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RESEARCH ARTICLE

Theory of mind and emotion regulation difficulties in adolescents with borderline traits

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ABSTRACT

Objective. Dysfunctions in both emotion regulation and social cognition (understanding behavior in mental state terms, or mentalizing) have been proposed as explanations for disturbances of interpersonal behavior in Borderline Personality Disorder (BPD). This study aimed to examine mentalizing in adolescents with emerging BPD from a dimensional and categorical point of view, controlling for sex, age, Axis I and Axis II symptoms, and to explore the mediating role of emotion regulation in the relation between theory of mind and borderline traits.

Method. The newly developed Movie for the Assessment of Social Cognition (MASC) was administered alongside self-report measures of emotion regulation and psychopathology to 111 adolescent inpatients between the ages of 12-17 (mean age = 15.5; *SD* = 1.44). For categorical analyses borderline diagnosis was determined through clinical interview, which

showed that 35% of the sample met criteria for BPD.

Results. Findings suggest a unique relationship between borderline traits and 'overmentalizing' (excessive inaccurate mentalizing) independent of age, sex, externalizing, internalizing and psychopathy symptoms. The relation between overmentalizing and BPD traits was mediated by difficulties in emotion regulation, accounting for 43.5% of the overmentalizing to BPD path.

Conclusions. Results suggest that in borderline patients the loss of mentalization is more apparent in the emergence of unusual alternative strategies (overmentalizing)

than in the loss of the capacity *per se* (no mentalizing or undermentalizing). Moreover, for the first time, empirical evidence is provided to support the notion that mentalizing exerts its influence on borderline traits through the mediating role of emotion dysregulation.

Introduction

Disturbances in interpersonal relations are commonly considered one of the three core symptoms of Borderline Personality Disorder (BPD), alongside impulsivity and affective instability[1, 2 3, 4]. It has been proposed that dysfunction in mentalizing may lie at the foundation of these disturbances[5-7]. The concept of mentalizing has been in use in psychoanalytic literature since the 1970s.[8] It was incorporated into the neurobiological, as well as the developmental literature [9, 10] in the 1980s and 1990s, where it has been used interchangeably with the more frequently used concept of 'theory of mind' (ToM). Premack and Woodruff[11] coined the term 'theory of mind' to refer to the capacity to interpret other people's behavior within a mentalistic framework in order to understand how self and others think, feel, perceive, imagine, react, attribute, infer, and so on. It is through this capacity that we are able to engage in the activities that humans value most, such as family, friendship, love, cooperation, play, and community[12], but perhaps also gaining advantage in intra-species competition for resources [13].

A wide range of constructs that may be considered aspects of mentalizing have been investigated in relation to BPD in adults and are reviewed elsewhere[6, 14]. Given the developmental nature of the mentalization theory of BPD[15], and the accumulating evidence of the seriousness of adolescent precursors of BPD[16-18], mentalization could be an important early target for intervention, making it possible to influence the developmental trajectory of BPD [19, 20]. To our knowledge, ToM (or mentalizing) has not yet been studied in relation to BPD in adolescents. There are two possible reasons for

this paucity of studies. First, the diagnosis of personality disorders in general in adolescents is still associated with controversy[21-23] and some clinicians appear to be reluctant to consider the diagnosis[24]. The instability of personality in adolescence[25] and the stigma associated with a diagnosis of personality disorder are both reasons for this reluctance[26], along with the suggestion that symptoms of BPD are better explained by Axis I symptoms[27]. However, there has been a steady increase in evidence supporting the diagnosis of juvenile BPD. As summarized in several recent review articles[18, 28], this includes evidence for longitudinal continuity[29, 30] , a genetic basis[31-33], overlap in the latent variables underlying symptoms[17, 34, 35] and the risk factors[36-38] for adolescent BPD and the full-blown adult disorder, and evidence for marked separation of course and outcome of adolescent BPD and other Axis-I and Axis-II disorders[20, 30, 39].

A further challenge for studies investigating mentalizing dysfunction in adolescent BPD relates to measurement. Most ToM tasks developed over the last 20 years show ceiling effects in older age groups or lack divergent validity for disorders other than autism spectrum disorders[40]. Developmentally more advanced tests of social cognition have been introduced in recent years[41-43] but these tend to measure only singular aspects of mentalizing, and do not resemble the demands of everyday-life social cognition[44]. To address these limitations, Dziobek and colleagues[44] recently developed a naturalistic, video-based instrument for the assessment of ToM called the Movie for the Assessment of Social Cognition (MASC). The MASC not only allows for the usual dichotomous (right/wrong) response format, which is reflected in its total score, but also opens up the possibility of studying dysfunction in mentalization by including a

qualitative error analysis where wrong choices (distracters) correspond to one of three error categories: (1) undermentalizing involving insufficient mental state reasoning resulting in incorrect, "reduced" mental state attribution; (2) undermentalizing involving a complete lack of ToM; and (3) overmentalizing reflecting over-interpretative mental state reasoning[45]. In addition the test considers different mental state modalities (thoughts, emotions, intentions) with positive, negative and neutral valence[44].

The first aim of this study was to investigate the relationship between borderline traits and mentalizing as measured by the MASC in a clinical sample of adolescents, in order to assess the specificity of mentalizing dysfunction in psychopathology involving BPD. There is considerable evidence for anomalous social cognition involving over-interpretive mentalizing associated with BPD, including reports of a general hypervigilance and hypersensitivity to social-emotional stimuli[46-48], and findings suggesting that these individuals have difficulty with suppressing irrelevant aversive information[49]. We predicted a positive relationship between BPD and overmentalizing or excessive ToM, from both a dimensional (trait) and categorical (diagnosis) perspective.

In examining this relationship, several potential confounding factors had to be controlled for. Studies have shown a correlation between increased ToM understanding and age[50], and female sex[51]. A gender difference has also been reported for BPD traits[52], although not all studies find predominance of female individuals in adolescent BPD samples[30]. The most common comorbid disorders with BPD have known social-cognitive deficits, particularly externalizing[54] and internalizing[55] problems on Axis I and

psychopathy on Axis II[56, 57]. Moreover, given the concerns about the borderline construct in adolescence, and the high comorbidity between BPD and Axis I and Axis II conditions [53], we wished to control for these confounds in order to establish the specificity of the relationship of borderline personality features and mentalizing dysfunction by statistically controlling for these characteristics. We acknowledge that this is a conservative strategy in so far as these co-occuring demographic and clinical features may not be independent but may be part of this complex disorder. Taken together, we expected borderline traits to associate with overmentalizing, even when controlling for sex, age, symptoms of internalizing and externalizing disorder and psychopathic traits.

The second aim of the study was to investigate whether dysfunctional emotion regulation (ER) was an alternative (separate) or a linked aspect of vulnerability to BPD. The most comprehensive and coherent body of clinical research involving BPD has consistently emphasized the role of ER. Linehan's work[58] on the role of ER has not only provided a highly efficacious set of clinical interventions focused around this hypothesized dysfunction, but has also provided extensive cross-sectional and some developmental data linking ER to difficulties observed in BPD[59]. ER and mentalizing may be independent predictors of borderline traits in adolescents. However, ER includes the awareness and understanding of emotions, the acceptance of emotions, and the ability to control impulsive behaviors and behave flexibly in accordance with desired goals when experiencing negative emotions[59], all of which overlap with the mentalizing construct. ER and mentalizing have not been studied in the same

individuals at the same time, either in adolescents or in adults with BPD. We have initially hypothesized that difficulties in emotion regulation may antedate and to some measure underpin mentalizing problems, because ER dysfunction may disrupt the social processes through which mentalizing is normally acquired and thus 'cause' dysfunctions in mentalization (Fonagy, P., Gergely, G., Jurist, E., & Target, M. (2002). Affect Regulation, Mentalization and the Development of the Self. New York: Other Press. Subsequently, Sharp and Fonagy[6, 60] suggested that poor mentalizing capacity in the child may be associated with insecure attachment, which in turn is linked to poor parental mentalizing capacity, and that this may result in the development of psychopathology by bringing about ER difficulties. Mentalizing in our view involves the capacity to understand oneself as well as others in mentalistic terms that extend to states of affect, desire and belief (both epistemic and affective states), and thus it could be argued that mentalizing is an important component of emotion regulation, particularly in the context of social relationships. This study offered the opportunity to test a model in which ER problems play a role in mediating the relationship between mentalizing and BPD.

Methods

Participants

The sample included 111 consecutive admissions (62 girls and 49 boys) to the Adolescent Treatment Program of a private tertiary care inpatient treatment facility specializing in the evaluation and stabilization of adolescents who failed to respond to

previous interventions. Adolescents were between the ages of 12 and 17 (mean age = 15.5; *SD* = 1.44). All patients received a comprehensive psychiatric evaluation at intake. 80% of the sample was diagnosed with a mood disorder (dysthymia, major depressive disorder, bipolar disorder), 52% received an anxiety disorder diagnosis (PTSD, GAD, social phobia, other phobias, OCD) and 24% were diagnosed with an externalizing disorder (ADHD, Conduct Disorder, Oppositional Defiant Disorder). The modal number of diagnoses was two and the average number of diagnoses between two and three. Ten percent of the sample had at least one or more suicide attempts in the last year, while 27% had a lifetime history of one or more suicide attempts. 42% of the sample reported cutting during the last year, and 48% reported ever cutting. 48% of the sample scored above the clinical cut-off (T-score of 65) for internalizing disorders, and 37% for externalizing disorders on the YSR[61], 23% of the sample (n = 24) met criteria for BPD on the Child Interview for DSM-IV Borderline Personality Disorder[62]. While the unit was in principle open to all mental disorders, the study adopted the following exclusion criteria: (1) diagnosis of schizophrenia or any psychotic disorder, and/or (2) diagnosis of mental retardation. Inclusion criteria were: (1) age between 12 and 17, and (2) sufficient fluency in English to complete all research. Complete data was absent for 4 individuals who were removed from the final dataset.

Measures

Theory of mind (mentalizing). The MASC[44] is a computerized test for the assessment of theory of mind or mentalizing abilities that approximates the demands of

everyday life[63]. Subjects are asked to watch a 15-minute film about four characters getting together for a dinner party. Themes of each segment cover friendship and dating issues. Each character experiences different situations through the course of the film that elicit emotions and mental states such as anger, affection, gratefulness, jealousy, fear, ambition, embarrassment, or disgust. The relationships between the characters vary in the amount of intimacy (friends – strangers) and thus represent different social reference systems on which mental state inferences have to be made.

During administration of the task, the film is stopped at 45 points during the plot and questions referring to the characters' mental states (feelings, thoughts, and intentions) are asked (e.g., “What is Betty feeling?”, “What is Cliff thinking?”). Participants' correct responses are scored as one point and added to an overall score. In addition to the total score, (i) overmentalizing, (ii) undermentalizing, and (iii) no mentalizing are scored. Similar to a study with young adults[63], we used the multiple-choice version of the MASC that offers four options for each query (MASC-MC): the three options described above, in addition to a control question which demands non-social inferences to be made, thereby controlling for verbal understanding of the task stimuli. The MASC is a reliable instrument that has proven sensitive in detecting subtle mindreading difficulties in adults of normal IQ[44], young adults under stress conditions[63], as well as patients with bipolar disorder[45], and autism[64].

Borderline Personality Features Scale for Children (BPFS-C). The BPFSC is a self-report instrument that assesses borderline personality features among children and adolescents aged nine and older[65]. The BPFSC is based upon the BOR (borderline)

Scale of the Personality Assessment Inventory (PAI[66]), modified for youth. A four-point Likert scale ranging from 1 (*not at all true*) to 5 (*always true*) is used to report on affective instability, identity problems, negative relationships and self-harm. The BPFSC has shown good internal consistency across 12 months as well as construct validity[65] and criterion validity[67]. In the current study Cronbach's α was .90.

Childhood Interview for DSM-IV Borderline Personality Disorder (CI-BPD). The CI-BPD is a semi-structured interview that assesses DSM-IV BPD in latency-age children and adolescents[62]. It was adapted for use in youth from the Diagnostic Interview for Personality Disorders. After asking a series of corresponding questions, the interviewer rates each DSM-based criterion with a score of 0 ("absent"), 1 ("probably present"), or 2 ("definitely present"). The patient meets criteria for BPD if five or more criteria are met at the 2-level. The CI-BPD has adequate inter-rater reliability and demonstrated a significant relationship to clinician diagnosis at time of discharge in the current sample ($\chi^2 = 20.25$, $p < .001$). Internal consistency was good with a Cronbach's alpha of .82.

The Youth Self-Report. The Youth Self-Report (YSR)[61] is a self-report measure of psychopathology. The measure contains 112 problem items, each scored on a 3-point scale (0= '*not true*', 1='*somewhat or sometimes true*', or 2='*very or often true*'). The measure yields a Total Problems *t*-score of general psychiatric functioning and two broad subscales of Externalizing behavior problems and Internalizing behavior problems. Externalizing is composed of the subscales Aggressive behavior and Rule-

breaking behavior; and Internalizing is composed of the subscales Anxious/Depressed, Withdrawn/Depressed, and Somatic Complaints.

The Antisocial Process Screening Device (APSD). The APSD[68] is the most commonly used questionnaire measure of youth psychopathic traits[69]. It is a 20-item self-report measure designed to assess traits associated with the construct of psychopathy similar to those assessed by the PCL-R[70]. Each item on the APSD is scored either 0=‘*not at all true*’, 1=‘*sometimes true*’, or 2=‘*definitely true*’ with the total score indicating overall level of psychopathic traits.

The Difficulties in Emotion Regulation Strategies Scale (DERS). The DERS[59] provides a comprehensive assessment of difficulties in ER, including awareness and understanding of emotions, acceptance of emotions, the ability to engage in goal-directed behavior and refrain from impulsive behavior when experiencing negative emotions, as well as the flexible use of situationally appropriate strategies to modulate emotional responses. After the original validation study in undergraduate students[59], the DERS has recently been validated in a community sample of adolescents[71].

Results

Descriptive statistics

Means, standard deviations and ranges for all main study variables are summarized in Table 1.

Table 1 about here

The relationship between mentalizing and borderline traits

Bivariate correlations between study variables are summarized in Table 2.

Table 2 about here

Table 2 shows that borderline traits were positively correlated with both Axis I (internalizing and externalizing problems) and psychopathy. Borderline traits were negatively correlated with the total ToM score (indicating reduced overall ToM capacity associated with increased borderline traits), which was clearly driven by a very strong correlation between ToM errors of the overmentalizing type (r = 41; p < .001). No other ToM errors correlated with borderline traits. Difficulties in emotion regulation were also strongly correlated with borderline traits (r = 62; p < .001).

Table 2 furthermore shows that, as expected, overmentalizing also correlated with age, internalizing problems, externalizing problems, and problems in emotion regulation, but not with psychopathy or gender. To determine the specificity of the relationship between overmentalizing and borderline traits, we performed a regression analysis with borderline traits as outcome variable and overmentalizing, internalizing problems, externalizing problems, age and sex as predictor variables. Sex was included in the regression because independent sample t-tests showed a significant difference between boys (m = 63.90; SD = 16.37) and girls (m = 73.85; SD = 16.31) on the BPFSC (t = 3.15; df = 107; p = .002).

Results of the hierarchical regression showed a moderately strong overall relationship between predictor variables and borderline traits, which was significantly improved by adding overmentalizing to the equation (R^2 change= xxxx, F/t=, p=). Together, predictor variables accounted for 69% of the variation in BPFSC scores (adjusted R^2). Overmentalizing was uniquely associated with borderline traits (B = .91;

p = .002), alongside sex (*B* = -9.99; *p* < .001), internalizing problems (*B* = .39; *p* < .001) and externalizing problems (*B* = .67; *p* < .001). All variables, however, were independently related to borderline features.

Mentalizing in adolescents meeting criteria for BPD vs. psychiatric controls

Independent sample t-tests showed that adolescents meeting criteria for BPD on the CI-BPD (*n* = 28; *m* = 10.13; *SD* = 5.45) were significantly more likely (*t* = -2.27; *p* = .03) to engage in overmentalizing compared to adolescents not meeting criteria on the CI-BPD (*n* = 79; *m* = 7.46; *SD* = 3.36). Group differences for all other ToM variables were non-significant.

A hierarchical logistic regression analysis with BPD diagnosis as outcome variable, and sex, age, internalizing problems, externalizing problems and overmentalizing as predictor variables confirmed the unique relationship between overmentalzing and BPD. Adding overmentalizing to the equation improved prediction of BPD from x% to y% (stats for the omnibus model) with overmentalizing (*ß* = .17; *SE* = .08; *Wald* = 4.04; *df* = 1, *p* = .04), sex (*ß* = - 2.62; *SE* = .77; *Wald* = 11.37; *df* = 1, *p* = .001) and externalizing (*ß* = .97; *SE* = .35; *Wald* = 7.47; *df* = 1, *p* = .006) making a significant contribution to the prediction.

Difficulties in emotion regulation as mediator in the relationship between overmentalizing and borderline traits

As we have seen, difficulties in ER (DERS) were strongly associated to BPFSC scores and we wished to examine whether DERS could be seen to serve as a mediator

of the relation between overmentalizing and borderline personality traits. We used standard meditational analyses methods[72, 73]. Prior to testing for mediation, formal detection-tolerance and the variance inflation factor (VIF) were conducted to test for multicollinearity. It was unnecessary to center the predictor variable[74, 75] since multicollinearity was not a problem (VIF = 1.082; tolerance = 0.925), with a tolerance of less than 0.20 or 0.10 and a VIF of less than 5 or 10.

Next, overmentalizing was regressed on the dependent variable, borderline personality traits, and then the mediator (DERS). In step one of the hierarchical regression, overmentalizing was significantly related to BPD traits [$t(1, 105) = 4.226$, $p < .0001$]. When DERS was added in step two, overmentalizing became less significant [$t(2, 105) = 2.934$, $p < .01$] and DERS was significantly related to BPD traits [$t(2, 105) = .686$, $p < .0001$]. Thus, DERS appeared to mediate some of the relation between overmentalizing and BPD (see Table 3).

Table 3 about here

Post-hoc probing of the significant mediation model was conducted with Sobel's equation[72, 73]. The significance of the mediation effect found for DERS in the relation between overmentalizing and BPD traits was tested by regressing: (1) DERS on overmentalizing (B = 2.021, SE = .703); (2) BPD on overmentalizing and DERS (B = .793, SE = .270). To determine whether the mediation effect was statistically reliable, Sobel's test ($z = 2.77$) was performed and was found to be significant at the $p < .01$ level, with approximately 43.5% of the overmentalizing to BPD path accounted for by DERS. The values of path coefficients are visually represented in Figure 1.

Figure 1 about here

Discussion

This study is the first to use a ToM task that resembled the demands of everyday-life social cognition[44] to examine mentalizing difficulties in relation to borderline traits in adolescents. While other studies have investigated aspects of emotional processing in borderline youth[76], ours is the first to use a task specifically developed to assess mentalizing impairment in psychiatric disorder by considering potential dysfunctions of mentalizing such as insufficient mental state reasoning resulting in incorrect, "reduced" mental state attribution as opposed to a complete lack of ToM. Neither undermentalizing nor complete absence of mentalizing were linked to borderline traits. By contrast, overmentalizing (over-interpretive mental state reasoning) was strongly associated with BPD features in adolescents. Those with BPD features also showed a tendency to make overly complex inferences based on social cues that resulted in errors. They tended to over-interpret social signs[45, 63]. Studies using this task have demonstrated general difficulties in ToM for individuals with autism spectrum disorders[44], and undermentalizing but not overmentalizing in adult euthymic bipolar patients[45]. Although internalizing and externalizing scores were associated with overmentalizing, controlling for these and demographic predictors of mentalizing dysfunction did not eliminate the prediction from overmentalizing to borderline trait scores. Thus the current study adds to the growing body of evidence linking varying types of social cognitive dysfunctions to particular psychiatric disorders and specifically linking overmentalizing to borderline traits in adolescents. Taken together, these results

confirm clinical[77, 78] and theoretical[6] evidence that in borderline patients the dysfunction of mentalization is more apparent in the emergence of unusual alternative strategies (overmentalizing) than in the loss of the capacity *per se* (no mentalizing or undermentalizing). This is hardly surprising, since patients with BPD present quite differently from patients with autistic spectrum disorders where undermentalization is most commonly observed.

This is also the first study to examine ToM and difficulties in ER in relation to borderline traits in adolescents. While previous studies have examined these constructs independently from each other in relation to adult BPD, they have not yet been studied together in adolescents. Our results suggest that difficulties in ER at least in part mediate the association between overmentalizing and BPD. Bearing in mind that the cross-sectional nature of the data makes these findings suggestive rather than definitive, the meditational path analyses carried out here are at least consistent with the suggestion that overmentalizing in some adolescents may be indicative of their difficulties in regulating their emotional responses to social situations, either because they misattribute inappropriate epistemic or affective states to others, or because they poorly contextualize and perhaps overinterpret their own emotional reactions. In either case, overmentalizing may cause difficulties in ER, which in turn leads to the emergence of symptoms characteristic of BPD. Results from randomized clinical trials [Bateman, A. W., & Fonagy, P. (2001). Treatment of borderline personality disorder with psychoanalytically oriented partial hospitalization: an 18-month follow-up. American Journal of Psychiatry, 158(1), 36-42.; Bateman, A., & Fonagy, P. (2008). 8-year follow-

up of patients treated for borderline personality disorder: mentalization-based treatment versus treatment as usual. Am J Psychiatry, 165(5), 631-638. Bateman, A. W., & Fonagy, P. (2009). Randomized controlled trial of outpatient Mentalization-based Treatment versus Structured Clinical Management for borderline personality disorder. American Journal of Psychiatry, 166(12), 1355-1364.] testing a psychosocial intervention aimed at improving BPD symptoms by focusing on improving the quality of mentalization in an attachment context [78] are consistent with this model. We have suggested that asking patients to focus on emotional links of thoughts and other mental states specifically in an attachment context can lead to improved emotion regulation [Fonagy, P., & Bateman, A. W. (2006). Mechanisms of change in mentalization-based treatment of BPD. J Clin Psychol, 62, 411-430].

An alternative model of the cross-sectional associations we observed might suggest that ER problems may cause mentalization dysfunction. There is extensive neurophysiological evidence from adults and children that emotional arousal disrupts mentalizing in a range of contexts [Bartels, A., & Zeki, S. (2000). The neural basis of romantic love. Neuroreport, 11(17), 3829-3834; Bartels, A., & Zeki, S. (2004). The neural correlates of maternal and romantic love. Neuroimage, 21(3), 1155-1166; Gobbini, M. I., & Haxby, J. V. (2007). Neural systems for recognition of familiar faces. Neuropsychologia, 45(1), 32-41; Gobbini, M. I., Leibenluft, E., Santiago, N., & Haxby, J. V. (2004). Social and emotional attachment in the neural representation of faces. Neuroimage, 22(4), 1628-1635; Ortigue, S., Bianchi-Demicheli, F., Hamilton, A. F., & Grafton, S. T. (2007). The neural basis of love as a subliminal prime: an event-related

functional magnetic resonance imaging study. J Cogn Neurosci, 19(7), 1218-1230.]. Emotion dysregulation may have causes independent of mentalizing problems. It is well-known that borderline patients commonly have histories of significant trauma[80, 81]. Recent animal research suggests that early trauma may permanently affect the HPA axis[82]. Research with traumatized children and adult female victims of childhood sexual abuse has also demonstrated persistent changes in the HPA axis[83-86]. Indeed, abnormal stress responsivity has been demonstrated in borderline patients[87, 88]. Increased stress responsivity, in turn, affects mentalizing capacity. A recent study[63] used the MASC to show that high cortisol responding women make more mentalizing errors after stress induction – in particular due to a tendency to overmentalize - thereby demonstrating that stress responsivity modulates social cognition.

A less parsimonious but ultimately more plausible model would assume that mentalizing and emotion dysregulation represent separate but interacting difficulties in individuals with a vulnerability to BPD. In a dynamic developmental model, we may consider early affect dysregulation to undermine an individual's capacity to utilize social environments that are likely to enhance the development of mentalizing, particularly family environments [Dunn, J., & Brown, J. (2001). Relationships, talk about feelings, and the development of affect regulation in early childhood. In J. Garber & K. Dodge (Eds.), Affect regulation and dysregulation in childhood (pp. 89–108). Cambridge: Cambridge University Press. Dunn, J., Deater-Deckard, K., Pickering, K., & Golding, J. (1999). Siblings, parents, and partners: family relationships within a longitudinal community study. ALSPAC study team. Avon Longitudinal Study of Pregnancy and

Childhood. J Child Psychol Psychiatry, 40(7), 1025-1037], leading to dysfunctional mentalization. Overmentalizing, which involves over-interpreting social cues in others, in turn, derails the emotion regulation system spinning the adolescent into a vicious cycle of over-interpreting what others are thinking and being unable to regulate the anxious rumination caused by this over-interpretation.

There are several limitations to this study, most notably the cross-sectional nature of the mediational model. Further, we are just beginning to appreciate the complexities of the normal development of mentalizing in adolescence [Blakemore, S. J. (2008). The social brain in adolescence. Nat Rev Neurosci, 9(4), 267-277. Blakemore, S. J., den Ouden, H., Choudhury, S., & Frith, C. (2007). Adolescent development of the neural circuitry for thinking about intentions. Soc Cogn Affect Neurosci, 2(2), 130-139], which must provide the background for the anomalies observed in this group. Longitudinal studies will be needed to elaborate our understanding of the dynamic interplay of emotion regulation and mentalization across development. Notwithstanding this limitation, the current study is important as the first to examine mentalizing and emotion dysregulation in adolescent BPD. It has been suggested that disturbed relationships may be a phenotype for BPD in the same way that impulsivity and affective instability have been conceptualized[1]. The psychological endophenotype of mentalizing offers an important bridge from the neurobiology of relationships to the more specific interpersonal impairments of BPD. It also provides a valuable target for treatment in adolescents with emerging BPD. Given that the MASC has recently been

adapted for fMRI[89], a natural next step would be to examine the neural correlates of overmentalizing in adults or adolescents with BPD.

Table 1. Means, standard deviations and ranges for all main study variables

	Mean	SD	Range
Age	15.49	1.44	12-17
Total BPFSC	69.47	17.00	30-112
YSR Internalizing	62.45	13.11	32-89
YSR Externalizing	60.96	10.81	34-91
Total APSD	15.32	5.74	0-33
Total ToM	31.84	5.48	10-39
Excessive ToM	8.11	4.08	2-26
No ToM	1.93	1.65	0-7
Less ToM	3.12	2.45	0-18
Control ToM	4.51	1.24	1-6
DERS total	102.18	31.08	38-173

Table 2. Bivariate correlations between main study variables (n = 107)

	Age	BPFSC	Int	Ext	YPI	TotToM	ExToM	8	9	10	11
1. Age	1										
2. BPFSC	-.03	1									
3. Int	.11	.53**	1								
4. Ext	.07	.60**	.35**	1							
5. APSD	.13	.36**	.26**	.61**	1						
6. Tot ToM	.27**	-.22*	-.03	-.12	.06	1					
7. Ex ToM	-.25**	.41**	.25**	.27**	.16	-.78**	1				
8. No ToM	.02	-.08	-.13	-.03	-.04	-.38**	-.02	1			
9. Less ToM	-.14	-.13	-.29**	-.16	-.33**	-.49	.04	.17	1		
10. Cont	.12	.14	.11	-	-	.36**	-.24*	-	-	1	

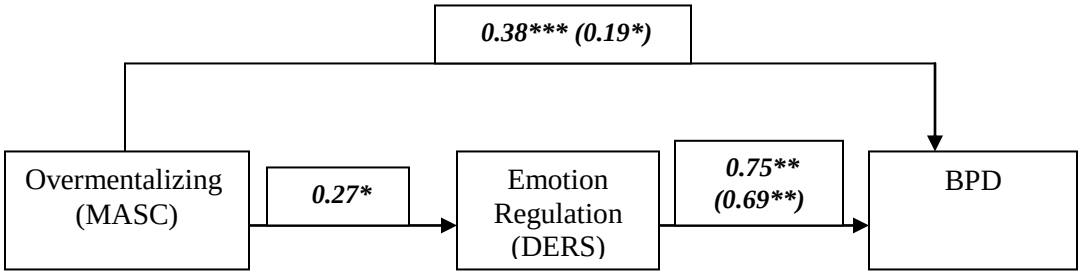
ToM				.02	.001			.23*	.25**		
11. DERS	-.02	.75**	.62**	.48**	-.32**	-.11	.25**	-.09	-.09	.14	1

Table 3. Summary of hierarchical regression analysis for mediation of overmentalizing to Borderline Personality Traits (n = 107)

Variable	B	SE B	ß
Step 1			
	1.56	.370	.383**
Overmentalizing			
Step 2			
	.793	.270	.194*
Overmentalizing			
DERS	.375	.036	.686**

Note. R^2 = .15 for Step 1 (p < .0001); ΔR^2 = .58 for Step 2 (p < .0001). MASC = Movie for the Assessment of Social Cognition; DERS = Difficulties in Emotion Regulation Scale. * p < .01, **p < .0001.

Figure 1.



Note: Values on each path are standardized β's (path coefficients). Those coefficients inside of parentheses are standardized partial regression coefficients from equations that include both variables with direct effects on the criterion or dependent variable.

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