

METACOGNITIVE DYSFUNCTIONS IN PERSONALITY DISORDERS: CORRELATIONS WITH DISORDER SEVERITY AND PERSONALITY STYLES

Antonio Semerari, MD, Livia Colle, PhD,
Giovanni Pellecchia, PsyD, Ivana Buccione, PsyD,
Antonino Carcione, MD, Giancarlo Dimaggio, MD,
Giuseppe Nicolò, MD, Michele Procacci, MD,
and Roberto Pedone, PhD

Metacognitive impairment is crucial to explaining difficulties in life tasks of patients with personality disorders (PDs). However, several issues remain open. There is a lack of evidence that metacognitive impairments are more severe in patients with PDs. The relationship between severity of PD pathology and the extent of metacognitive impairment has not been explored, and there has not been any finding to support the linking of different PDs with specific metacognitive profiles. The authors administered the Metacognitive Assessment Interview to 198 outpatients with PDs and 108 outpatients with no PDs, differentiating overall severity from stylistic elements of personality pathology. Results showed that metacognitive impairments were more severe in the group with PDs than in the control group, and that metacognitive dysfunctions and the severity of the PD were highly associated. Positive correlations were found between specific metacognitive dysfunctions and specific personality styles. Results suggest that metacognitive impairments could be considered a common pathogenic factor for PDs.

Metacognition has been defined as the ability to understand and reflect on mental states in order to manage life tasks and regulate internal mental processes and interpersonal relationships (Dimaggio & Lysaker, 2010;

This article was accepted under the editorship of Robert F. Kruger and John Livesley.

From Third Center of Cognitive Behavioral Psychotherapy and SPC School of Cognitive Psychotherapy, Rome, Italy (A. S., L. C., G. P., I. V., A. C., G. N., M. P., R. P.); Department of Psychology, Center of Cognitive Science, University of Turin, Italy (L. C.); MIT Center, Center of Metacognitive Interpersonal Therapy, Rome, Italy (G. D.); and Department of Psychology, Second University of Naples, Italy (R. P.).

We wish to thank Shonagh McAulay for her valuable, careful, and patient English language revisions of the manuscript throughout the phases of the journal's acceptance process. We also thank the anonymous reviewers for their generous feedback.

Address correspondence to Antonio Semerari, Terzo Centro di Psicoterapia Cognitiva, Via Ravenna 9/c Rome, Italy. E-mail: semerari@terzocentro.it

Semerari et al., 2003). This definition highlights the functional meaning of metacognition, considered as a set of skills that enable us to comprehend our own mental states and those of others. Conversely, Wells (2000) employed the term *metacognition* to refer to a set of beliefs about mental contents, rather than a function that enables us to be aware of mental states. In Semerari, Carcione, Dimaggio, Nicolò, and Procacci (2007), metacognition refers to comprehensive mindreading capacity, overlapping in this respect with the concept of mentalization proposed by Bateman and Fonagy (2004). The principal difference between these two models is that Fonagy views mentalization as a unidimensional function (Fonagy, Steele, Steele, & Target, 1998), whereas Semerari and colleagues consider metacognition as a multicomponent function in which single components can be selectively impaired.

Despite the variety of conceptual models, there is widespread agreement that individuals need to understand internal mental states in order to form stable and coherent self-representations, and that they must understand others' mental states in order to form and maintain interpersonal relationships (Dimaggio, Semerari, et al., 2007; Jørgensen, 2010). Patients with personality disorders (PDs) typically fail to develop adaptive responses to these universal life tasks (American Psychiatric Association [APA], 2013; Livesley, 2011). For that reason, a close relationship between metacognitive impairment and personality pathology has been suggested (Bateman & Fonagy, 2004; Dimaggio & Lysaker, 2010; Dimaggio, Semerari, et al., 2007). Even though this hypothesis is persuasive on a theoretical level, several issues are still open; three of them will be addressed in the current study.

METACOGNITION AND PERSONALITY DISORDERS: THREE OPEN ISSUES

Metacognitive dysfunctions are not present exclusively in individuals with PDs, but have also been found in those with symptomatic disorders, so much so that Gumley (2011) has considered metacognitive dysfunctions a pathogenic transdiagnostic factor. Therefore, to confirm the hypothesis that metacognitive impairments are specifically implicated in PD dysfunctions, PDs should feature more severe metacognitive impairments than symptom disorders. However, no studies to date have directly compared metacognitive abilities in PDs and symptom disorders.

Furthermore, several studies have convincingly linked severity with the major interpersonal and life quality problems typical of PDs (Dimaggio et al., 2013; Hopwood et al., 2011; Verheul, Bartak, & Widiger, 2007). Therefore, if metacognitive dysfunctions undermine quality of life and social adaptation of individuals with PDs, we expect that severity of personality pathology would be correlated with metacognitive impairments. However, there is no evidence linking metacognitive impairments and the severity of PD psychopathology.

The last problematic issue concerns the wide range of capacities included in metacognition, which extends from the awareness and labeling of inner mental states to understanding emotions of others by recognizing facial expression. Because most empirical studies have focused on single metacognitive capacities, there is no conclusive evidence available on what kind of metacognitive functions are specifically impaired in different PDs.

Here we briefly summarize the findings on metacognitive abilities in those with PDs obtained from (a) analysis of patients' narratives and (b) self-reports and laboratory tasks.

METACOGNITION IN PATIENTS' DISCOURSE

Discourse analysis has been used to investigate both mentalizing and metacognition in patients with PDs. Fonagy and colleagues developed the Reflective Functioning Scale (RFS), a unidimensional scale of mindreading (Fonagy et al., 1998; Taubner et al., 2013), which was applied to the Adult Attachment Interview of patients with borderline personality disorder (BPD). Results showed lower metacognitive performance in the subgroup of patients with BPD and a history of abuse compared with the control group (Fonagy et al., 1996). Levinson and Fonagy (2004) found that severe offenders with PDs had lower RFS scores than both outpatients with PDs and a healthy control group.

Semerari et al. (2003) developed a multidimensional scale of metacognition, the Metacognition Assessment Scale (MAS), which measured patients' mindreading through the analysis of psychotherapy session transcripts. The MAS is divided into three subscales that evaluate metacognition functions in, respectively, the first-person domain, the third-person domain, and the strategies for coping with psychological difficulties (Mastery). The first two scales include a number of dimensions; some of them are measured in the present study and described here.

Monitoring refers to the ability to identify elements of one's own inner states, such as emotions, thoughts, and motivations. If monitoring is impaired, the individual is unable to verbalize the content of mental states and to explain the inner motivation for his or her behavior. Because monitoring includes the ability to recognize and label emotions, monitoring impairment partially overlaps with the concept of alexithymia. *Differentiation* refers to the ability to recognize the representational nature of mental states. In this respect, differentiation deficits closely resemble the *equivalent mode* described by Bateman and Fonagy (2004), in which fantasy and imagination are treated as *equivalent* to external reality. Additionally, differentiation refers to the ability to recognize the subjective nature of one's own thoughts, and thus to use this awareness to treat one's own beliefs with critical distance. *Integration* denotes the ability to reflect on multiple mental states, ordering them by relevance in order to produce coherent behavioral responses. Integration enables the subject to connect his or her inner mental states and to construct consistent narratives of his or

her mental processes. *Decentering* refers to the ability to make plausible inferences about the mental states of others by adopting their perspectives. Decentering also partially overlaps with the concept of theory of mind, because it includes the ability to reflect upon others' intentions, desires, and beliefs independently of our own perspective.

Patients with different PDs presented diversified profiles of metacognitive impairments as measured with the MAS. Patients with avoidant personality disorder (AVPD) and narcissistic personality disorder (NPD), for example, showed low ability to monitor their own emotions (Dimaggio, Proccacci, et al., 2007). In contrast, patients with BPD had more preserved monitoring but exhibited a lack of integration and poor differentiation (Semerari et al., 2005). In addition to discourse analysis, several experimental studies have examined single components of metacognition, frequently with contradictory results. In the brief review here, we reframe some significant data emerging from these studies within the conceptual framework of metacognition proposed by Semerari et al. (2007).

MONITORING IN SELF-DOMAIN

The monitoring metacognitive impairment that has been most extensively studied is alexithymia (Bagby, Parker, & Taylor, 1994). Alexithymia has been linked both with interpersonal problems (Nicolò et al., 2011), and with a cold, distant, and nonassertive personality style (Inslegers et al., 2012; Spitzer, Sieble-Jürges, Barnow, Grabe, & Freyberger, 2005). Positive correlations have been found with schizotypal, avoidant, and dependent personality traits (Bach, de Zwaan, Ackard, Nutzinger, & Mitchell, 1994), with schizoid and antisocial traits (De Rick & Vanhule, 2007), with Cluster C traits (Honkalampi, Hintikka, Antikainen, Lehtonen, & Viinamaki, 2001), and with avoidant, dependent, passive-aggressive and depressive traits, but not with Cluster B traits (Nicolò et al., 2011). In contrast, some studies have found alexithymia as a feature of BPD (McMain et al., 2013; New et al., 2012). Negative correlations have been found with histrionic personality traits (Bach et al., 1994).

MONITORING IN THE OTHER MIND DOMAIN

Research on the ability to understand the mental states of others has largely focused on understanding facial emotional expression. Some studies found that patients with BPD were less accurate, particularly in recognizing expressions of anger, disgust, and fear (Bland, Williams, Scharer, & Manning, 2004; Levine, Marziali, & Hood, 1997). Inconsistently, other studies showed that participants with BPD were able to classify facial emotions even at a low intensity (Dyck et al., 2009; Lynch et al., 2006; Minzenberg, Fan, New, Tang, & Siever, 2006), but with response bias toward specific primary emotions such as anger (Arntz & Veen, 2001; Domes, Schulze, & Herpertz, 2009) or fear and disgust (Unoka, Fogd,

Füzy, & Csukly, 2011). Ritter and colleagues (2011) suggested that NPD patients are capable of recognizing the emotions of others but are impaired in feeling what other people feel. In contrast, Marissen, Deen, and Franken (2012) found that, compared with control groups, patients with NPD were overall less accurate in recognizing emotional expressions. Rosenthal and colleagues (2011) investigated facial emotional recognition with a morphing task in patients with AVPD and in a control group. Patients with AVPD successfully identified each emotion as did the control group, except for fear.

DECENTERING AND THEORY OF MIND

Recent studies have reported both enhanced mental states understanding (Fertuck et al., 2009; Frick et al. 2012; Harari, Shamay-Tsoory, Ravid, & Levkovitz, 2010) and impaired mental states understanding in BPD (Ghiassi, Dimaggio, & Brune, 2010; Preißler et al., 2010). Patients with BPD were prone to “over-interpretative mental states reasoning” (Sharp et al., 2013, p. 569). On the contrary, Cluster C patients showed the highest mindreading skills compared to patients with BPD and healthy controls (Arntz, Bernstein, Oorschot, & Schobre, 2009).

Another concept that is closely related to theory of mind is empathy, in particular cognitive empathy. Empathy involves both understanding other people’s mental states (cognitive empathy) and the ability to resonate sympathetically with other people’s emotional states (affective empathy). Studies comparing affective and cognitive empathic skills in BPD revealed a consistent pattern: Patients with BPD scored higher for affective empathy but lower for cognitive empathy (Harari et al., 2010; New et al., 2012). Conversely, persons with antisocial PD or with psychopathic traits showed unimpaired cognitive empathy (Richell, Mitchell, & Newman, 2003), while their emotional empathy appeared to be severely damaged (Blair et al., 2004). Patients with NPD also showed lack of empathy (Given-Wilson, McIlwain, & Warburton, 2011), and they were found to be less empathetic than BPD patients (Ritter et al., 2011).

CURRENT STUDY

Overall, the experimental evidence does not support the hypothesis of a generalized impairment in metacognitive ability in individuals with PDs. More specifically, it is not clearly understood whether significant differences in metacognitive competence exist between PDs and symptomatic disorders; neither is it clear whether such variations are present within different categories of PD. One possible reason for the inconsistent results is that most studies have focused on a single categorical diagnosis without taking into account the global severity of personality dysfunction. Furthermore, it is possible that specific impairments in metacognition are closely related to patterns of symptomatic expression of personality pa-

thology, which do not emerge when considering single categorical PD diagnoses.

This study aims to evaluate metacognitive functions in patients with and without PD diagnoses with the following hypotheses: (a) Metacognition is more impaired in patients with PD than in patients with symptomatic disorders; even though patients with PD may present more symptoms than patients with no PD (Dimaggio et al., 2013), we could expect that the metacognitive abilities of these two clinical groups are independent from the level of symptomatology; (b) global metacognitive impairment is strictly related to PD severity; and (c) specific metacognitive profiles are related to specific personality styles. To verify the last two hypotheses, it is necessary to discriminate between global severity and symptomatic stylistic expressions. Recently, Hopwood and colleagues (2011) developed a method to differentiate severity from personality styles, and they highlighted five personality styles: Withdrawal, Peculiarity, Fearfulness, Instability, and Deliberateness. Adopting a methodology similar to that used in Hopwood et al.'s study, we expect to discriminate similar personality styles with specific metacognitive impairments. We expect low monitoring performance to be related to Withdrawal, because difficulties in monitoring inner states have been found in AVPD (Dimaggio, Procacci, et al., 2007) and alexithymia has been associated with a cold and detached style (Inslegers et al., 2012). We expect decentering impairment to be associated with Peculiarity personality style. Disregard for opinions and viewpoints of other people, together with a tendency toward perseverance in idiosyncratic interpretations of external reality, may result in mindsets and behaviors perceived as bizarre by others. Finally, we predict a high correlation between the Instability personality style and a combined impairment of integration and differentiation, because the ability to integrate conflicting mental representations and the capacity to differentiate mental representations from external reality are both preconditions for behavioral stability and coherence.

METHOD

PARTICIPANTS

Participants were 306 consecutive adult patients requiring treatment or seeking consultation in an Italian outpatient clinic, the Third Centre of Cognitive Psychotherapy, from 2009 to 2012. The mean age was 34.41 ($SD = 10.67$), ranging from age 18 to 72. One hundred thirty-nine participants (45.6%) were male and 167 (54.4%) were female. All participants met *DSM-IV* diagnostic criteria for at least one symptom disorder. The sample as a whole met the criteria for Axis I. One hundred eight (35.3%) patients did not satisfy criteria for PDs, while 198 (64.7%) patients met criteria for both PDs and symptom disorders. We split the whole sample into two groups according to the presence of PD diagnosis. Table 1 shows diag-

**TABLE 1. Demographic and Diagnostic Characteristics in the Two Groups:
Axis I Diagnosis and Axis II Diagnostic Comorbidity**

	<i>n</i>	Sex	Age Mean (<i>SD</i>)								
PD	198	95M/103F	33.81 (10.66) range (18–70)								
NNPD	108	46M/62F	35.77 (10.29) range (18–72)								
Percentage of Axis I diagnosis											
	Anxiety disorders	Mood disorders	Eatings disorders	Dissociative disorders	Other						
NNPD	46.29	36.11	7.4	—	10.18						
PD	43.43	32.82	7.57	6.56	9.59						
Percentage of Axis II diagnostic comorbidity for PD											
	AV	DEP	OC	PA	DE	PAR	ST	SZ	HIS	NAR	BDL
	2.02	1.51	2.52	8.58	15.15	5.55	2.52	1.01	3.03	3.03	6.06

Note. Other = Axis I disorders not included in the anxiety, mood, eating, and dissociative disorders; AV = Avoidant PD; DEP = Dependent PD; OC = Obsessive-Compulsive PD; PA = Passive-Aggressive PD; DE = Depressive PD; PAR = Paranoid PD; ST = Schizotypal PD; SZ = Schizoid PD; HIS = Histrionic PD; NAR = Narcissistic PD; BDL = Borderline PD. *N* = 306.

nostic distributions and PD comorbidity rates. Exclusion criteria included the presence of neurological disorders, psychotic disorders, and active substance dependence.

MEASURES

The study protocol was approved by the local Ethical Committee. After giving informed consent, all participants completed the following four measures.

The Metacognition Assessment Interview. The MAI (Semerari et al., 2012) is a semistructured clinical interview designed to elicit and evaluate the metacognitive abilities of the participant in a brief narrative of a psychologically significant experience or event. The metacognitive functions assessed by the MAI are those previously described in our introduction: Monitoring (MON), Integration (INT), Differentiation (DIF), and Decentering (DEC). In the context of the interview, the patient is asked to describe the most disturbing experience of the previous 6 months. This time frame was selected to facilitate recall. Once the description of the episode is completed, the interviewer asks a series of questions to elicit and evaluate each metacognitive subfunction.

The MAI was tested in two preliminary studies. In the first study, factorial analysis was used to investigate 175 nonclinical subjects and revealed the presence of two higher order domains which can be described, respectively, as “self mental states awareness” and “others’ mental states understanding” (Semerari et al., 2012). In the second study, conducted on the same current study sample, factorial analysis indicated the presence of four factors, consistent with the structure of the MAI subfunctions, and confirmed a higher structure of two factors as previously found (Pellecchia et al., 2013). In the same study, concerning validity, a significant associa-

tion was found between MAI results and alexithymia as measured with the Toronto Alexithymia Scale (TAS-20; Bagby et al., 1994). In particular, MON subfunction and MAI global score were associated with all TAS-20 dimensions and total score (correlation coefficients ranged from .24 to .39, $p < .01$). MAI subfunctions and global score results were associated with the global evaluation of interpersonal problems measured with the Inventory of Interpersonal Problems (Pilkonis, Kim, Proietti, & Barkham, 1996), with correlation coefficients ranging from .19 to .27 ($p < .01$). In the present study, the MAI was administered and scored by three senior interviewers blinded to clinical diagnosis. Preliminary interrater reliability evaluation was carried out on 20 interviews. To estimate the correlation for every single function rated by different judges, the Intraclass Correlation Coefficient (ICC) was used. A two-way mixed absolute agreement model was applied to carry out the ICC for each dimension of the MAI. The ICC for the MAI's functions ranged from .55 to .72 for MON; from .50 to .67 for INT; from .49 to .78 for DIF; and from .45 to .61 for DEC; all analyses were significant ($p < .001$) and provide good interrater reliability. Internal consistency of the MAI dimensions was estimated with Cronbach's alphas, which ranged from .85 to .89.

The Structured Clinical Interview for DSM-IV. The DSM-IV Axis I and II diagnoses were obtained using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1997a), and the Structured Clinical Interview for DSM-IV Axis II Disorders (SCID-II; First, Spitzer, Gibbon & Williams, 1997b), respectively. Twenty SCID-I interviews were rated twice and revealed excellent interrater reliabilities for Axis I (kappas ranged between .98 and 1.00). Similarly, 20 SCID-II interviews were rated twice; internal consistency of traits of PDs ranged from .70 and .89 for the majority of the PD diagnoses; only four PDs (obsessive-compulsive, dependent, schizotypal, and passive-aggressive) had alphas above .60. Interrater reliability was adequate for both trait scores (a two-way mixed absolute agreement model for ICCs ranged between .88 and .99, mean = .94) and categorical diagnoses (average $k = .89$). SCID-II was administered after SCID-I.

The Symptom Checklist-90-R. The SCL-90-R (Derogatis, 1977) is a 90-item self-report inventory designed to reflect the psychological symptom patterns of psychiatric and medical patients. It is a measure of current (state) psychological symptom status. The SCL-90-R measures nine primary symptom dimensions and generates an estimate of global psychopathology, the Global Severity Index (GSI), which has been adopted in the current study as a measure of symptoms.

ANALYSES

To test the first hypothesis, we first compared the two groups on the SCL90-R Global Severity Index. Variance and covariance analyses were

then conducted comparing MAI global and subfunction scores between groups. Then, in order to assess the second and third hypotheses, we first constructed a severity measure by summing the number of SCID-II criteria met by the whole sample. Therefore, severity score represented the general dimensions of PD symptoms in the sample. An analysis of internal consistency and criterion-total correlations supported the view that a general severity composite may be represented in this way (Hopwood et al., 2011). Then, to differentiate a general severity dimension from stylistic elements of symptomatic expression, a series of independent simple linear regression analyses were run to obtain 12 residual term scores representing elements of each disorder independent of severity. Successively a principal components analysis (PCA) with orthogonally rotated components was computed on residual dimensions to reduce the number of variables to a meaningful set of styles. Finally, we examined the relationships between the identified styles, severity, and metacognitive subfunctions.

RESULTS

First, the PD and no PD groups were compared on global psychopathology. The PD group showed significantly more symptoms than the no PD group, $F(1, 304) = 42.31, p = .001$. Then, a comparison between groups on the MAI revealed a significant group effect for both MAI global score, $F(1, 303) = 17.02, p < .001$, and for subfunctions scores, [DIF, $F(1, 303) = 17.79, p < .001$; INT, $F(1, 303) = 7.261, p = .007$; DEC, $F(1, 303) = 10.737, p = .001$] with the PD patient group performing at a lower level than controls. The only exception was MON subfunction, where the difference did not remain significant when symptomatology was taken into account, $F(1, 303) = 2.717, p = .1 ns$. These results are reported in Table 2.

TABLE 2. MAI Global Score and Subfunctions Scores Associated With the Presence of Axis I or Axis II Disorders Before and After Controlling for Global Psychopathology (One-Way Analysis of Variance/Covariance)

MAI	nnPD	PD	$F(1, 303)$	Cohen's d /Partial Eta Squared
	Mean (SD) ($n = 108$)	Mean (SD) ($n = 198$)		
Monitoring	3.39 (.72)	3.15 (.70)	8.27**	.34
	3.34 (.07)	3.18 (.05)	2.71 <i>ns</i>	.01
Differentiation	3.34 (.61)	2.88 (.63)	39.49**	.74
	3.25 (.06)	2.93 (.04)	17.79**	.05
Integration	3.29 (.72)	2.94 (.71)	17.05**	.49
	3.22 (.07)	2.97 (.05)	7.26*	.02
Decentration	3.22 (.75)	2.81 (.76)	21.42**	.54
	3.16 (.07)	2.84 (.05)	10.73**	.03
Global score	13.25 (2.43)	11.79 (2.41)	26.38**	.61
	12.97 (.23)	11.94 (.17)	11.61**	.03
SCL90-R - GSI	.88 (.57)	1.35 (.62)	42.31**	.80

Note. In the first line are reported raw means for global score and each subfunction; in the second line are reported means adjusted for SCL90-R Global Psychopathology. * $p < .05$; ** $p < .001$.

The internal consistency of the severity dimension was .91 and the analysis of criterion-total correlations revealed that all PD criteria were positively correlated with severity dimension reporting correlation coefficients ranging from .15 to .57, median = .26. With respect to the criterion-total correlation, 79.79% of them were significant ($p < .05$) in bivariate correlation. These results support the view that PD symptoms are sufficiently homogeneous to be represented as a general unitary dimension of PD severity. A set of independent bivariate regression analyses provided the standardized residual terms, which were successively analyzed with PCA. Kaiser's rule and scree test suggested the extraction of four factors (eigenvalues = 2.30, 1.72, 1.56, 1.19), which accounted for 56.53% of the variance. The opportunity of considering the first four factors was also supported by the eigenvalue of the fifth factor (1.02), which appeared lower than the fourth eigenvalue of random data (1.16), as suggested by a parallel analysis. The relationship between the residualized term of each PD provided by regression analyses and the four-factor solution reflects the quota of variance in each disorder not explained by severity, and can be considered a measure of stylistic dimensions (Hopwood et al., 2011).

The first component had the largest positive correlations on schizoid, avoidant, and depressive PDs, and negative correlations with histrionic and narcissistic PDs. We defined this dimension as Withdrawal versus Histrionism. The second component had large negative coefficients on dependent PDs. There were positive coefficients on paranoid, schizoid, and schizotypal PDs. We named this second dimension Peculiarity versus Conformity. The third component had the largest positive coefficient on obsessive-compulsive and narcissistic PDs, as well as large negative coefficients on borderline PDs and partially negative coefficients on dependent PDs. We named this dimension Rigidity versus Instability. The fourth component had the largest positive coefficient on antisocial and passive-aggressive criteria, and a negative coefficient on obsessive-compulsive criteria. We named this component Opposition versus Inflexible Adherence to Rules. See Table 3.

Correlations among MAI subfunctions, severity, and stylistic dimensions were computed using Pearson's procedure. Results showed that severity correlates negatively with global metacognition and with Differentiation, Integration, and Decentering functions, but not Monitoring, which presented the same correlational pattern as the other functions without reaching significance.

Stylistic dimensions were also correlated to metacognition, although to a lesser degree than the severity dimension. Different personality styles presented interesting and specific associations with metacognition. Withdrawal was associated with low Monitoring, and Peculiarity was associated with low Differentiation, Decentering, and global metacognition. Instability revealed an association with low Differentiation and Integration. Only Opposition to rules style correlated neither with metacognitive global score nor with subfunctions. See Table 4.

TABLE 3. Structure Coefficients of Residualized Personality Disorders Correlations With Stylistic Components of Personality Pathology

	Withdrawal vs. Histrionism	Peculiarity vs. Conformity	Rigidity vs. Instability	Opposition vs. Inflexible Adherence to Rules
Paranoid	-.055	.624**	-.036	.052
Schizoid	.476**	.391**	-.026	-.299**
Schizotypal	.121	.774**	-.166*	-.127
Antisocial	-.009	.094	-.108	.582**
Borderline	-.376**	.008	-.691**	-.084
Histrionic	-.717**	-.144*	-.155*	-.119
Narcissistic	-.607**	.104	.513**	.153*
Avoidant	.707**	-.016	.013	-.032
Dependent	.130	-.617**	-.346**	-.121
Obsessive-Compulsive	-.001	-.081	.792**	-.297**
NOS-Depressive	.676**	-.362**	.184**	-.007
NOS-Passive-Aggressive	-.005	-.110	.035	.804**

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

DISCUSSION

Patients with PDs appear to have greater difficulties in managing and coping with the demands of everyday life, and it is plausible that this discrepancy is, at least to some extent, attributable to the poorer metacognitive abilities of these patients. Our results support the hypothesis of a close relationship between PDs and metacognitive impairments, and, consequently, of greater life task difficulties for patients with PDs. Results confirmed the first hypothesis that patients with PDs have lower metacognitive abilities than patients without PDs. Differences in metacognitive abilities between the two groups were significant for metacognition as a whole, as well as for each subfunction. These discrepancies remained significant even when global symptoms were taken as covariates, with the exception of Monitoring, which was the only function significantly affected by symptom severity.

The strong relationship between metacognitive impairments and personality pathology is also confirmed by further analysis. Consistent with our predictions, lower metacognitive performance was associated with higher personality severity. In the light of the *DSM-5* proposal to separate

TABLE 4. Correlations of General Severity and Stylistic Elements of Personality Pathology Symptoms With Metacognition

MAI	Severity	Withdrawal vs. Histrionism	Peculiarity vs. Conformity	Rigidity vs. Instability	Opposition vs. Inflexible Adherence to Rules
Monitoring	-.139	-.142*	-.139	.050	.024
Differentiation	-.358**	-.026	-.183**	.163*	.038
Integration	-.220**	-.061	-.107	.184**	.025
Decentration	-.261**	-.075	-.155*	.050	.050
Total	-.281**	-.090	-.168*	.127	.040

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

severity and stylistic elements of symptom expression in PD classification (APA, 2013), this finding seems particularly interesting. According to Hopwood and colleagues (2011), “severity approximates a shared etiological loading that may account for what has previously been considered diagnostic comorbidity” (p. 315). Our results suggest that a global metacognitive impairment could be considered as a shared etiological component of personality pathology. Further studies on PDs should take into account the severity dimension, as defined in the *DSM-5* proposal, for a deeper understanding of the relationship between severity and metacognitive impairments.

Analysis revealed four different personality styles: Withdrawal versus Histrionism; Peculiarity versus Conformity; Rigidity versus Instability; and Opposition versus Inflexible Adherence to Rules. Consistent with our third hypothesis, three styles significantly correlated with specific metacognitive subfunctions. Withdrawal correlated with low monitoring, Peculiarity with low differentiation and decentration, and Instability with low integration and differentiation. Unexpectedly, Opposition style was not related to any metacognitive impairment. Because Opposition style includes antisocial and passive-aggressive traits, which share a low sensitivity to other people’s point of view, we had predicted that Opposition style would be closely related to Decentering impairments. This unexpected result may be due to the low number of patients in our sample with antisocial and psychopathic traits. Another possible reason is suggested by our parallel analysis. Considering that the eigenvalue of the fourth factor is slightly greater than the fourth eigenvalue of random data, antisocial and psychopathic traits possibly do not correlate with MAI because this is a weak representation of the specific features of these traits. A third possibility is that the influences of antisocial and psychopathic features on decentering and other metacognitive impairments may be shared with other PD styles, and thus be accounted for in the correlation between generalized PD severity and metacognition. Overall, evidence of specific profiles of metacognitive impairments in different personality styles supports the hypothesis that metacognition is a multicomponent ability that can be selectively impaired in different personality pathologies. Three of the styles that emerged in this study closely resemble three styles described in Hopwood et al.’s (2011) study: Withdrawal versus Histrionism is similar to the Withdrawal style suggested by Hopwood et al.; Peculiarity versus Conformity overlaps with the Peculiarity style; and Rigidity versus Instability recalls the Instability style. The most confidence can be placed in the two stylistic dimensions that explained the most PD-specific variance across both studies: withdrawal and peculiarity. These dimensions in particular seem to be important markers of PD variance that is distinct from general personality pathology and thus could be useful for classifying meaningfully distinct subgroups of PD patients. Further studies would be needed to strength these preliminary results. Hopwood et al. (2011) highlighted two additional styles, Fearfulness and Deliberateness styles, whereas we found a

fourth style called Opposition versus Inflexible Adherence to Rules. One possible reason for this discrepancy between the two studies may be due to *DSM-IV* criteria that load on more than one stylistic dimension. Therefore, differences in the criteria distributions of the two samples might have affected the emerging stylistic structures. Further studies with a larger sample and more appropriate PD measurements might be useful for both distinguishing severity from stylistic symptomatic expression and replicating the different styles that emerged in these studies.

Finally, our results are consistent with treatment data indicating that interventions specifically designed, or indirectly able, to effect changes in metacognition are associated with symptom reduction and improved functioning (Bateman & Fonagy, 2009; Levy et al., 2006), implying the value of a clinical focus on metacognitive impairments. These results also may provide a useful framework for understanding the specific kinds of deficits, and thus interventions, that may be most useful for particular patients.

CONCLUSION

The findings of this study strengthen the hypothesis that underlying and inherent metacognitive impairments significantly affect personality pathology. Results showed that patients with PD have poorer metacognitive abilities than patients without PD and highlighted a high correlation between poor metacognitive functioning and severity of PD diagnosis. These results suggested that metacognitive impairments may represent a general dimension of personality pathologies, which should be taken into account in the current nosography debate on the definition of PDs. Moreover, the relationship between styles and specific profiles of metacognitive impairments suggests that single metacognitive deficits could selectively affect the symptomatic expression of personality.

Our study has a number of limitations. First, our sample is not representative of PDs in general, because it is composed of outpatients actively seeking treatment. Second, the methodology used to evaluate severity, and to isolate severity from personality styles, was based on the categories of *DSM-IV*, which does not provide an independent score for the severity dimension. Diagnostic tools designed to differentiate between personality styles may contribute productively to the further clarification of associations between the different personality styles and metacognitive impairments.

REFERENCES

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Arntz, A., Bernstein, D., Oorschot, M., & Schobre, P. (2009). Theory of mind in borderline and cluster-C personality disorder. *Journal of Nervous and Mental Disease*, 197, 801-807.
- Arntz, A., & Veen, G. (2001). Evaluations of

- others by borderline patients. *Journal of Nervous and Mental Disease*, 189, 513–521.
- Bach, M., de Zwaan, M., Ackard, D., Nutting, D. O., & Mitchell, J. E. (1994). Alexithymia: Relationship to personality disorders. *Comprehensive Psychiatry*, 35, 239–243.
- Bagby, R. M., Parker, J. D. A., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia Scale-I: Item selection and cross validation of the factor structure. *Journal of Psychosomatic Research*, 38, 23–32.
- Bateman, A., & Fonagy, P. (2004). *Psychotherapy for borderline personality disorder: A practical guide*. Oxford, UK: Oxford University Press.
- Bateman, A., & Fonagy, P. (2008). 8-year follow-up of patients treated for borderline personality disorder: Mentalization-based treatment versus treatment as usual. *American Journal of Psychiatry*, 165, 631–638.
- Blair, R. J. R., Mitchell, D. G. V., Peschardt, K. S., Colledge, E., Leonard, R. A., Shine, J. H., . . . Perrett, D. I. (2004). Reduced sensitivity to others' fearful expressions in psychopathic individuals. *Personality and Individual Differences*, 37, 1111–1121.
- Bland, A. R., Williams, C. A., Scharer, K., & Manning, S. (2004). Emotion processing in borderline personality disorders. *Issues in Mental Health Nursing*, 25, 655–672.
- De Rick, A., & Vanheule, S. (2007). Alexithymia and DSM-IV personality disorders traits in alcoholic inpatients: A study of the relation between both constructs. *Personality and Individual Differences*, 43(1), 119–129.
- Derogatis L. R. (1977). *SCL-90-R, administration, scoring & procedures manual-I for the revised version*. Baltimore, MD: Johns Hopkins School of Medicine.
- Dimaggio, G., Carcione, A., Nicolò, G., Lysaker, P. H., D'Angerio, S., Conti, L. M., . . . Semerari, A. (2013). Differences between axes depend on where you set the bar: Associations among symptoms, interpersonal relationship and alexithymia with number of personality disorder criteria. *Journal of Personality Disorders*, 27, 359–370.
- Dimaggio, G., & Lysaker, P. H. (Eds.). (2010). *Metacognition and severe adult mental disorders: From basic research to treatment*. London: Routledge.
- Dimaggio, G., Procacci, M., Nicolò, G., Popolo, R., Semerari, A., Carcione, A., & Lysaker, P. H. (2007). Poor metacognition in narcissistic and avoidant personality disorders: Analysis of four psychotherapy patients. *Clinical Psychology and Psychotherapy*, 14, 386–401.
- Dimaggio, G., Semerari, A., Carcione, A., Nicolò, G., & Procacci, M. (2007). *Psychotherapy of personality disorders: Metacognition, states of mind, and interpersonal cycles*. London: Routledge.
- Domes, G., Schulze, L., & Herpertz, S. C. (2009). Emotion recognition in borderline personality disorder: A review of the literature. *Journal of Personality Disorders*, 23, 6–19.
- Dyck, M., Habel, U., Slodczyk, J., Schlummer, J., Backes, V., Schneider, F., & Reske, M. (2009). Negative bias in fast emotion discrimination in border personality disorder. *Psychological Medicine*, 39, 855–864.
- Fertuck, E. A., Jekal, A., Song, I., Wyman, B., Morris, M. C., Wilson, S. T., & Brodsky, B. S. (2009). Enhanced 'Reading the Mind in the Eyes' in borderline personality disorder compared to healthy controls. *Psychological Medicine*, 39, 1979–1988.
- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (1997a). *Structured clinical interview for DSM-IV Axis I disorders—Clinical version (SCID-I)*. Washington, DC: American Psychiatric Press.
- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (1997b). *Structured clinical interview for DSM-IV Axis II personality disorders (SCID-II)*. Washington, DC: American Psychiatric Press.
- Fonagy, P., Leigh, T., Steele, M., Steele, H., Kennedy, R., Mattoon, G., . . . Gerber, A. (1996). The relation of attachment status, psychiatric classification, and response to psychotherapy. *Journal of Consulting and Clinical Psychology*, 64, 22–31.
- Fonagy, P., Steele, M., Steele, H., & Target, M. (1998). *Reflective functioning manual, version 4.1. For application to Adult Attachment Interview*. London: University College of London.
- Frick, C., Lang, S., Kotchoubey, B., Sieswer-

- da, S., Dinu-Biringer, R., Berger, M., . . . Barnow, S. (2012). Hypersensitivity in borderline personality during mindreading. *PLoS One*, *7*, e41650.
- Ghiassi, V., Dimaggio, G., & Brune, M. (2010). Dysfunctions in understanding other minds in borderline personality disorder: A study using cartoon picture stories. *Psychotherapy Research*, *20*, 657–667.
- Given-Wilson, Z., McIlwain, D., & Warburton, W. (2011). Meta-cognitive and interpersonal difficulties in overt and covert narcissism. *Personality and Individual Differences*, *50*, 1000–1005.
- Gumley, A. (2011). Metacognition, affect regulation and symptom expression: A transdiagnostic perspective. *Psychiatry Research*, *190*, 72–78.
- Harari, H., Shamay-Tsoory, S. G., Ravid, M., & Levkovitz, Y. (2010). Double dissociation between cognitive and affective empathy in borderline personality disorder. *Psychiatry Research*, *175*, 277–299.
- Honkalampi, K., Hintikka, J., Antikainen, R., Lehtonen, J., & Viinamaki, H. (2001). Alexithymia in patients with major depressive disorder and comorbid cluster C personality disorders: A 6-month follow-up study. *Journal of Personality Disorders*, *3*, 245–254.
- Hopwood, C. J., Malone, J. C., Ansell, E. B., Sanislow, C. A., Grilo, C. M., McGlashan, T. H., . . . Morey, L. C. (2011). Personality assessment in DSM-5: Empirical support for rating severity, style, and traits. *Journal of Personality Disorders*, *25*(3), 305–320.
- Inslegers, R., Vanheule, S., Meganck, R., Debaere, V., Trensou, E., & Desmet, M. (2012). Interpersonal problems and cognitive characteristics of interpersonal representations in alexithymia: A study using a self-report and interview-based measure of alexithymia. *Journal of Nervous and Mental Disease*, *200*, 607–613.
- Jørgensen, C. R. (2010). Invited essay: Identity and borderline personality disorder. *Journal of Personality Disorders*, *24*(3), 344–364.
- Levine, D., Marziali, E., & Hood, J. (1997). Emotion processing in borderline personality disorders. *Journal of Nervous and Mental Disease*, *185*, 204–246.
- Levinson, A., & Fonagy, P. (2004). Offending and attachment: The relationship between interpersonal awareness and offending in a prison population with psychiatric disorders. *Canadian Journal of Psychoanalysis*, *12*, 225–251.
- Levy, K. N., Meehan, K. B., Kelly, K. M., Reynoso, J. S., Weber, M., Clarkin, J. F., & Kernberg, O. F. (2006). Change in attachment patterns and reflective function in a randomized control trial of transference-focused psychotherapy for borderline personality disorder. *Journal of Consulting and Clinical Psychology*, *74*, 1027–1040.
- Livesley, W. J. (2011). An empirically-based classification of personality disorder. *Journal of Personality Disorders*, *25*(3), 397–420.
- Lynch, T. R., Rosenthal, M. Z., Kosson, D. S., Cheavens, J. S., Lejuez, C. W., & Blair, R. J. (2006). Heightened sensitivity to facial expressions of emotion in borderline personality disorder. *Emotion*, *6*, 647–655.
- Marissen, M. A., Deen, M. L., & Franken, I. H. (2012). Disturbed emotion recognition in patients with narcissistic personality disorder. *Psychiatry Research*, *2*, 269–273.
- McMain, S., Links, P. S., Guimond, T., Wnuk, S., Eynan, R., Bergmans, Y., & Warwar, S. (2013). An exploratory study of the relationship between changes in emotion and cognitive processes and treatment outcome in borderline personality disorder. *Psychotherapy Research*, *23*, 658–673.
- Minzenberg, M. J., Fan, J., New, A. S., Tang, C. Y., & Siever, L. J. (2007). Front-limbic dysfunction in response to facial emotion in borderline personality disorder: An event related fMRI study. *Psychiatry Research*, *155*, 231–243.
- New, A. S., aan het Rot, M., Ripoll, L. H., Perez-Rodriguez M. M., Lazarus, S., Zipursky, E., . . . Siever, L. J. (2012). Empathy and alexithymia in borderline personality disorder: Clinical and laboratory measures. *Journal of Personality Disorders*, *26*(5), 660–675.
- Nicolò, G., Semerari, A., Lysaker, P. H., Dimaggio, G., Conti, L., d'Angerio, S., . . . Carcione, A. (2011). Alexithymia in personality disorders: Correlations with symptoms and interpersonal functioning. *Psychiatry Research*, *190*, 37–42.

- Pellecchia, G., Moroni, F., Carcione, A., Cole, L., Dimaggio, G., Nicolò, G., . . . Semerari, A. (2013). *Metacognition Assessment Interview: Instrument description and factor structure*. Manuscript submitted for publication.
- Pilkonis, P. A., Kim, Y., Proietti, J. M., & Barkham, M. (1996). Scales for personality disorders developed from the Inventory of Interpersonal Problems. *Journal of Personality Disorders, 10*, 355–369.
- Preißler, S., Dziobek, I., Ritter, K., Heekeren, H. R., & Roepke, S. (2010). Social cognition in borderline personality disorder: Evidence for disturbed recognition of the emotions, thoughts, and intentions of others. *Frontiers in Behavioral Neuroscience, 4*, 1–8.
- Richell, R. A., Mitchell, D. G., & Newman, C. (2003). Theory of mind and psychopathy: Can psychopathic individuals read the “language of the eyes”? *Neuropsychologia, 41*, 523–526.
- Ritter, K., Dziobek, I., Preißler, S., Ruter, A., Vater, A., Fydrich, T., . . . Roepke S. (2011). Lack of empathy in patients with narcissistic personality disorder. *Psychiatry Research, 187*, 241–247.
- Rosenthal, M. Z., Kim, K., Herr, N. R., Smoski, M. J., Cheavens, J. S., Lynch, T. R., & Kosson, D. S. (2011). Speed and accuracy of facial expression classification in avoidant personality disorder: A preliminary study. *Personality Disorders, 4*, 327–334.
- Semerari, A., Carcione, A., Dimaggio, G., Falcone, M., Nicolò, G., & Procacci, M. (2003). How to evaluate metacognitive functioning in psychotherapy? The metacognition assessment scale and its applications. *Clinical Psychology & Psychotherapy, 10*, 238–261.
- Semerari, A., Carcione, A., Dimaggio, G., Nicolò, G., Pedone, R., & Procacci, M. (2005). Metarepresentative functions in borderline personality disorder. *Journal of Personality Disorders, 19*, 609–710.
- Semerari, A., Carcione, A., Dimaggio, G., Nicolò, G., & Procacci, M. (2007). Understanding minds: Different functions and different disorders? The contribution of psychotherapy research. *Psychotherapy Research, 17*(1), 106–119.
- Semerari, A., Cucchi, M., Dimaggio, G., Cavadini, D., Carcione, A., Bottelli, V., . . . Smeraldi, E. (2012). The development of the Metacognition Assessment Interview: Instrument description, factor structure and reliability in a non-clinical sample. *Psychiatry Research, 200*, 890–895.
- Sharp, C., Ha, C., Carbon, C., Kim, S., Perry, K., Williams, L., & Fonagy, P. (2013). Hypermentalizing in adolescent inpatients: Treatment effects and association with borderline traits. *Journal of Personality Disorders, 27*, 3–18.
- Spitzer, C., Sieble-Jürges, U., Barnow, S., Grabe, H. S., & Freyberger, H. S. (2005). Alexithymia and interpersonal problems. *Psychotherapy and Psychosomatics, 74*, 240–246.
- Taubner, S., Hörz, S., Fischer-Kern, M., Doering, S., Buchheim, A., & Zimmermann, J. (2013). Internal structure of the Reflective Functioning Scale. *Psychological Assessment, 25*(1), 127–135.
- Unoka, Z., Fogd, D., Fűzy, M., & Csukly, G. (2011). Misreading the facial signs: Specific impairments and error patterns in recognition of facial emotions with negative valence in borderline personality disorder. *Psychiatry Research, 189*, 419–425.
- Verheul, R., Bartak, A., & Widiger, T. (2007). Prevalence and construct validity of personality disorder not otherwise specified. *Journal of Personality Disorders, 21*, 359–370.
- Wells, A. (2000). *Emotional disorders and metacognition: Innovative cognitive therapy*. New York, NY: John Wiley & Sons.