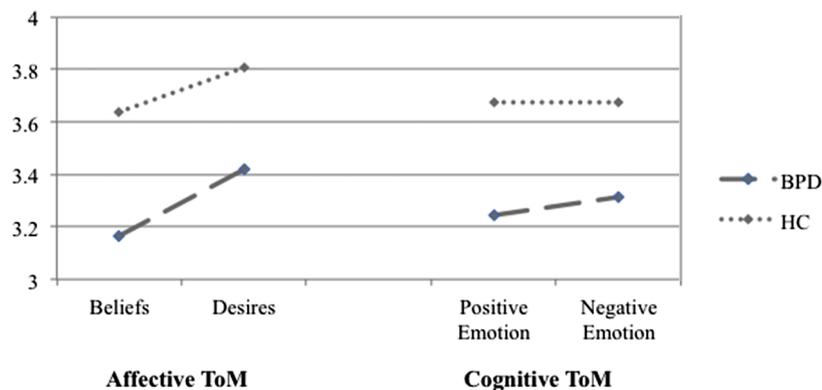Fig. 2. BPD vs. controls: Mean scores at Th.o.m.a.s. subscales.

Fig. 3. BPD vs. controls: Mean scores at Th.o.m.a.s. dimension (i.e., cognitive and affective ToM).

The most interesting result was in regard to the significant negative correlation ($r = -0.562$; $p < 0.01$) found between the general performance on the Th.o.m.a.s. and the scores resulting from the *Quick Inventory of Depressive Symptomatology* (QIDS), which was aimed at detecting depressive symptomatology. Such results held for all the scales of the Th.o.m.a.s. analyzed separately ($-0.507 < r < -0.604$; $0.01 < p < 0.05$), with the only exception of scale D (Other-Me), where the correlation was on the border of statistical significance ($r = -0.442$; $p = 0.05$).

Moreover, a significant negative correlation was found between the profile scores resulting from the *Quick Inventory of Depressive Symptomatology* (QIDS) and the performance scores obtained on an item investigating both cognitive ($r = -0.563$; $p = 0.0.01$) and affective ToM ($r = -0.568$; $p = 0.0.009$).

Finally, as for the relational, social and occupational functioning, the profile scores obtained using the *Global Assessment of Functioning Scale* were found to correlate with the Relation subscale ($r = 0.476$; $p < 0.05$). Analogously, a significant correlation ($r = 0.468$; $p < 0.05$) was detected between the profile scores of the *Global Assessment of Relational Functioning Scale* and the patients' performance on scale B (Other-Self) of the Th.o.m.a.s.

4. Discussion

Mindreading is a multicomponent ability (e.g., Choi-Kain and Gunderson 2008; Semerari et al., 2014), which may explain to some extent why studies on this topic of BPD have produced such contradictory and inconsistent data. Patients with BPD may in fact have difficulties only with specific and discrete components of mindreading. In this study, we used the Th.o.m.a.s. (Bosco et al., 2009, 2016), which allowed us to assess and compare a number of distinct components of ToM directly, on the basis of the patients' real-life experiences. Our results showed that patients with BPD performed at a lower

mindreading level than the HCs only on specific aspects and dimensions of mindreading, which are rated separately on the scales of the Th.o.m.a.s. interview.

Notably, the BPD group differed from the HC group on scales B (Other-Self, third-person ToM allocentric perspective) and D (Other-Me, second-order ToM, allocentric perspective), which both evaluate the capacity to attribute mental states from an allocentric point of view, independent of one's own standpoint. Mindreading competence in real life is highly dependent upon perspective-taking. The B (Other-Self) scale requests interviewees to describe another person's self-assessment as if imagining themselves in their shoes, without reference to the interviewees' own opinions about that person. In scale D (Other–Me), interviewees are again required to assume an allocentric perspective, but in reverse. This time they must describe another person's assessment of themselves, again disregarding their own opinion about themselves. This aspect of mindreading has been considered in studies focused on ToM in clinical samples. Laghi et al. (2014) found that patients with bulimia nervosa performed poorly compared with HCs when required to reflect on another person's mental state – that is, third-person ToM – from an allocentric perspective. However, they performed equal to controls on questions evaluating first-person ToM. Similarly, using Th.o.m.a.s. in a study with individuals with alcohol use disorder, Bosco et al. (2014) found that such individuals had difficulties on scale B (Other-Self). Interestingly, this discrepancy between allocentric and egocentric mindreading abilities has not been observed in another severe form of psychopathology, namely, schizophrenia (Bosco et al., 2009).

The difficulties experienced by the patients with BPD are apparent only on those tasks that require them to assume the perspective of another individual, and this deficit emerges across all the mental states evaluated by scales B and D; i.e., beliefs, positive and negative emotions and desires. In contrast, performance on scales A (I-Me) and C (I-Other) was rated as similar for both the HCs group and the BPD group. Scales A
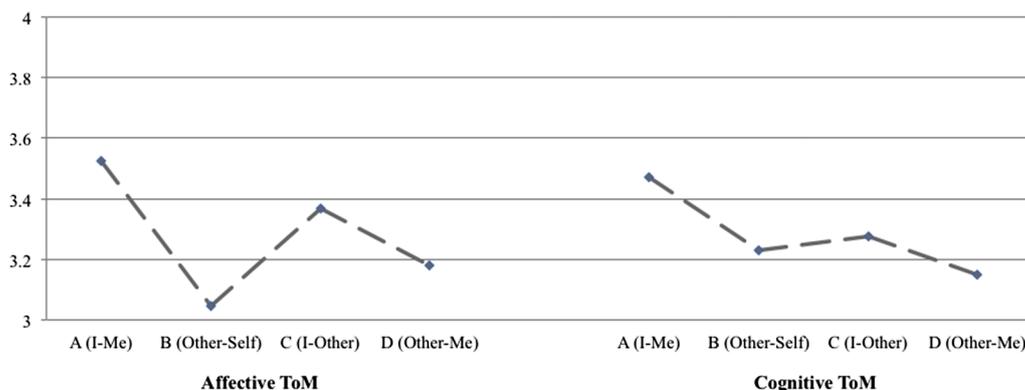

Fig. 4. BPD performance (mean scores) at cognitive and affective ToM questions, within each Th.o.m.a.s. scale.

Table 2

Descriptive statistics for each self-report measure describing the profile of clinical impairment of the individuals with BPD.

Measure	Mean	Standard Deviation
Brief Psychiatric Rating Scale - BPRS	63.70	18.42
Global Assessment of Functioning Scale - GAF	54.25	13.11
Global Assessment of Relational Functioning Scale - GARF	54.00	16.65
Social and Occupational Functioning Assessment Scale - SOFAS	57.50	12.40
Quick Inventory of Depressive Symptomatology – QUIDS-16	14.70	6.94
Baratt Impulsiveness Scale – BIS-11	65.20	9.43
Borderline Personality Disorder Severity Index - BPDSI	21.22	11.08

and C require interviewees to attribute mental states to themselves or to others but departing from their own point of view, that is, from an egocentric perspective.

These results appear to be in accordance with previous evidence reporting similar aspects of mindreading under other names. Semerari et al. (2014), for example, used the concept of *decentering* (the ability to make plausible inferences about others' mental states by adopting their perspective) to refer to allocentric perspective-taking. In studying several components of mindreading, which included decentering, Semerari and colleagues found that the BPD group presented greater difficulties with decentering than patients with other PDs. Additionally, this study analyzed the severity of personality disorder in both samples, as assessed by the number of SCID II criteria met by the patients. Interestingly, the decentering deficit of the patients in the BPD group remained constant (although without statistical significance), even after the general severity of personality psychopathology was considered.

In contrast, on the egocentric scales A (I-Me) and C (I-Other), when required to interpret states of mind from their own point of view, the individuals with BPD demonstrated a competent level of mindreading. These results appear to confirm those of previous experimental studies, which showed that patients with BPD were well able to access their own emotions (Nicolò et al., 2011).

It is interesting to note that in the present study, the difficulties of the individuals with BPD emerge most clearly not on those tasks that measure awareness of mental states but on those that explore the relationships between the patient's own mental states, their causes and their behavioral consequences. Moreover, awareness of mental states per se does not appear to be particularly impaired. In other words, the individuals with BPD do not seem to find it difficult to recognize thoughts and feelings but rather to make sense of their mental states in relation to a specific context, whether in causal terms (what made me feel this way) or in terms of impact (how my state of mind influenced my behavior).

In the recent literature on mindreading in BPD, no consensus has been reached as to whether difficulty in understanding the cognitive states or emotional states of others is predominant in BPD (Tay et al., 2017; DiMaggio and Brune, 2016). In this study, we also examined cognitive and affective mindreading competence in each group. To test these two dimensions with the Th.o.m.a.s, we grouped desires and beliefs together as cognitive ToM and positive and negative emotions together as affective ToM. Comparing these two dimensions in the two groups, we found that the data overall indicated significantly poorer performance in the BPD patients group. We identified no differences between mindreading competence with cognitive content or mindreading with affective content. Further analysis and assessment of mindreading content in the BPD sample alone produced results that appear to confirm our central hypothesis, namely, that the perspective (allocentric or egocentric) and the degree of complexity of the mental contents involved in acts of mindreading are key to understanding the mindreading difficulties of patients with BPD. Individuals with BPD struggled to reflect on cognitive mental contents (beliefs and desires) but also on affective mental contents (positive and negative emotions), and the degree of difficulty they experienced was directly associated

with the perspective they were required to assume in the mindreading tasks. The most challenging tasks for the BPD group were those proposed in the B and D scales of the Th.o.m.a.s, which require the interviewee to assume an allocentric perspective while reflecting upon his or her own mental states and upon the mental states of others. The data are in agreement with previous studies, which show that scale D (second-order ToM) is more difficult than other scales (scale A) (Bosco and Gabbatore, 2017). The patients with BPD appeared to be equally challenged by the cognitive mental content and the affective mental content involved in these tasks. However, the data obtained from this study suggest that further investigation of easily comparable complex mindreading tasks may be warranted to establish whether a specific BPD mindreading difficulty could be linked primarily to cognitive or affective mental content.

Our data suggest that to establish whether a BPD-specific mindreading deficit could be linked primarily to tasks involving cognitive mental content or to those involving affective mental content, further study may be warranted. A comparative study using complex but easily comparable mindreading tasks with both cognitive and affective mental content involved could yield greater clarity.

A further interesting result emerging from this study is the correlation between mindreading functions as assessed by the Th.o.m.a.s. and depressive symptoms as assessed by the *Quick Inventory of Depressive Symptomatology* (Rush et al., 2003). The importance of assessing symptomatic comorbidity has been emphasized in the recent literature. Depressive symptoms are frequently comorbid in patients with personality disorders and appear to affect their performance on mindreading tasks (Arntz et al., 2009; Semerari et al., 2014). Some studies found that performance on ToM tasks was affected by depressive symptoms. However, the data obtained in these studies were not congruent (Fertuck et al., 2009; Richman and Unoka, 2015).

In the study conducted by Richman and Unoka (2015), patients with both BPD and comorbid depression performed at a higher level than patients with either BPD alone or depression alone. In Fertuck's study involving patients with BPD, the severity of depressive symptoms was correlated to the lowest rated competence in mindreading. Our study appears to confirm such results, demonstrating a positive correlation between the performance of the patients with BPD on all scales of the Th.o.m.a.s. and the self-administered scale for depressive symptoms.

Overall, our results support the hypothesis that patients with BPD do not present with generalized mindreading impairment but with impairments of a specific set of skills. These results highlight the importance of using multidimensional mindreading assessment tools for a more exact profiling of mindreading impairments in BPD. Moreover, our results also appear to emphasize the importance of a real-world approach to the assessment of mindreading ability, with a focus on the patient's real life experience, which is the case with the Th.o.m.a.s. interview.

This study has a number of limitations, and further investigations will be required to draw definitive conclusions. The main limitation is the small numbers of patients in our BPD sample group. Given the heterogeneous character of BPD, a wide and variable range of mindreading competence is to be expected. For this reason, a larger patient sample would be required to confirm the results obtained in this study.

The second limitation concerns the need for further clarification of the relationship between mindreading competence and depressive symptoms in both the BPD group and the control group. The effects of depressive symptoms on mindreading competence in the control sample could have been compared with those observed in the BPD patient group. This could have improved our understanding of the wider implications of depressive symptoms for mindreading performance in general.

A follow-up study could be used to explore in greater detail the relationship between patients' depressive symptomatology and mindreading performance in BPD, and in particular, the impact of depressive symptomatology on specific components of mindreading ability as assessed by the Th.o.m.a.s scales. The involvement of a second control group of patients with major depression but without BPD could further refine our understanding of how depressive symptomatology affects mindreading. A direct comparison between these two forms of psychopathology could support a more precise understanding of the role played by depressive symptoms in the mindreading competencies of patients with BPD.

Future studies could also explore sociodemographic aspects and how they may influence mindreading competence and performance in BPD patient populations. Sociodemographic issues have been addressed in BPD (i.e., Cramer et al., 2007). Possible interactions between sociodemographic traits and performance in ToM tasks should be researched in BPD patient groups.

Overall, the results of our study show the benefits of assessing mindreading competence in heterogeneous patient groups such as BPD patient groups using multicomponent assessment tools that permit researchers to compare the various components of mindreading as distinct component skills rather than taking a global view of mindreading competence. For maximum efficacy, interview testing should be based on real-life events and situations drawn from the patient's own everyday life and personal relationships. The identification of a specific profile of mindreading dysfunction in patients with BPD could ultimately have useful implications for clinical therapy.

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