

Theory of Mind and Emotion Regulation Difficulties in Adolescents With Borderline Traits

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Objective: Dysfunctions in both emotion regulation and social cognition (understanding behavior in mental state terms, theory of mind 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 gender, 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 to 17 (mean age = 15.5 years; SD = 1.44 years). For categorical analyses borderline diagnosis was determined through semi-structured clinical interview, which showed that 23% of the sample met criteria for BPD. **Results:** Findings suggest a relationship between borderline traits and “hypermentalizing” (excessive, inaccurate mentalizing) independent of age, gender, externalizing, internalizing and psychopathy symptoms. The relation between hypermentalizing and BPD traits was partially mediated by difficulties in emotion regulation, accounting for 43.5% of the hypermentalizing to BPD path. **Conclusions:** Results suggest that in adolescents with borderline personality features the loss of mentalization is more apparent in the emergence of unusual alternative strategies (hypermentalizing) 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. *J. Am. Acad. Child Adolesc. Psychiatry*, 2011;50(6): 563–573. **Key Words:** borderline personality disorder, social cognition, mentalizing, theory of mind, emotion dysregulation

Disturbances in interpersonal relations are commonly considered one of the three core symptoms of Borderline Personality Disorder (BPD), alongside impulsivity and affective instability.¹⁻⁴ 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 1970s⁸ to refer to the process of mental elaboration, including symbolization, which

leads to the transformation and elaboration of drive-affect experiences as mental phenomena and structures.⁹ It was incorporated into the neurobiological, as well as the developmental literature^{10,11} in the 1980s and 1990s, where it has been used interchangeably with the more frequently used concept of “theory of mind” (ToM). Premack and Woodruff¹² coined this term to refer to the capacity to interpret other people’s behavior within a mentalistic framework to understand how self and others think, feel, perceive, imagine, react, attribute, infer, and so on.

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.^{6,13} Given the developmental



This article is discussed in an editorial by Drs. Marianne Goodman and Larry J. Siever on page 536.



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nature of the mentalization theory of BPD¹⁴ and the accumulating evidence of the seriousness of adolescent precursors of BPD,¹⁵⁻¹⁷ mentalization could be an important early target for intervention for influencing the developmental trajectory of BPD.^{9,18} To our knowledge, ToM (or mentalizing) has not yet been studied in relation to BPD in adolescents. There are two possible reasons for this. First, the diagnosis of personality disorders in adolescents is still associated with controversy²⁰⁻²²; because of the instability of personality in adolescence,²³ the stigma associated with a diagnosis of personality disorder and the suggestion that symptoms of BPD are better explained by Axis I symptoms²⁴. However, there has been a steady increase in evidence supporting the diagnosis of juvenile BPD,^{17,25} including evidence for longitudinal continuity,^{26,27} a genetic basis,²⁸⁻³⁰ overlap in the latent variables underlying symptoms,^{16,31,32} and the risk factors³³⁻³⁵ 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.^{19,27,36}

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.³⁷ Developmentally more advanced tests of social cognition have been introduced in recent years,³⁸⁻⁴⁰ but these tend to measure only singular aspects of mentalizing, and do not resemble the demands of everyday-life social cognition.⁴¹ To address these limitations, Dziobek *et al.*⁴¹ 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 includes a qualitative error analysis where wrong choices (distracters) correspond to one of three error categories: (1) "less ToM" (undermentalizing) involving insufficient mental state reasoning resulting in incorrect, "reduced" mental state attribution, in which case a research participant may refer to mental states but in an impoverished way; (2) "no ToM" (no mentalizing) involving a complete lack of ToM; in this case, a research participant may fail to use any mental state term in explaining behavior; and (3) "exces-

sive ToM" (hypermentalizing) reflecting over-interpretative mental state reasoning.⁴² In addition, the test considers different mental state modalities (thoughts, emotions, intentions) with positive, negative, and neutral valence.⁴¹

The first aim of the current study was to investigate the relation between borderline traits and mentalizing as measured by the MASC in a clinical sample of adolescents, to assess the specificity of mentalizing dysfunction in psychopathology involving BPD. We were particularly interested in the relation between hypermentalizing and borderline features. The concept of hypermentalizing has a strong tradition in the psychoanalytic literature, where it typically refers to excessive use of projection.⁴³ In the neuroscience literature, the concept is used by Frith *et al.*⁴⁴ in describing the attribution of higher levels of intentionality than appears contextually appropriate. In particular, Frith *et al.* used the term "hypermentalizing" to refer to mentalizing errors occurring through the overinterpretation or overattribution of intentions or mental states to others. There is considerable evidence for anomalous social cognition involving over-interpretive or hypermentalizing associated with BPD in adults, including reports of a general hypervigilance and hypersensitivity to social-emotional stimuli,⁴⁵⁻⁴⁷ and findings suggesting that these individuals have difficulty with suppressing irrelevant aversive information.⁴⁸ Moreover, most studies support the notion that those with BPD are able to recognize mental states in the self and others, with some studies even demonstrating enhanced capacity to discriminate the mental state of others from expressions in the eye region of the face.⁴⁹ On this basis, we predicted that BPD features would be exclusively related to hypermentalizing or excessive ToM (as opposed to undermentalizing or no mentalizing), from both a dimensional (trait) and categorical (diagnosis) perspective.

In examining this relationship, we had to control for several potential confounding factors. Studies have shown that being older⁵⁰ and female⁵¹ are both correlated with increased ToM understanding. A gender difference has also been reported for BPD traits,⁵² although not all studies find predominance of female individuals in adolescent BPD samples.²⁷ The most common comorbid disorders with BPD have known social-cognitive deficits, particularly externalizing⁵³ and internalizing⁵⁴ problems on Axis I and

psychopathy on Axis II.^{55,56} Moreover, given the concerns about the borderline construct in adolescence and the high comorbidity between BPD and Axis I and Axis II conditions,⁵⁷ we wished to statistically control for these confounds in order to establish the specificity of the relation between borderline personality features and mentalizing dysfunction. Taken together, we expected borderline traits to associate with hypermentalizing, even when controlling for gender, age, symptoms of internalizing, externalizing disorder, and psychopathic traits, as well as categorical disorders.

The second aim of the study was to investigate whether difficulty in 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 work⁵⁸ 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.⁵ ER and mentalizing may be independent predictors of borderline traits in adolescents. However, ER, as operationalized in the current study using the Gratz et al. formulation,⁵⁹ includes the awareness and understanding of emotions, the acceptance of emotions, and the ability to control impulsive behaviors and to behave flexibly in accordance with desired goals when experiencing negative emotions, 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. One hypothesis is that hypermentalizing (the overinterpretation of others' mental states) may increase difficulties in emotion regulation, which in turn may be associated with increased borderline symptoms. As such, ER dysfunction will partially mediate the relationship between mentalizing and BPD.

METHOD

Participants

All consecutive admissions ($N = 132$) to the Adolescent Treatment Program of a private tertiary care inpatient treatment facility were approached to participate in the study. The adolescent unit specializes in the evaluation and stabilization of adolescents who failed to respond to previous interventions. Inclusion

criteria were ages between 12 and 17 years, English as a first language, and admission to the unit. A total of 21 subjects were excluded from the final analyses because of declining or revoking consent, discharging before the completion of research assessments, or exclusion criteria, which included active psychosis, $IQ < 70$, diagnosis of autism spectrum disorder, and primary language not being English. All adolescents were admitted voluntarily. Of the sample, 52.4% reported no specific reason for admission. Those who reported reasons for admission cited the following: death of loved one (7%), divorce/remarriage (4.9%), problems with romantic partners (3.2%), school/city move (6.5%), social problems (3.2%), family problems (7.6%), academics (3.2%), depression/suicidality (3.2%), attention-deficit/hyperactivity disorder (ADHD; 2.2%), rape/abuse (1%/6%) and substance-related problems (1.1%).

Our final sample comprised of 111 adolescents (62 girls and 49 boys; mean age = 15.5 years; $SD = 1.44$ years). The Diagnostic Interview Schedule for Children (DISC)⁶⁰ was administered to participants at intake. Of this sample, 80% were diagnosed with a mood disorder (dysthymia, major depressive disorder, bipolar disorder); 52% received an anxiety disorder diagnosis (PTSD, GAD, social phobia, other phobias, OCD); 24% were diagnosed with a disruptive behavior disorder (ADHD, conduct disorder, oppositional defiant disorder), whereas 50% of the sample had a diagnosis of either substance abuse or dependence. The modal number of diagnoses was two and the average number of diagnoses between two and three, with all adolescents receiving at least one Axis I diagnosis. Of the sample, 10% had at least one or more suicide attempts in the last year, whereas 27% had a lifetime history of one or more suicide attempts. In addition, 42% of the sample reported cutting during the last year, and 48% reported ever cutting. Other prevalent forms of purposeful self-harm included: cigarette burns (10.9%), skin carving (39.1%), sticking materials into the skin (31.8%), and punching (20%). Of the sample, 48% scored above the clinical cut-off (t -score of 65) for internalizing disorders, and 37% for externalizing disorders on the YSR,⁶¹ and 23% of the sample ($n = 24$) met criteria for BPD on the Childhood Interview for DSM-IV Borderline Personality Disorder.⁶²

Measures

Theory of Mind (Mentalizing). The MASC⁴¹ is a computerized test for the assessment of theory of mind or mentalizing abilities that approximates the demands of everyday life.⁶³ Examples of test stimuli are provided in the online supplemental material (Supplement 1, available online). 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 experi-

ences 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 (from friends to 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?" or "What is Cliff thinking?"). Participants are provided with four response options: (1) a hypermentalizing response, (2) an undermentalizing response, a (3) no mentalizing response, and a (4) accurate mentalizing response. To derive a summary score of each of the subscales, points are simply added, so that, for instance, a subject who chose mostly hypermentalizing response options would have a high hypermentalizing score. Similarly, participants' correct responses are scored as one point and added. To calculate an overall mentalizing score, mentalizing errors are subtracted from accurate mentalizing, such that for the overall score, a higher score indicates accurate mentalizing. The MASC is a reliable instrument that has proved sensitive in detecting subtle mindreading difficulties in adults of normal IQ,⁴¹ young adults,⁶³ as well as patients with bipolar disorder⁴² and autism.⁶⁴

Borderline Personality Features Scale for Children (BPFSC). 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 (PAI⁶⁶), modified for youth. A five-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 validity⁶⁵ and criterion validity.⁶⁷ In the current study, Cronbach's α was 0.90.

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 interrater reliability⁶² and demonstrated significant, albeit moderate, agreement with clinician diagnosis at time of discharge in the current sample ($\kappa = 0.47$; $p < .001$). Internal consistency was good, with a Cronbach's alpha of 0.82.

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 three-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.

Antisocial Process Screening Device (APSD). The APSD⁶⁸ 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.

Difficulties in Emotion Regulation Strategies Scale (DERS). The DERS⁵⁹ 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. It consists of 36 items that are scored on a five-point Likert scale, ranging from 1 (almost never [0–10%]) to 5 (almost always [91–100%]). A higher total score indicates greater emotion dysregulation. The highest possible total score is 180. The measure has demonstrated adequate construct and predictive validity and good test-retest reliability in undergraduate students,⁵⁹ and was recently validated in a community sample of adolescents.⁷¹ The DERS has been used previously in inpatient adolescent samples.^{72,73} In the present sample, internal consistency of this measure was good with a Cronbach's alpha of 0.86.

Diagnostic Interview Schedule for Children (DISC). The DISC⁶⁰ is a highly structured clinical interview used to diagnose psychiatric disorders in children and adolescents between the ages of 9 and 17 years. Although it is designed to be administered by lay interviewers, all adolescents in this study were interviewed by doctoral psychology students or clinical research assistants who had completed training and several practice sessions administering the interview under the supervision of the first author. The interview is administered after computerized prompts that the interviewer reads out loud. The adolescent's answer is then input into the program and the program presents the next appropriate prompt. In this study, the interviews were always administered in private, with the interviewer and adolescent facing one another and

the computer monitor within viewing distance of the interviewer. For the purposes of this study, only "Positive Diagnoses" that met all DSM criteria on the clinical report of the DISC were considered. All positive diagnoses of anxiety (including social phobia, separation anxiety, specific phobia, panic disorder, agoraphobia, generalized anxiety disorder, post-traumatic stress disorder, and obsessive compulsive disorder) were grouped together to form the "any anxiety" category. Similarly, dysthymia and major depressive disorder were grouped into the "any depression" category and conduct, oppositional defiant disorders, and ADHD were grouped into the "disruptive behavior disorder" category.

Procedures

The study was approved by the appropriate institutional review board. All adolescents admitted to the inpatient psychiatric unit were approached on the day of admission about participating in this study. Informed consent from the parents was collected first, and, if granted, assent from the adolescent was obtained in person. Adolescents were then consecutively assessed by doctoral level clinical psychology students, licensed clinicians, and/or trained clinical research assistants under the direct supervision of the first author and following the instructions associated with each assessment tool. Diagnostic interviews were conducted independently and in private with the adolescents. All adolescents were assessed within the first 2 weeks after admission. The average length of stay in this program is 5 to 7 weeks.

Data Analysis Plan

Preliminary Analyses. Before testing the main study hypotheses, preliminary analyses were run to determine means, standard deviations and ranges for all main study variables. Next, Pearson correlations, χ^2 tests and independent sample *t*-test were run to examine the bivariate relations between main study variables (including categorical DISC diagnoses) and to determine which possible confounders (externalizing, problems, internalizing problems, psychopathy, gender, and age) needed to be controlled for in the multivariate regressions.

Multivariate Regression Analyses. Depending on bivariate relations, predictors were entered into two types of regression analyses to determine the specificity of the relationship between hypermentalizing and borderline traits: (1) a hierarchical linear regression to examine the relation between mentalizing and borderline features dimensionally; and (2) a hierarchical logistic regression to examine the relation between mentalizing and a categorical diagnosis of BPD. Demonstrating links between mentalizing and BPD from both dimensional and categorical points of view

strengthens confidence in positive findings. In both regressions, BPD was the outcome variable and hypermentalizing, internalizing problems, externalizing problems, age, and gender were predictor variables. All predictor variables except hypermentalizing were entered on Step 1 and hypermentalizing on Step 2.

Mediational Analyses. Standard mediational analyses methods^{74,75} were used to examine difficulties in emotion regulation (DERS) as a mediator of the relation between hypermentalizing and borderline personality traits (BPD). Mediational analyses are used when it is hypothesized that a significant amount of the variance in the relationship between two variables (in this case, hypermentalizing and borderline features) is explained by a third variable (in this case, difficulties in emotion regulation). If significant, one can assume that the predictor (hypermentalizing) exerts its influence on the dependent variable (borderline features) through the effects of the third variable (difficulties in emotion regulation). First, three statistically significant relationships must be established between the following: (1) predictor (hypermentalizing) and mediator (DERS) variables; (2) predictor (hypermentalizing) and dependent (BPD) variables; and (3) mediator (DERS) and dependent (BPD) variables. A two-step hierarchical regression is then conducted to test for mediation with hypermentalizing regressed on BPD, followed by DERS being added to the regression. A significant mediation effect is indicated if hypermentalizing becomes less significant when DERS is added in step 2, and DERS remains significantly related to the dependent variable (BPD traits).

Typically, if the mediation model is significant, post hoc probing is conducted.^{74,75} In this case, two regression equations were run: (1) mediator (DERS) regressed on the predictor (hypermentalizing) variable; and (2) dependent variable (BPD) regressed on the predictor (hypermentalizing) and mediator (DERS) variables. Using the unstandardized regression coefficients and standard errors, Sobel's equation^{74,75} was then completed to test the significance of the decrease seen in the predictor-dependent relation when the mediator was entered into the model.

RESULTS

Descriptive Statistics

Means, standard deviations, and ranges for all main study variables are summarized in [Table 1](#).

Relation Between Mentalizing and Borderline Traits

Bivariate correlations between study variables are summarized in [Table 2](#).

[Table 2](#) shows that borderline traits were positively correlated with both Axis I (internalizing

TABLE 1 Means, Standard Deviations, and Ranges for All Main Study Variables

Characteristic	Mean	SD	Range
Age (y)	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
MASC: Total ToM	31.84	5.48	10–39
MASC: Excessive ToM	8.11	4.08	2–26
MASC: No ToM	1.93	1.65	0–7
MASC: Less ToM	3.12	2.45	0–18
MASC: Control ToM	4.51	1.24	1–6
DERS total	102.18	31.08	38–173

Note: In a recent study, it was shown that a clinical cut-off of 66 has adequate sensitivity and specificity in predicting interview-based diagnosis of borderline personality disorder.⁶⁷ No clinical cut-off are available for the Difficulties in Emotion Regulation Scale (DERS), Movie for the Assessment of Social Cognition (MASC), or Antisocial Process Screening Device (APSD). A t-score cut-off ≥ 65 is recommended to separate individuals at higher risk for psychopathology on the Youth Self Report (YSR).⁶¹ BPFSC = Borderline Personality Features Scale for Children; ToM = theory of mind.

and externalizing problems) and psychopathic traits. Borderline traits were negatively correlated with the total ToM score (indicating reduced overall ToM/mentalizing capacity associated with increased borderline traits), which was clearly driven by a very strong correlation between ToM errors of the hypermentalizing type ($r = 0.41$; $p < .001$). No other ToM errors corre-

lated with borderline traits. Difficulties in emotion regulation were also strongly correlated with borderline traits ($r = 0.75$; $p < .001$).

Table 2 furthermore shows that hypermentalizing also correlated with age, internalizing problems, externalizing problems, and problems in emotion regulation, but not with psychopathy or gender. Dimensional measures of externalizing and internalizing problems were therefore controlled for in subsequent multivariate analyses to examine the specificity of the BPD-hypermentalizing link. Despite relations between dimensional internalizing and externalizing scores with hypermentalizing, independent sample *t*-tests revealed no group differences in hypermentalizing for adolescents with a categorical DISC diagnoses of any mood disorder ($t = -1.10$; $df = 109$; $p = .28$), any anxiety disorder ($t = -0.13$; $df = 109$; $p = .89$), and any disruptive behavior disorder ($t = -1.33$; $df = 109$; $p = .18$). Therefore, categorical diagnoses were not controlled for in subsequent multivariate analyses. However, independent sample *t*-tests showed a significant difference between boys (mean = 63.90; SD = 16.37) and girls (mean = 73.85; SD = 16.31) on the BPFSC ($t = 3.15$; $df = 109$; $p = .002$).

Results of the hierarchical linear regression showed a moderately strong overall relationship between predictor variables and borderline traits, which was significantly improved by adding hypermentalizing to the equation (R^2 change = 5%, $F = 30.09$, $p < .001$). Together, predictor variables accounted for 62% of the variation in

TABLE 2 Bivariate Correlations Between Main Study Variables ($n = 107$)

	Age	BPFSC	Int	Ext	APSD	Tot ToM	Ex ToM	No ToM	Less ToM	Cont ToM	DERS
Age	1.00	–									
BPFSC	–0.03	1.00									
Int	0.11	0.53**	1.00								
Ext	0.07	0.60**	0.35**	1.00							
APSD	0.13	0.36**	0.26*	0.61**	1.00						
Tot ToM	0.27**	–0.22*	–0.03	–0.12	0.06	1.00					
Ex ToM	–0.25**	0.41**	0.25**	0.27**	0.16	–0.78**	1.00				
No ToM	0.02	–0.08	–0.13	–0.03	–0.04	–0.38**	–0.02	1.00			
Less ToM	–0.14	–0.13	–0.29**	–0.16	–0.33**	–0.49	0.04	0.17	1.00		
Cont ToM	0.12	0.14	0.11	–0.02	–0.001	0.36**	–0.24*	–0.23*	–0.25**	1.00	
DERS	–0.02	0.75**	0.62**	0.48**	–0.32**	–0.11	0.25**	–0.09	–0.09	0.14	1.00

Note: APSD = Antisocial Process Screening Device; BPFSC = Borderline Personality Features Scale for Children; Cont ToM = control questions theory of mind; DERS = Difficulties in Emotion Regulation Scale; Ext = externalizing problems; Ex ToM = excessive theory of mind; Int = internalizing problems; Less ToM = less theory of mind; No ToM = no theory of mind; Tot ToM = total theory of mind.

* $p < .05$; ** $p < .01$.

TABLE 3 Summary of Hierarchical Regression Analysis for Mediation of Hypermentalizing to Borderline Personality Traits ($n = 107$)

Variable	B	SE B	β	R^2	p
Step 1					
Hypermentalizing	1.56	0.370	0.383 [§]	0.15	.0001
Step 2					
Hypermentalizing	0.793	0.270	0.194**	0.58	<.0001
DERS	0.375	0.036	0.686 [§]		

Note: DERS = Difficulties in Emotion Regulation Scale.
** $p < .01$; [§] $p < .0001$.

BPFSC scores (adjusted R^2). Hypermentalizing was independently associated with borderline traits ($B = 0.91$; $p = .002$), along with gender ($B = -9.99$; $p < .001$), internalizing problems ($B = 0.39$; $p < .001$), and externalizing problems ($B = 0.67$; $p < .001$). All variables, however, were independently related to borderline features.

Mentalizing in Adolescents Meeting Criteria for BPD Versus Psychiatric Controls

Independent sample t -tests showed that adolescents meeting criteria for BPD on the CI-BPD ($n = 28$; mean = 10.13; SD = 5.45) had significantly higher hypermentalizing scores ($t = -2.27$; $p = .03$) compared with adolescents not meeting criteria on the CI-BPD ($n = 79$; mean = 7.46; SD = 3.36). Group differences for all other ToM variables were nonsignificant.

Results of the hierarchical logistic regression confirmed the unique relationship between hypermentalizing and BPD. Change in R_L^2 (calculated using the Hosmer and Lemeshow⁷⁶ method for logistic regression), showed that the addition of hypermentalizing to the equation improved prediction of BPD from 38% to 48% with hypermentalizing ($B = 0.17$; SE = .08; Wald = 4.04; $df = 1$, $p = .04$), gender ($B = -2.62$; SE = .77; Wald = 11.37; $df = 1$, $p = .001$), and externalizing problems ($B = 0.97$; SE = .35; Wald = 7.47; $df = 1$, $p = .006$) making significant contributions to the prediction.

Difficulties in Emotion Regulation as Mediator in the Relationship Between Hypermentalizing and Borderline Traits

Multicollinearity was not a problem (VIF = 1.082; tolerance = 0.925), with a tolerance of more than 0.20 or 0.10 and a VIF of less than 5 or 10 so that variables were not centered. In step 1 of the

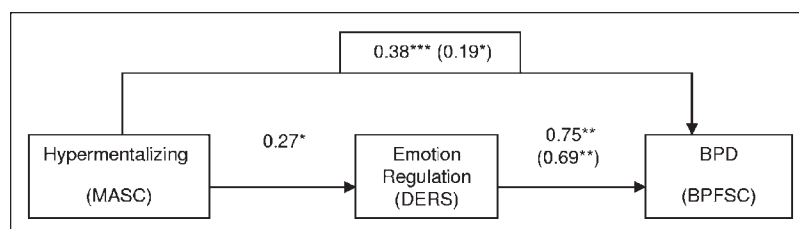
hierarchical regression, hypermentalizing was significantly related to BPD traits [$t(1, 105) = 4.226$, $p < .0001$]. When DERS was added in step 2, hypermentalizing became less significant [$t(2, 105) = 2.934$, $p < .01$] and DERS was significantly related to BPD traits [$t(2, 105) = 0.686$, $p < .0001$]. Thus DERS appeared to partially mediate the relation between hypermentalizing and BPD (Table 3).

Post-hoc tests showed the following regression coefficients: DERS on hypermentalizing ($B = 2.021$, SE = 0.703), and BPD on hypermentalizing and DERS ($B = 0.793$, SE = 0.270). Results of Sobel's test were significant ($z = 2.77$; $p < .01$), with approximately 43.5% of the hypermentalizing to BPD path accounted for by DERS (Figure 1).

DISCUSSION

This study is the first to use a ToM task that resembled the demands of everyday-life social cognition⁴¹ to examine mentalizing difficulties in relation to borderline traits in adolescents. Although other studies have investigated aspects of emotional processing in borderline youth,⁷⁷ 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, hypermentalizing (overinterpretive mental state reasoning) was strongly associated with BPD features in adolescents. Participants with BPD features showed a tendency to make overly complex inferences based on social cues that resulted in errors; these individ-

FIGURE 1 Difficulties in emotion regulation (DERS) as a mediator of the relation between hypermentalizing (MASC) and borderline personality traits (BPFSC). Note: Values on each path are standardized β values (path coefficients). Coefficients inside parentheses are standardized partial regression coefficients from equations that include both variables with direct effects on the criterion or dependent variable. * $p < .05$; ** $p < .01$; *** $p < .001$.



uals tended to overinterpret social signs. Studies using this task have demonstrated general difficulties in ToM for individuals with autism spectrum disorders⁴¹ and undermentalizing in adult euthymic bipolar patients.⁴² Although internalizing and externalizing scores were associated with hypermentalizing, controlling for these and demographic predictors of mentalizing dysfunction did not eliminate the prediction from hypermentalizing 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 hypermentalizing to borderline traits in adolescents. Taken together, these results confirm clinical^{78,79} and theoretical⁶ evidence that, in patients with borderline personality disorder, the dysfunction of mentalization is more apparent in the emergence of unusual alternative strategies (hypermentalizing) than in the loss of the capacity per se (no mentalizing or undermentalizing). This is hardly surprising, as patients with BPD present quite differently from patients with autistic spectrum disorders, in whom 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. Although previous studies have examined these constructs independently of each other in relation to adult BPD, they have not yet been studied together in adults or adolescents. Our results suggest that difficulties in ER at least in part mediate the association between hypermentalizing and BPD. Bearing in mind that the cross-sectional nature of the data makes these findings suggestive rather than definitive, the mediational path analyses carried out here are at least consistent with the suggestion that hypermentalizing in some adolescents may be indicative of their difficulties in regulating their emo-

tional 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, hypermentalizing may cause difficulties in ER, which in turn leads to the emergence of symptoms characteristic of BPD. Results from randomized clinical trials^{80,81} testing a psychosocial intervention aimed at improving BPD symptoms by focusing on improving the quality of mentalization are consistent with this model. In this approach, patients' focus on emotional links of thoughts and other mental states is suggested to lead to improved emotion regulation.⁸²

Taken together, we suggest 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 use social environments that are likely to enhance the development of mentalizing,⁸³ particularly family environments,^{84,85} leading to dysfunctional mentalization. Hypermentalizing, which involves overinterpreting social cues in others, in turn, derails the emotion regulation system spinning the adolescent into a vicious cycle of overinterpreting what others are thinking and being unable to regulate the anxious rumination caused by this overinterpretation.

There are several limitations to this study. First, diagnosis of BPD relied exclusively on adolescent self-report, and should be confirmed by parent-report in future studies. Second, the cross-sectional nature of the partial mediational model should be noted. The mediational analyses demonstrated that difficulties in emotion regulation explain a significant amount of the variance in the relation between hypermentalizing

and borderline features. In other words, hypermentalizing exerts its influence on borderline features partially through the effects of difficulties in emotion regulation. This finding should be interpreted with caution since causal relationships (e.g., $mz \rightarrow$ emotion regulation \rightarrow BPD) can be inferred with greater confidence when they are shown to develop over time; thus, the lack of longitudinal data in this study limits inference of causality or directionality.

A third limitation to the current study is that we are just beginning to appreciate the complexities of the normal development of mentalizing in adolescence,⁸⁶⁻⁸⁸ which must provide the background for the anomalies observed in this group. The dearth of studies addressing the normal and abnormal development of mentalizing in adolescents is partly due to the limited availability of mentalizing measures in this age group. Although the downward extension of the MASC from adult to adolescent populations in the current study in the absence of normal control data may be seen as a limitation, the discriminative validity demonstrated here for the MASC is encouraging. More research in the reliability and validity of this and other measures for mentalizing in adolescent populations is needed. Longitudinal studies will be needed to elaborate our understanding of the dynamic interplay of emotion regulation and mentalization across development, taking into account the trauma histories and symptoms of post-traumatic stress disorder, given the potential of these to affect the development of both mentalizing and emotion regulation capacity.

Notwithstanding these limitations, the current study is important as the first to examine mentalizing and emotion dysregulation in adolescent BPD. It has been suggested that disturbed rela-

tionships 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 logical next step would be to examine the neural correlates of hypermentalizing in adults or adolescents with BPD. ☺

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SUPPLEMENT 1: EXAMPLES FROM A MOVIE FOR THE ASSESSMENT OF SOCIAL COGNITION (MASC–MC)

For the purposes of reproducing the task material, we have developed verbal descriptions of the movie scenes. Research subjects are presented with actual movie scenes and not a narrative describing the movie scene.

INSTRUCTIONS:

- You will be watching a 15-minute film. Please watch very carefully and try to understand what each character is feeling or thinking.
- Now you will meet each character: Sandra, Michael, Betty, and Cliff (a photo is shown of each).
- The film shows these four people getting together for a Saturday evening.
- The movie will be stopped at various points and some questions will be asked. All of the answers are multiple choice and require one option to be selected from a choice of four. If you are not exactly sure of the correct answer, please guess.
- When you answer, try to imagine what the characters are feeling or thinking at the very moment the film is stopped.
- The first scene is about to start. Are you ready? Again, please watch very carefully because each scene will be presented only once.

QUESTION 1:

Imagine a movie scene that starts with the doorbell ringing. A young and attractive woman named Sandra opens the front door. Upon opening the door, a man, who looks to be around the same age as Sandra, enters the house. Sandra says “Hi” and the man asks her whether she is surprised. Before she can answer, he tells her that she looks terrific. He asks whether she did something with her hair. Sandra touches her hair and starts to say something but the young man compliments her by telling her that her hair looks very classy.

The movie then stops and the following question is presented with four options to choose from:

What is Sandra feeling?

- (1) that her hair does not look nice (no mentalizing)
- (2) that she is pleased about his compliment (less mentalizing)
- (3) that she is exasperated about the man coming on too strong (hypermentalizing)

- (4) that she is flattered but somewhat taken by surprise (accurate mentalizing)

QUESTION 5:

In a previous scene, Sandra is on the phone with her good friend Betty, whom she implores to join them for dinner. Betty had previously stated that she could think of better things to do on a Saturday night and the scene ended. This scene starts with Sandra saying to Betty while smiling “Betty, I swear if you are not at this dinner on Saturday night, I will never ever speak to you again.”

The movie then stops and the following question is presented with four options to choose from:

Why is Sandra saying this?

- (1) if Betty will not come, she will not speak to her anymore (less mentalizing)
- (2) to try to blackmail Betty into coming on Saturday (hypermentalizing)
- (3) to persuade Betty in a joking way to come (accurate mentalizing)
- (4) because Betty has better things to do on Saturday (no mentalizing)

QUESTION 30:

All four characters are now in the kitchen preparing dinner together. The scene begins with Cliff asking Sandra for a bottle opener for the new bottle of wine. Michael then states that he has finished cutting all the onions and asks what else goes into the sauce that they are preparing. Betty checks with Sandra “two cups of cream, right?” and Michael looks over to Betty and responds: “If it were up to you you’d go for five, right?” The scene ends with Betty’s sigh and expression of displeasure.

The movie then stops and the following question is presented with four options to choose from:

What is Betty feeling?

- (1) hates Michael and wants him to leave (hypermentalizing)
- (2) five cups of cream would be too much for the sauce (no mentalizing)
- (3) offended by Michael’s comment (accurate mentalizing)
- (4) astonished that Michael knows she likes cream (less mentalizing)

Note: This material has been derived from Dziobek I, Rogers K, Fleck S, Bahnemann M, Heekeren HR, Wolf OT, Convit A. Introducing MASC: a movie for the assessment of social cognition. *J Autism Dev Disord.* 2006;36:623-636, and is printed with permission of the original authors.