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Social Information Processing and Cluster B Personality Pathology among Clinic-Referred Adolescents

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Key Words
Adolescents · Mentalizing · Personality pathology · Social information processing

Abstract
Background: This study investigated relations between personality pathology and mentalizing capacities reflected in social information processing (SIP) of adolescents. ***Sampling and Methods:*** 96 adolescent outpatients completed a structured interview regarding SIP. Their clinicians completed a checklist based on DSM-IV, assessing severity of personality pathology. ***Results:*** Significant relations were found between the severity of personality pathology and SIP: the more severe the personality pathology, the higher the intensity of reported emotions, the more likely adolescents were to choose inadequate coping strategies and aggressive reactions in social situations, and the more positively they evaluated aggressive reactions. Severity of traits of antisocial (ASPD) and borderline personality disorder (BPD) had unique associations with distinctive SIP variables: ASPD being more related to inadequate coping strategies, less reflection on other's motives and aggressive responses, and BPD being more related to avoidant or prosocial responses and in particular to memories of frustrating events. ***Conclusions:*** This study provides evidence for difficulties in SIP among adolescents with more severe personality pathology, suggesting that the steps in the SIP model can be used to operationalize mentalizing problems. The results seem to paint a picture of ASPD and BPD having a shared background, but their own specific problems concerning SIP.

Introduction

Personality disorders are considered life-span developmental disorders, as these disorders have been found to be continuous in different developmental categories, and similarities in terms of phenomenology, structure, stability, validity, and morbidity are found for adolescents and adults [1, 2]. Especially in adolescence, (subclinical) personality pathology can interfere with the process of gradually assuming more adult roles and responsibilities, and hamper the developmental tasks in adolescence. Although adolescents with personality pathology commonly seek help, they often go unrecognized due to clinicians still seeming to be reluctant to diagnose personality disorder prior to the age of 18 years [3] and stigma can be considered a key lingering barrier to early

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diagnosis in day-to-day practice [4]. Notwithstanding this reluctance, a growing body of research shows that personality pathology can be assessed in adolescents in a reliable and valid manner [5, 6]. However, the theoretical understanding of personality pathology in adolescents still remains unclear.

In this article, we focus on cluster B personality pathology, which according to the DSM-IV [7] includes the dramatic and emotional personality disorders antisocial (ASPD), borderline (BPD), histrionic and narcissistic personality disorders. Cluster B personality disorders are among the most prevalent mental disorders in the general population [8, 9] and are associated with high societal costs and low quality of life [10, 11]. Both clinicians and researchers agree that problems in social functioning and social understanding are central features of cluster B personality pathology.

Bateman and Fonagy [12] described the core of personality disorders, most notably BPD, as deficiencies in mentalization, a form of social cognition. It is the mental process by which an individual implicitly and explicitly interprets the actions of himself and others as meaningful based on intentional mental states. However, mentalization is a difficult concept to specify and objectify [13]. Although mentalization and social cognition, or theory of mind, are sometimes used interchangeably in the literature, they stem from different research traditions. While mentalization is rooted in attachment theory, social cognition and theory of mind are derived from cognitive theories [14].

Fonagy and Luyten [15] linked the key features of BPD to impairments in specific facets of mentalization. By describing mentalization as organized along four polarities: automatic/controlled, cognitive/affective, internal/external based and self/other focused, mentalization was differentiated with regard to self and others, as well as in specific relationships. This perspective implies that in research and clinical practice, both the social context and specific categories of relationships have to be considered in the assessment of mentalization, enabling the integration of mentalization and the social cognitive perspective. While automatic/implicit mentalizing is more reflexive and requires less cognitive effort, controlled/explicit mentalizing requires more focused attention when decoding mental states, and more closely resembles social cognitive tasks. In patients with BPD, increased levels of arousal appear to affect explicit mentalization more than implicit mentalization [15]. Ha et al. [16] found that adolescent patients with higher levels of BPD symptoms demonstrated significantly poorer reflective function compared to patients without BPD. Sharp et al. [17] examined social cognitions and reflections in adolescents with emerging BPD and noted a strong association between BPD features and hypermentalizing, defined as the reflecting overinterpretative mental state reasoning, e.g. making overly complex inferences based on social cues that result in errors. The question remains, however, which specific problems in social cognition characterize adolescents with personality pathology. This question is hampered by the lack of studies addressing mentalizing dysfunctions in adolescents, partly due to limited availability of mentalizing measures in this age group [17]. Most tasks measuring social cognition are theory-of-mind tasks developed for the assessment of autism spectrum disorders, which lack divergent validity for personality disorders. In recent years, different mentalization tasks have been developed, for example: the CRFS (Caregiver Reflective Functioning Scale for Children) [16], the MASC (Movie for the Assessment of Social Cognition) [18] and the MSA (Mentalizing Stories for Adolescents) [19]. Sharp et al. [17] concluded, however, that these more advanced tests of social cognition, as developed in the recent years, tend to measure only singular aspects of mentalizing and do not adequately resemble the demands of social cognition in daily life.

A model that could further our understanding of social cognition was proposed by Crick and Dodge [20], who posited in their social information processing (SIP) model that children enter a social situation with a 'database' of past experiences and biologically determined capabilities, which they may access during social encounters. This database resembles the context of secure early attachments in the mentalization theory [12]. Representations of attachment relationships based on attachment experiences with primary caregivers develop into internal working models, which in turn form the database of rules that guide the processing of information in social situations [21].

Crick and Dodge [20] described how children process and respond to social information in six steps. When faced with a social dilemma, children first attend to (encode) and interpret social cues and information with regard to others' feelings and intentions (steps one and two); next, they specify their interaction goals and access their cognitive repertoires (steps three and four); then they decide upon and evaluate possible responses to the given situation (step five) and, finally, they enact the chosen response (step six). Lemerise and Arsenio [22] explicitly described how emotional processes interact with (cognitive) SIP and hypothesized that individual differ-

ences in emotionality and emotion regulation influence each step of SIP. More specifically, children who are high in emotionality and poor at regulating emotions will show deficits in SIP. The SIP model has been investigated in various areas of research, such as aggression in children [23], social withdrawal [24], childhood anxiety [25] and childhood/adolescent depression [26]. More recently, attention has shifted to the relation between SIP and more stable traits, such as shyness [27] and attachment representations [22]. However, to the best of our knowledge, research regarding SIP has not addressed the relations with personality pathology.

Although rooted in different theoretical models, SIP shows remarkable similarities to a theoretical specification of mentalizing proposed by Twemlow et al. [28], who identified four psychological problems specific to individuals who are not capable of mentalizing: First, these individuals suffer from an incapacity to fully know, recognize and, therefore, regulate affect, that is to soothe themselves and to control impulses as needed, to improve judgment in social and interpersonal situations; second, these individuals experience an incapacity to accurately estimate how other people feel in relation to their own feeling states; third, they tend to attribute negative intent to others when none is meant, and are rigid and inflexible about their expectations of others, and fourth, they are incapable of developing solutions to interpersonal problems that are considered as acceptable to all parties.

We propose that we may further the understanding of mentalizing problems in adolescents with personality pathology by mapping the four psychological problems of poor mentalizing described by Twemlow et al. [28] onto the six specific steps of the SIP model. Their first psychological problem, the incapacity to fully know and regulate affect, resembles the bias present in the encoding of internal and external cues (to know the affect) and in the response access and construction (to regulate arousal) of the SIP model. Their second problem, the incapacity to accurately estimate how other people feel in relation to their own feelings, and their third problem, the tendency to attribute negative intent to others when none is meant, both show a strong resemblance to the problems in the second step of SIP: the interpretation of cues. Their fourth problem, the incapability of developing solutions to interpersonal problems that are acceptable to all parties, could be due to a shortcoming in response access or construction (i.e. they do not know how they could react), but also due to a deficit in the response decision (i.e. they do not evaluate the outcomes of the response in terms what this would mean to the other or the relationship, for example) or in the behavioral enactment (i.e. they are not capable to act in a way that is acceptable to all parties).

Although adolescence is a period during which individuals undergo significant changes in social behavior, few empirical behavioral studies have reported significant behavioral development specific to social cognition, which cannot be explained by general improvements in, for example, attention or memory [29]. No developmental study of SIP has been conducted to date [30]. Studies have cross-sectionally compared SIP in different age groups, but given the lack of hypotheses regarding development, tests for age effects in these studies were exploratory and revealed inconsistent findings [23].

The present study aimed to contribute to the understanding of personality pathology in adolescents by connecting mentalizing problems, as reflected in the steps of the SIP model, to cluster B personality pathology in adolescents. In line with the theory of mentalization [12], we hypothesized that adolescents with a greater severity of cluster B personality pathology would have more problems in their SIP, such as making more hostile attributions, having stronger emotional reactions, reporting more inadequate coping strategies and being more likely to attribute negative intent to others in ambiguous social situations. Furthermore, we hypothesized that greater severity of cluster B personality disorder would be associated with less reflecting on other people's motives; being less capable of developing solutions to interpersonal problems that are acceptable to all parties; being more likely to choose an avoidant or aggressive reaction, and reporting more memories of past frustrating situations they encountered – this specifically, as we expected them to not focus enough attention to the present social situation, but getting overwhelmed by emotions, which were triggered when traces of past disappointing or frustrating social experiences in the database were activated through encoding and interpretation.

In combining the research traditions of mentalization (which focused primarily on BPD) with SIP (which focused primarily on aggressive behaviors), we hypothesized different patterns in social cognition specific for adolescents with greater severity of BPD traits and adolescents with greater severity of ASPD traits. Kobak et al. [31] stated that although ASPD and BPD may share some core features, such as impulsivity, the trajectories leading to these disorders may be influenced by the degree of emotionality associated with impulsive and aggressive behavior. We hypothesized that more ASPD traits in adolescents would be uniquely associated with the generation and positive evaluation of aggressive responses. Fur-

thermore, we hypothesized that more BPD traits in adolescents would be uniquely associated with a higher intensity of emotions and more reported feelings of anger or disappointment. When considering problems in regulating emotions, we hypothesized a unique positive association with inadequate coping strategies and a unique negative association with adequate coping strategies. Lastly, we hypothesized adolescents with more BPD traits to be more likely to recall a greater amount of memories of past frustrating experiences.

Methods

Participants and Procedure

All participants were patients at the youth psychiatry outpatient ward Fornhese in the Netherlands. They were mostly referred to Fornhese by their family physicians for assessment and treatment of psychiatric problems, such as attention deficit disorder, anxiety disorder, autistic spectrum disorder, eating disorder, depression or personality pathology. All patients in the period from March 2006 to September 2007 were asked to participate in the current research project after their first interview, and 96 adolescents (53%) of the approached patients aged 12–18 years participated after both the participants and their parents had given informed consent. There were no specific exclusion criteria. Reasons for nonparticipation were generally not wanting to plan additional appointments during the assessment phase. For the current study, we used data from the 90 participants who had complete data. Thirty-eight (42%) participants were boys, and 52 (58%) were girls. Their mean age was approximately 15 years (mean = 14.86; SD = 1.41). Cognitive functioning, which was measured using the WISC-III NL (the Dutch translation of the Wechsler Intelligence Scale for Children) and WAIS (the Dutch translation of the Wechsler Adult Intelligence Scale), was average (mean total intelligence quotient: = 99.8, SD = 17, range: 64–141). Participants' gender, age and diagnoses on both axes I and II of the DSM-IV-TR were comparable to the total patient group in the outpatient ward during the given period.

A research assistant completed a structured interview regarding SIP. Information about cognitive functioning was gathered from the patient file. If no recent intelligence test was present in the file, three subtests of the intelligence test were completed. On an axis II checklist, which consisted all DSM-IV criteria for personality disorders, clinicians were asked to assess the severity of each criterion of axis II pathology on 5-point rating scales, ranging from clearly absent to present. The clinicians who assessed the axis II pathology and DSM-IV diagnosis were not the same as the research assistant who completed the structured interview regarding SIP, so these variables were assessed independently of each other.

After a multidisciplinary assessment, the DSM-IV-TR diagnoses were assigned in consensus during a multidisciplinary staff meeting. The primary diagnosis on axis I was evenly distributed across autistic spectrum disorders, disruptive disorders, internalizing disorders and other diagnoses. Of the participants, 32% had more than one diagnosis on axis I, and the global assessment of functioning was 60 (SD = 5), which corresponds with moderate symptoms or moderate difficulties in social or school functioning. As was to be expected from the general underestimation due to reluctance of diagnosing personality disorders in adolescents, only 5% of the participants were diagnosed with a personality disorder (mostly personality disorders not otherwise specified) on axis II.

Measures

SIP Interview in Adolescents

The SIP interview in adolescents was used to assess SIP (case examples of vignettes, questions and the scoring procedure of the SIP interview in adolescents are available upon request) and based on those published in the literature [30, 32]. The participants were read 6 short vignettes of conflict situations among peers (only text, no visual information), in which the intentions and emotions were not clear. The stories concerned conflicts about schoolwork, friendships, jobs and romantic feelings. After every story, the participants were asked questions based on the SIP model. Participants were asked to describe the feelings they would experience in the presented situation, the attribution of the provocateur's intent, how they would react, and which consequences they would expect of their reaction. Finally, participants also reviewed hypothetical responses of others, who reacted either aggressively, dismissively or proactively. The reported emotions, coping strategies, attribution of intent, response generation and capacity to reflect upon the motives of someone else were scored by a research assistant and a clinical psychologist.

SIP and emotion processes were assessed with open-ended questions and rating scales describing the intensity of emotions for each vignette. To assess interrater reliability of the coded open answers, trained clinicians independently coded transcriptions of randomly selected participants' answers to 60 vignettes.

Reported emotions were assessed with open-ended questions, of which the responses that included anger and disappointment (i.e. 'angry, betrayed or annoyed') were counted. Interrater agreement κ was 1. The intensity of the reported emotion was given on a 10-point scale.

Coping strategies were assessed with the questions 'when you feel so (negative emotion mentioned), can you think of something that could make you feel better? What can you think of?' Answers to these questions were coded as adequate coping when an attempt to solve the problem was mentioned (i.e. 'I'll go to the teacher and explain what happened'); an attempt was made to find a distraction ('Go to my room and play my music'), or when a cognitive strategy was suggested ('I'll think it was not really a big deal'). Answers were coded as inadequate when any form of aggression was mentioned ('Yes! Beat him up! Then it's my turn to laugh!'); when only acts by another person were mentioned ('When he gives me a new one'), or when respondents answered with do not know/irrelevant. Interrater agreement κ was 0.62.

Attribution of intent was assessed with an open-ended question. Answers to the question 'why do you think he (behavior in vignette)?' were coded as *benign*, *accidental*, *ambiguous* or *hostile*. On rare occasions, when multiple answers were given, participants were prompted to provide one definitive answer. Interrater agreement κ was 0.71. The answers to the open-ended questions were combined into hostile attribution variables, which were created by counting the number of hostile answers (i.e. 'He is trying to pay me back because he is jealous') and counting the number of nonhostile

answers (i.e. 'He did not know that I would be in trouble' or 'He probably had to be somewhere else, like a funeral').

Response generation was assessed with the question *'what would you do now?'* Answers were coded in three categories: avoidant reactions (i.e. 'I would not mention it'), prosocial responses (i.e. 'I would ask what was going on') and aggressive responses (i.e. 'I would beat him up and teach him a lesson'). Interrater agreement κ was 0.74.

To assess *response evaluation*, participants were presented with three responses to each vignette in random order. One response was clearly aggressive, one response was prosocial, and one response was avoidant. Participants were asked to evaluate these responses by indicating on a 6-point rating scale to what extent they would enact this response themselves, and whether or not they approved this response as a clever/useful solution. Ratings were averaged across vignettes into the variables avoidant responses, prosocial responses and aggressive responses.

Recall of memories of past frustrating experiences was assessed with the question 'Have you ever experienced something like this story yourself?' The number of affirmative reactions (either as victim, frustrator or without any indication of the subject's role) across the 6 vignettes was counted.

Reflecting upon other's motives was assessed by asking the participants in situations where they reported they would never choose a response like the presented one, whether they could reflect on a person who had indeed chosen this response. The number of responses that presented some reflection (e.g. 'maybe when that person was very angry' or 'when the other person has done the same thing over and over in the past') was counted across the 6 vignettes. Interrater agreement κ was 1.

Severity of Cluster B Personality Pathology

Clinical psychologists or child psychiatrists, specialized in working with adolescents, assessed the severity of cluster B personality pathology on a checklist containing all axis II criteria currently included in the DSM-IV, presented in random order. The clinicians completed the axis II checklist after two or three clinical interview sessions, rating each criterion on a 5-point scale, ranging from clearly absent to clearly present. Means were calculated for a total cluster B score as well as separate scores for ASPD, BPD, histrionic and narcissistic personality disorder. Scores varied from 1 to 3.3, with a mean of 1.75 and SD of 0.6, indicating variation in the severity of personality pathology in this sample. Only total cluster B scores, and ASPD and BPD scale scores are used in the present report. The 4 subscales correlated between 0.78 and 0.88 with the total cluster B score. The ASPD scale and BPD scale correlated 0.57 ($p < 0.01$).

Statistical Analyses

Descriptive statistics were calculated for all variables under study. Correlations were calculated between (1) all SIP variables, (2) the three personality disorder variables and (3) the SIP variables and the three personality disorder variables, respectively. Three stepwise regression analyses were performed to examine the associations between SIP and personality disorders. First, it was examined which of the SIP variables were related to the cluster B total score. Secondly, it was examined which of the SIP variables were related to ASPD, while taking BPD into account. Finally, we tested which of the SIP variables were related to BPD, while taking into account ASPD.

Table 1. Descriptive statistics for the SIP and personality disorder variables (n = 90)

	Min.	Max.	Mean	SD
SIP variables				
Emotions				
Intensity of emotions	3.50	10.00	7.06	1.39
Reported amount of anger or disappointment	0	6.00	4.09	1.42
Coping				
Inadequate coping	0	6.00	1.60	1.47
Adequate coping	0	6.00	4.04	1.56
Attribution of intent				
Hostile intent	0	5.00	1.81	1.06
Nonhostile intent	1.00	5.00	2.60	1.04
Response generation				
Avoidant response	0	7.00	1.34	1.39
Prosocial response	2.00	11.00	6.39	2.14
Aggressive response	0	6.00	1.33	1.35
Estimated likelihood to choose response				
Avoidant response	0	4.17	1.91	0.83
Prosocial response	2.33	6.00	4.35	0.80
Aggressive response	0	3.67	1.55	0.87
Positive evaluation presented response				
Avoidant response	0	4.00	1.41	1.17
Prosocial response	2.00	6.00	4.78	1.15
Aggressive response	0	4	1.09	0.92
Memories of past frustrating experience				
Total number of memories	0	6.00	2.07	1.60
Reflecting upon other's motives				
Limited/no reflecting	0	2.20	0.75	0.47
Reflecting	0	1.83	0.82	0.49
Personality disorder variables				
Cluster B total score	1.00	3.30	1.76	0.61
ASPD	1.00	4.10	1.80	0.92
BPD	1.00	4.00	1.89	0.80

Results

Descriptive Statistics

Means and standard deviations of all variables under study are presented in table 1. Bivariate correlations between SIP variables are presented in table 2. Correlations ranged between –0.91 (inadequate coping with adequate coping) and 0.61 (estimated likelihood to choose an avoidant response with positive evaluation of an avoidant response). The cluster B total score showed, as was to be expected, substantial correlations with both ASPD ($r = 0.78$, $p < 0.001$) and BPD ($r = 0.88$, $p < 0.001$). ASPD showed a significant correlation with BPD ($r = 0.88$, $p < 0.001$). Finally, correlations between the SIP variables and the three personality disorder variables, respectively, are

Table 2. Correlations between SIP variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Emotions																	
1 Intensity of emotions																	
2 Reported amount of anger or disappointment	0.10																
Coping																	
3 Inadequate coping	0.07	0.11															
4 Adequate coping	–0.05	0.03	–0.91*														
Attribution of intent																	
5 Hostile intent	0.10	0.12	0.15	–0.10													
6 Nonhostile intent	–0.02	–0.05	–0.00	–0.00	–0.45*												
Response generation																	
7 Avoidant response	0.11	0.08	0.26*	–0.20	0.17	0.06											
8 Prosocial response	–0.13	0.02	–0.19	0.27*	–0.00	–0.5	0.33*										
9 Aggressive response	0.23*	0.15	0.14	–0.13	0.05	–0.19	–0.04	–0.42*									
Estimated likelihood to choose response																	
10 Avoidant response	0.09	–0.05	–0.02	0.06	0.01	0.02	0.17	–0.05	–0.02								
11 Prosocial response	0.26*	0.14	–0.12	0.15	–0.29*	0.09	–0.35*	0.15	0.04	–0.00							
12 Aggressive response	0.19*	0.16	0.01	0.02	–0.02	–0.08	–0.08	–0.15	0.39*	0.32	0.26*						
Positive evaluation of presented response																	
13 Avoidant response	–0.07	–0.08	0.19	–0.18	0.05	0.06	0.04	–0.07	–0.06	0.61*	–0.19	0.15					
14 Prosocial response	0.07	0.21*	–0.07	0.09	–0.33*	0.30*	–0.03	0.09	–0.05	–0.05	0.51*	0.02	–0.16				
15 Aggressive response	0.17	0.08	0.07	–0.05	0.01	–0.13	0.00	–0.10	0.34*	0.28*	0.14	0.71*	0.21*	–0.00			
Memories of past frustrating experience																	
16 Total number of memories	0.19	0.22*	0.14	–0.05	–0.07	0.08	0.09	0.09	0.06	–0.09	0.00	0.09	–0.06	0.03	0.08		
Reflecting upon other's motives																	
17 Limited/not reflecting	–0.13	–0.24*	–0.00	–0.05	0.20	–0.20	–0.17	0.11	–0.02	–0.35*	–0.23*	–0.46	–0.13	–0.29*	0.39*	–0.11	
18 Reflecting	0.07	0.28*	–0.03	0.13	–0.04	0.08	0.18	0.09	–0.11	–0.14	0.04	–0.26*	–0.28*	0.03	0.23*	0.09	–0.37*

* $p < 0.05$.

reported in table 3. Correlations ranged from –0.26 (adequate coping with ASPD) to 0.34 (total number of memories of past frustrating experiences with BPD).

Associations between SIP and Personality Disorders

Using stepwise regression analyses, associations between SIP and personality disorders were examined.

SIP and Cluster B Total Score

Stepwise regression analyses showed that only the total number of memories of past frustrating experiences and estimated likelihood to choose an aggressive response significantly predicted the cluster B total score (table 4). Adolescents who experienced more frustrating experiences and reported a greater likelihood to choose aggressive responses reported more cluster B personality disorder symptoms. Together the two SIP variables explained 16% of the variance in cluster B personality disorder symptoms. None of the other SIP variables was significantly related to cluster B personality disorder symptoms.

SIP and ASPD

Adolescents who reported more BPD symptoms (entered as the first step in the analyses) also reported more ASPD symptoms (table 5). Subsequently, all SIP variables were added to the model. Analyses showed that adolescents who reported less response generation of a prosocial response, less response generation of an avoidant response and a more positive evaluation of an avoidant response reported more cluster B personality disorder symptoms. Together, the BPD symptoms and three SIP variables explained 48% of the variance. None of the other SIP variables was significantly related to cluster B personality disorder symptoms.

Table 3. Correlations between SIP variables and personality disorder variables

	Cluster B total score	ASPD	BPD
Emotions			
Intensity of emotions	0.23*	0.23*	0.16
Reported amount of anger or disappointment	0.16	0.00	0.18
Coping			
Inadequate coping	0.23*	0.26*	0.21*
Adequate coping	–0.17	–0.26*	–0.13
Attribution of intent			
Hostile intent	–0.08	0.04	–0.02
Nonhostile intent	–0.03	–0.04	–0.04
Response generation			
Avoidant response	0.02	–0.08	0.13
Prosocial response	0.02	–0.19	0.11
Aggressive response	0.22*	0.28*	0.10
Estimated likelihood to choose response			
Avoidant response	0.05	0.12	0.01
Prosocial response	0.14	0.09	0.08
Aggressive response	0.25*	0.29*	0.14
Positive evaluation of presented response			
Avoidant response	0.12	0.21	0.02
Prosocial response	0.11	0.02	0.10
Aggressive response	0.19	0.16	0.12
Memories of past frustrating experience			
Total number of memories	0.33*	0.14	0.34*
Reflecting upon other's motives			
Limited/not reflecting	–0.02	0.06	–0.00
Reflecting	–0.10	–0.22*	–0.01

* $p < 0.05$.

Table 4. Stepwise regression analyses for the association between the SIP variables and cluster B total score

	B	SE	β	t	p
Model 1					
Total number of memories	0.13	0.04	0.33	3.29	0.001
Model 2					
Total number of memories	0.12	0.04	0.31	3.14	0.002
Estimated likelihood: aggressive response	0.15	0.07	0.22	2.19	0.031

All other SIP variables were excluded from the analyses since they did not add significantly to the model.

SIP and BPD

Adolescents who reported more ASPD symptoms (entered as the first step in the analyses) also reported more BPD symptoms (table 6). Additionally, adolescents who reported more memories of past frustrating experiences, *more* response generation of a prosocial response (in contrast to *less* generation when examining associations with ASPD), *more* response generation of an avoidant response, and more response generation of an aggressive response reported more cluster B personality disorder symptoms. Together, the BPD symptoms and three SIP variables explained 51% of the variance. None of the other SIP variables was significantly related to cluster B personality disorder symptoms.

Discussion

The present study explored the relations between the severity of cluster B personality pathology and mentalizing capacities in adolescents measured with the SIP model. The common idea that relations exist between cluster B personality pathology and problems in mentalizing is supported by the present findings. Using vignettes that presented various social situations, positive correlations were found between the severity of cluster B personality pathology and various steps in the SIP model. The more severe cluster B personality pathology in participants, the higher the intensity of their reported emotions and the more likely they were to choose inadequate coping strategies, such as avoidance or aggression, instead of actively trying to solve the problem or gain support. Furthermore, participants with more severe cluster B personality pathology were more likely to choose aggressive responses, evaluate aggressive responses of hypothetical others more positively and estimate that they were more likely to choose aggressive responses. This study thus provides evidence for difficulties in SIP in adolescents with a greater severity of cluster B personality pathology.

A significant correlation was also found between severity of cluster B personality pathology and the number of times participants reported memories of frustrating social situations. This could imply that adolescents with more severe cluster B personality pathology have encountered more frustrating situations in their development and have, therefore, stored more negative experiences in their database. This could be a possible explanation for their mentalizing difficulties and is consistent with literature concerning trauma and personality pathology [33]. Another explanation could be that adolescents with more severe cluster B personality pathology lack the skills to cope with negative situations and, therefore, experience more helplessness and insecure feelings compared to adolescents with healthier coping skills. Both the experience of more negative events and the feel-

Table 5. Stepwise regression analyses for the association between the SIP variables and ASPD, corrected for BPD

	B	SE	β	t	p
Model 1					
BPD	0.65	0.10	0.56	6.36	0.000
Model 2					
BPD	0.68	0.10	0.59	6.96	0.000
Response generation: prosocial	–0.11	0.04	–0.26	–3.07	0.003
Model 3					
BPD	0.73	0.09	0.64	7.79	0.000
Response generation: prosocial	–0.15	0.04	–0.36	–4.15	0.000
Response generation: avoidant	–0.18	0.06	–0.28	–3.25	0.002
Model 4					
BPD	0.73	0.09	0.63	7.93	0.000
Response generation: prosocial	–0.15	0.04	–0.34	–4.11	0.000
Response generation: avoidant	–0.19	0.05	–0.28	–3.37	0.001
Positive evaluation: avoidant	0.14	0.06	0.18	2.34	0.022

BPD was entered in the first step of the regression analyses. All SIP variables were entered stepwise in step 2. SIP variables not included in the table were excluded from the analyses since they did not add significantly to the model.

Table 6. Stepwise regression analyses for the association between the SIP variables and BPD, corrected for ASPD

	B	SE	β	t	p
Model 1					
ASPD	0.49	0.08	0.56	6.36	0.000
Model 2					
ASPD	0.46	0.07	0.52	6.16	0.000
Total number of memories	0.13	0.04	0.26	3.11	0.003
Model 3					
ASPD	0.49	0.07	0.57	6.68	0.000
Total number of memories	0.12	0.04	0.24	2.88	0.005
Response generation: prosocial	0.08	0.03	0.20	2.38	0.020
Model 4					
ASPD	0.19	0.07	0.61	7.43	0.000
Total number of memories	0.53	0.04	0.20	2.51	0.014
Response generation: prosocial	0.10	0.03	0.30	3.43	0.001
Response generation: avoidant	0.15	0.05	0.26	3.04	0.003
Model 5					
ASPD	0.50	0.07	0.58	7.09	0.000
Total number of memories	0.09	0.04	0.18	2.33	0.022
Response generation: prosocial	0.15	0.04	0.39	4.17	0.000
Response generation: avoidant	0.17	0.05	0.30	3.52	0.001
Response generation: aggressive	0.12	0.05	0.21	2.32	0.023

ASPD was entered in the first step of the regression analyses. All SIP variables were entered stepwise in step 2. SIP variables not included in the table were excluded from the analyses since they did not add significantly to the model.

ing of helplessness could indicate that adolescents with more severe cluster B personality pathology can get overwhelmed by memories of past frustrations or trauma, and then do not focus enough attention to the present social situation.

Several specific hypothesized relations between severity of cluster B personality pathology and mentalizing problems were not found. No significant correlations were found between the severity of cluster B personality pathology and the ability to interpret actions of others as meaningful based on their intentional mental states or motives. This is the SIP factor that resembles mentalizing abilities the most, so this result would imply that adolescents with more severe cluster B personality pathology actually are capable of mentalizing. Possible explanations for this counterintuitive finding are that, in the present study, participants were asked to explicitly reflect on a hypothetical situation, possibly implying that their attachment system was not activated and it was easier for participants to regulate their arousal. Also, the highly structured research situation might have helped the participants to focus their attention on the social information in the interview. This corresponds to the idea of Bateman and Fonagy [12] that the ability to mentalize is present in adolescents with cluster B personality pathology but is abandoned in actual frustrating social situations, when emotional arousal is high and attention span is limited.

Furthermore, no correlation was found between the severity of cluster B personality pathology and the attribution of both negative and positive intent. Severity of cluster B personality pathology does not seem to be related to a bias in the attribution of the other's intention. This is a remarkable finding for two reasons: First, the finding is in contrast with research findings in facial recognition tasks. Domes et al. [34] reviewed a number of studies that revealed a pattern of negativity or an anger bias, and a heightened sensitivity to the detection of negative emotions in patients with BPD. Secondly, this is in contrast with what we would expect of the findings on explicit mentalizing [15], such as in patients with BPD, increased levels of arousal appear to affect explicit mentalizing more than implicit mentalizing. The fact that we did not find an association between attribution of intent and severity of personality pathology might be the result of the reliance on hypothetical vignettes, lacking visual information, which might be a key factor in sensitivity to the detection of negative emotions. Additionally, it should be noted that our sample was rather small, which might have resulted in power issues to detect modest associations. Future research using more sophisticated measures and a larger sample is needed to elucidate associations between attribution of intent and personality pathology in more detail.

Stepwise regression analyses showed that only two SIP factors predicted cluster B personality pathology: the total number of memories of past frustrating experiences and the estimated likelihood to choose an aggressive response. Adolescents who experienced more frustrating experiences and reported a larger likelihood to choose an aggressive response reported more cluster B personality disorder symptoms.

Although adolescents who reported more BPD symptoms also reported more ASPD symptoms, our stepwise regression analyses on the differences between SIP correlates of ASPD versus BPD revealed some interesting directions for future research.

First, particularly for ASPD, but not for BPD, higher levels of personality pathology were related to a lower level of response generation of both prosocial and avoidant responses, and to a more positive evaluation of an avoidant response. Particularly for BPD, but not for ASPD, higher levels of pathology were related to more memories of past frustrating experiences and, furthermore, to increased response generation of avoidant, aggressive and prosocial responses. This was a remarkable finding, as increased generation of prosocial and avoidant responses was in contrast to less generation of prosocial and avoidant responses when examining associations with ASPD. Aggressive response generation is correlated with ASPD traits [35], and we also found more aggressive response generation in BPD, however, the major difference did not seem to be aggressive response generation, but differences in prosocial and avoidant response generation.

All in all, these results seem to paint a picture of ASPD and BPD having a shared background, but revealing distinct problems in social information processing: ASPD being more related to less avoidant and prosocial responses, and BPD being more related to more avoidant or prosocial responses, and particularly to memories of frustrating events. This seems to fit in with a 'shared risk' model [36] where both ASPD and BPD are assumed to originate in similar high-impulsivity and high-risk environments, but then develop in a more internalizing direction in the form of BPD for girls and a more externalizing direction in the form of ASPD for boys. More research, including studies on the specific role of gender, is warranted before we can draw more firm conclusions on these differences.

Limitations

Some limitations should be considered with respect to the current findings. A first limitation is that we were not able to test our hypothesis specifically with adolescents with diagnosed personality disorders. The reason for this, as aforementioned, is that there is still a strong reluctance in clinical practice to diagnose personality disorders in adolescents. However, we think our approach is next in quality: by measuring the severity of cluster B personality pathology in a more general group of clinically referred adolescents, we were still able to test our hypotheses, considering that adolescents with personality pathology generally have high comorbidity [37]. In addition, the lack of a control group means that we cannot compare our findings to adolescents in a normal population. At this moment, not enough is known about the development of SIP in normal populations [38] to make a clear comparison between our clinical group and a normal population. However, the fact that the variance within our clinical population is meaningfully related to the severity of cluster B pathology indicates that differences in SIP are also relevant in our clinical group. Further studies should, of course, refine these results by studying groups of adolescents with specific personality disorders as well as normal populations.

A second limitation is our reliance on a relative small sample size. Additional studies involving larger samples are necessary to replicate the present findings. One specific issue, in this regard, is that a relatively large number of tests was performed. Future studies should try to replicate our analyses with more statistical power. Also, in larger groups, we would be able to examine the findings for boys and girls separately.

A third limitation is in the use of vignettes. Real-life social information processing may be far more complex and involve not only the integration of visual and auditory information, but also the constant interaction with others, making the social situation and concomitantly SIP more complex and dynamic. In future studies, a combination of these aspects could be examined in observational studies of social situations that adolescents with personality pathology encounter. In addition, observational studies could counter any social desirability that might occur in responding to vignettes.

A fourth limitation is that, due to the integration of research instruments in the clinical assessment of the outpatient center for youth psychiatry, we were not able to use a semistructured interview to measure personality pathology. Future studies should try to replicate our analyses, for example, with a structured interview, such as the Structured Clinical Interview for DSM-IV Axis II Personality Disorders, SCID-II [39]. The diagnosis for BPD should also integrate dimensional factors alongside categorical diagnostic criteria, such as the promising alternative model for personality disorders presented in Section III of DSM-5 [40], which emphasizes impairments in self and relatedness as dimensional core features of personality disorders.

The findings in this study underscore the importance of the theoretical and empirical conceptualization of the specific aspects of mentalizing. The associations that were found between the elements of the SIP model and the elements of mentalizing contribute to a deeper understanding of personality pathology in adolescence. Although personality pathology in adolescents is a complex concept, also considering the co-occurrence of axis I and other axis II disorders, SIP seems a promising model in differentiating between cluster B personality pathology and thereby furthering the understanding of personality pathology in adolescence. As cluster B personality disorders are considered social disorders, which develop within the interaction of genetic vulnerability and environmental risk, it is important to understand more of how the social environment, both at risk and when adequate, becomes mentalized, in order to understand the mechanisms that are important in the development of personality pathology.

References

1 Chanen AM, Thompson K: Preventive strategies for borderline personality disorder in adolescents. Curr Treat Options Psychiatry 2014;1:358–368.

2 Newton-Howes G, Clark LA, Chanen A: Personality disorder across the life course. Lancet 2015;385:727–734.

3 Laurenssen EM, Hutsebaut J, Feenstra DJ, Van Busschbach JJ, Luyten P: Diagnosis of personality disorders in adolescents: a study among psychologists. Child Adolesc Psychiatry Ment Health 2013;7:3.

4 Fonagy P, Speranza M, Luyten P, Kaess M, Hessels C, Bohus M: ESCAP expert article: borderline personality disorder in adolescence: an expert research review with implications for clinical practice. Eur Child Adolesc Psychiatry 2015, Epub ahead of print.

5 Chanen AM, Jackson HJ, McGorry PD, Allott KA, Clarkson V, Yuen HP: Two-year stability of personality disorder in older adolescent outpatients. J Pers Disord 2004;18:526–541.
6 Westen D, Shedler J, Durret C, Glass S, Martens A: Personality diagnoses in adolescence: DSM-IV axis II diagnoses and an empirically derived alternative. Am J Psychiatry 2003; 160:952–966.
7 American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, ed 4, test revision. Washington, American Psychiatric Association, 2000.
8 Lenzenweger MF, Loranger AW, Korfine L, Neff C: Detecting personality disorders in a nonclinical population. Application of a 2-stage procedure for case identification. Arch Gen Psychiatry 1997;54:345–351.
9 Torgerson S, Kringlen E, Cramer V: The prevalence of personality disorders in a community sample. Arch Gen Psychiatry 2001;58: 590–596.
10 Soeteman DI, Hakkaart-van Roijen L, Verheul R, Busschbach JJV: The economic burden of personality disorders in mental health care. J Clin Psychiatry 2008;69:259–265.
11 Soeteman DI, Verheul R, Busschbach JJV: The burden of disease in personality disorders: diagnosis-specific quality of life. J Pers Disord 2008;22:259–268.
12 Bateman A, Fonagy P: Psychotherapy for Borderline Personality Disorder, Mentalization Based Treatment. Oxford, Oxford University Press, 2004.
13 Choi-Kain LW, Gunderson JG: Mentalization: ontogeny, assessment, and application in the treatment of borderline personality disorder. Am J Psychiatry 2008;165:1127–1135.
14 Rutherford HJ, Wareham JD, Vrouva I, Mayes LC, Fonagy P, Potenza MN: Sex differences moderate the relationship between adolescent language and mentalization. Personal Disord 2012;3:393–405.
15 Fonagy P, Luyten P: A developmental, mentalization-based approach to the understanding and treatment of borderline personality disorder. Dev Psychopathol 2009;21:1355–1381.
16 Ha C, Sharp C, Ensink K, Fonagy P, Cirino P: The measurement of reflective function in adolescents with and without borderline traits. J Adolesc 2013;36:1215–1223.
17 Sharp C, Pane H, Ha C, Venta A, Patel AB, Sturek J, Fonagy P: Theory of mind and emotion regulation difficulties in adolescents with borderline traits. J Am Acad Child Adolesc Psychiatry 2011;50:563–573.
18 Dziobek I, Fleck S, Kalbe E, Rogers K, Hassebstab J, Brand M, Kessler J, Woike J, Wolf O, Convit A: Introducing MASC: a movie for the assessment of social cognition. J Autism Dev Disord 2006;36:623–636.
19 Vrouva I, Fonagy P: Development of the mentalizing stories for adolescents (MSA). J Am Psychoanal Assoc 2009;57:1174–1178.
20 Crick NR, Dodge KA: A review and reformulation of social information processing mechanisms in children's social adjustment. Psychol Bull 1994;115:74–101.
21 Dwyer KM, Fredstrom BK, Rubin KH, Booth-LaForce C, Rose-Krasnor L, Burgess KB: Attachment, social information processing, and friendship quality of early adolescent girls and boys. J Soc Pers Relat 2010;27:91–116.
22 Lemerise EA, Arsenio WF: An integrated model of emotional processes and cognition in social information processing. Child Dev 2000;71:107–118.
23 Orobio de Castro B, Veerman JW, Koops W, Bosch JD, Monshouwer HJ: Hostile attribution of intent and aggressive behavior: a meta analysis. Child Dev 2002;73:916–934.
24 Burgess KB, Rose-Krasnor L, Wojslawowicz JC, Rubin KH, Booth-LaForce C: Social information processing and coping strategies of shy/withdrawn and aggressive children: does friendship matter? Child Dev 2006;77:371–383.
25 Suarez L, Bell-Dolan D: The relationship of child worry to cognitive biases: threat interpretation and likelihood of event occurrence. Behav Ther 2001;32:425–442.
26 Garber J, Keiley MK, Martin NC: Developmental trajectories of adolescents' depressive symptoms: predictors of change. Consult Clin Psychol 2002;70:79–95.
27 Burgess KB, Wojslawowicz JC, Rubin KH, Rose-Krasnor L, Booth-LaForce C: Social information processing and coping strategies of shy/withdrawn and aggressive children: does friendship matter? Child Dev 2006;77:371–383.
28 Twemlow SW, Fonagy P, Sacco FC: A developmental approach to mentalizing communities. I. A model for social change. Bull Menninger Clin 2005;69:265–281.
29 Blakemore SJ: The social brain in adolescence. Nat Rev Neurosci 2008;9:267–277.
30 Orobio de Castro B, Merk W, Koops W, Veerman JW, Bosch JD: Emotions in social information processing and their relations with reactive and proactive aggression in referred aggressive boys. J Clin Child Adolesc Psychol 2005;34:105–116.
31 Kobak R, Zajac K, Smith C: Adolescent attachment and trajectories of hostile-impulsive behavior: implications for the development of personality disorders. Dev Psychopathol 2009;21:839–851.
32 Orobio de Castro B: Social Information Processing and Emotion in Antisocial Boys. Amsterdam, Paedological Institute, 2000.
33 Jang KL, Stein MB, Taylor S, Asmundson GJG, Livesley WJ: Exposure to traumatic events and experiences: aetiological relationships with personality function. Psychiatry Res 2003;120:61–69.
34 Domes G, Schulze L, Herpertz S: Emotion recognition in borderline personality disorder – a review of the literature. J Pers Disord 2009;23:6–19.
35 Lobbestael J, Cima M, Arntz A: The relationship between adult reactive and proactive aggression, hostile interpretation bias, and antisocial personality disorder. J Pers Disord 2013;27:53–66.
36 Beauchaine TP, Klein DN, Crowell SE, Derbridge C, Gatzke-Kopp L: Multifinality in the development of personality disorders: a biology-sex-environment interaction model of antisocial and borderline traits. Dev Psychopathol 2009;21:735–770.
37 Chanen AM, Jovev M, Jackson HJ: Adaptive functioning and psychiatric symptoms in adolescents with borderline personality disorder. J Clin Psychiatry 2007;68:297–306.
38 Orobio de Castro B: The development of social information processing and aggressive behaviour: current issues. Eur J Dev Psychol 2004;1:87–102.
39 First MB, Gibbon M, Spitzer RL, Williams JBW, Smith BL: User's Guide for the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II). Washington, American Psychiatric Press, 1997.
40 American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, ed 5 (DSM-5). Arlington, American Psychiatric Publishing, 2013.