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Differences and overlap in self-reported symptoms of bipolar disorder and borderline personality disorder

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ABSTRACT

Background: Differential diagnosis between bipolar disorder (BD) and borderline personality disorder (BPD) is often challenging due to some overlap in symptoms and comorbidity of disorders. We investigated correlations in self-reported symptoms of BD and BPD in screening questionnaires at the levels of both total scores and individual items and explored overlapping dimensions.
Methods: The McLean Screening Instrument (MSI) for BPD and the Mood Disorder Questionnaire (MDQ) for BD were filled in by patients with unipolar and bipolar mood disorders ($n = 313$) from specialized psychiatric care within a pilot study of the Helsinki University Psychiatric Consortium. Pearson's correlation coefficients between total scores and individual items of the MSI and the MDQ were estimated. Relationships between MDQ and MSI were evaluated by exploratory factor analysis (EFA).
Results: The correlation between total scores of the MDQ and MSI was moderate ($r = 0.431$, $P < 0.001$). Significant correlations were found between the MSI items of "impulsivity" and "mood instability" and all MDQ items ($P < 0.01$). In the EFA, the MSI "impulsivity" and "mood instability" items had significant cross-loadings (0.348 and 0.298, respectively) with the MDQ factor. The MDQ items of "irritability", "flight of thoughts" and "distractibility" (0.280, 0.210 and 0.386, respectively) cross-loaded on the MSI factor.
Conclusions: The MDQ and MSI items of "affective instability", "impulsivity", "irritability", "flight of thoughts" and "distractibility" appear to overlap in content. The other scale items are more disorder-specific, and thus, may help to distinguish BD and BPD.

1. Introduction

Borderline personality disorder (BPD) is often comorbid with mood disorders and shares some phenomenological features with them, particularly with bipolar disorder (BD) [3]. This has resulted in numerous discussions about relationship of the BPD with BD, some authors even suggesting than BPD should be considered as a part of the bipolar spectrum disorders [1], others emphasizing differences between them [24]. Some recent studies have indicated partial overlap in pathogenetic mechanisms and genetics of the disorders, although clear distinctions have also been found

[6,31,32,34]. Phenomenological and neurobiological overlap may underlie common difficulties in differential diagnosis between BPD and BD. However, because of notable differences in their treatment [24], it is important to distinguish the two disorders in psychiatric and other clinical settings.

Numerous previous studies have found BD to be widely under-recognized [11,17,25], or recognized only after a long delay [17]. The same may be also true for BPD [19]. However, as BD has received increasing clinical recognition and attention in recent years, some reports have implied that BD also may also become overdiagnosed at times and, moreover, patients misdiagnosed with BD may be significantly more likely to be later diagnosed with BPD [38–40]. There is a possibility of overdiagnosis of BPD, too.

In the absence of widely approved biomarkers specific for each disorder, the diagnoses of BD and BPD remain clinical [18]. The systematic use of screening tests and structured clinical interviews may considerably improve detection of disorders in clinical psychiatry [29]. The McLean Screening Instrument (MSI) for BPDs

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and the Mood Disorder Questionnaire (MDQ) for BD are useful and valid screening instruments used in psychiatric settings to improve recognition of these disorders. Both are based on self-reported symptoms [11,12,36].

In this study, we aimed to investigate the correlation between the MSI and the MDQ at the levels of both total scores and individual items, and explore overlapping and non-overlapping self-reported items of BD and BPD.

2. Methods

2.1. The Helsinki University Psychiatric Consortium (HUPC)

This investigation is a part of the Helsinki University Psychiatric Consortium (HUPC) pilot study, a collaborative research project between the faculty of medicine of the university of Helsinki; the department of mental health and substance abuse services of the National institute for health and welfare; the Department of social services and health care, city of Helsinki; and the department of psychiatry, university of Helsinki and Helsinki university hospital. The study protocol was approved by the Ethics committee of Helsinki university central hospital.

2.2. Setting

The study was conducted in 10 community mental health centres, three psychiatric inpatient units and one day-hospital offering specialized secondary public mental health services in the metropolitan area of Helsinki between 12.1.2011 and 20.12.2012.

2.3. Sampling

Inclusion criteria for participation in the pilot study were patients' age of over 18 years and provision of informed consent. Patients with mental retardation, neurodegenerative disorders and insufficient Finnish language skills were excluded. Stratified patient sampling selection was performed by identifying all patients within a certain day or week in a unit or by randomly drawing eligible patients from patient lists. Patients treated for psychotic disorders, neuropsychiatric disorders and substance use disorders were excluded from our study. Of the 902 eligible patients with mood, neurotic or personality disorders, 372 declined to participate and 216 were lost for other reasons.

2.4. Clinical diagnoses

The validity of the clinical diagnoses assigned by the attending physicians was critically evaluated by the authors (I.B., K.A., M.K., B.K.) by re-examining all available information from the patient records. Authors K.A., I.B. and B.K. were residents of psychiatry trained in diagnostic evaluations; in any unclear cases, the senior psychiatrists (M.K., E.I., G.J., M.H.) were consulted. The validated clinical diagnoses were based on the ICD-10-DCR [35]. Lifetime principal diagnosis was assigned. Although there is no division of BD into types I (BD-I) and II (BD-II) in the ICD-10, we subtyped patients into these categories according to the DSM-IV [2]. This distinction is established clinical practice in Finland and included in the national BD treatment guidelines.

2.5. Description of patients

Altogether 313 patients participated in the study. Their mean age was 41.7 ± 13.1 years, and 229 (73.1%) were female. All patients were allocated into groups according to the lifetime principal diagnosis; (see Table 1). Patients comprised those with depressive episode (F32-F33; future unipolar depression [UD] [$n = 183$; mean age 41.4 ± 13.3 years]), bipolar affective disorder (F31; [$n = 99$, mean age 43.7 ± 12.7 years]) and others ($n = 31$, mean age 36.2 ± 13 years). Among patients with BD, 36 (36.3%) had type I, 55 (55.5%) type II and 8 (8%) unspecified type. Fifteen patients with neurotic and somatoform disorders, four patients with eating disorders, five patients with dysthymia and seven patients with BPD as lifetime principal diagnosis formed the group "others". There were 65 patients with BPD among all patients, including patients with BPD as lifetime principal diagnosis and as comorbid. Their mean age was 37.5 ± 13 years.

The analysis of representativeness was undertaken by comparing patients suffering from UD or BD in the HUPC with patients with the same diagnoses treated in 2011 and 2012 in psychiatric care organizations. No significant differences emerged in sex and age between these two groups (data not shown).

2.6. Mood Disorder Questionnaire (MDQ)

The MDQ is a brief self-report instrument for screening symptoms or behaviours related to a manic or hypomanic syndrome [12], and it has been translated into Finnish [13]. The first part of the MDQ includes 13 items requiring a "yes/no"

Table 1
Characteristics of MDQ and MSI responders ($n = 313$).

	BD		UD		Others	
	n	%	*n*	%	*n*	%
Number	99	32	183	58	31	10
Age (mean)	43.7 ± 12.7		41.4 ± 13.3		36.2 ± 13	
BPD	17	17.2	39	21.3	9	29
Sex (male)	36	36.3	42	22.9	6	19.4
Marital state						
Married	20	20.2	39	21.3	4	12.9
Cohabitation	17	17.2	29	15.8	3	9.7
Unmarried	32	32.2	75	41	17	55
Divorced	29	29.3	35	19.1	6	19.4
Widowed	1	1	3	1.7	0	0
Job						
Retired due to mental disorder	37	37.4	23	12.5	6	19.4
Unemployed	10	10	18	9.8	8	26
Sick leave	22	22.2	64	35	5	16.1
Retired due to another reason	1	1	8	4.4	0	0
Student	7	7.1	24	13.1	6	19.4
Employed	20	20.2	30	16.4	5	16.1
Unemployed due to another reason	2	2.2	14	7.7	1	3.2

BD: bipolar disorder; UD: unipolar depression; BPD: borderline personality; MDQ: Mood Disorder Questionnaire; MSI: McLean Screening Instrument.

Table 2
Results MDQ and MSI questionnaires in patients (n = 313).

	BD-I	BD-II	BD unspecified	UD	Others	P[*]
MDQ mean	10.4 ± 2.9	9.9 ± 3.3	10 ± 2.7	4.9 ± 3.7	4.9 ± 4.4	< 0.0001
MSI mean	5.1 ± 2.6	6.3 ± 2.3	7.6 ± 2.7	5.5 ± 2.7	5.2 ± 2.5	0.030
MDQ positive, n (%)	27 (75)	34 (62)	7 (88)	34 (19)	7 (23)	< 0.0001
MDQ negative, n (%)	9 (25)	21 (38)	1 (12)	149 (81)	24 (77)	< 0.0001
MSI positive, n (%)	12 (31)	27 (49)	6 (75)	74 (39)	9 (5)	0.090
MSI negative, n (%)	24 (69)	28 (51)	2 (25)	109 (61)	22 (95)	0.090

BD-I: bipolar disorder type I; BD-II: bipolar disorder type II; UD: unipolar depression; BPD: borderline personality disorder; MDQ: Mood Disorder Questionnaire; MSI: McLean Screening Instrument.

[*] P-values reflect differences between group of patients with bipolar disorder (I; II- or unspecified type) with groups of patients with unipolar depression and others.

response. The second part of the questionnaire inquires whether several of these symptoms have been experienced during the same time period, and the third part asks about the severity of the resulting problems. The screening is regarded as positive when seven or more symptoms have occurred within the same episode, causing moderate to severe problems. In the correlation analysis only the first question's responses were used; Cronbach's alpha for them was 0.89, indicating excellent internal consistency.

2.7. McLean Screening Instrument (MSI)

The MSI is a ten-item questionnaire designed to screen for BPD [36]; it has been translated into Finnish [19]. Each item requires a "yes/no" response. Each positive item indicates the presence of BPD symptoms. Previous research has suggested that a useful clinical cut-off score in predicting BPD among adults is seven or more. Cronbach's alpha for MSI was 0.747, indicating a good internal consistency.

2.8. Statistical analysis

Analyses were performed using the Mplus 7.1 software [21]. Because the items were categorical, the WLSMV estimator was used to estimate the models, and the model is effectively an item-response theory (IRT) model with two factors (MDQ and MSI). Potential cross-loadings were examined by looking at model Modification Indexes, which are used to identify structural misspecifications in the model. The correlation from 0.8 to 1 was considered as "very strong", from 0.6 to 0.79 as "strong", from 0.40–0.59 as "moderate", from 0.20–0.39 as "weak" and less than 0.2 as "very weak" [8].

3. Results

3.1. MDQ and MSI scores

The BD patients scored significantly higher on the MDQ and fell more often into MDQ positive category than their UD and "others" counterparts (see Table 2).
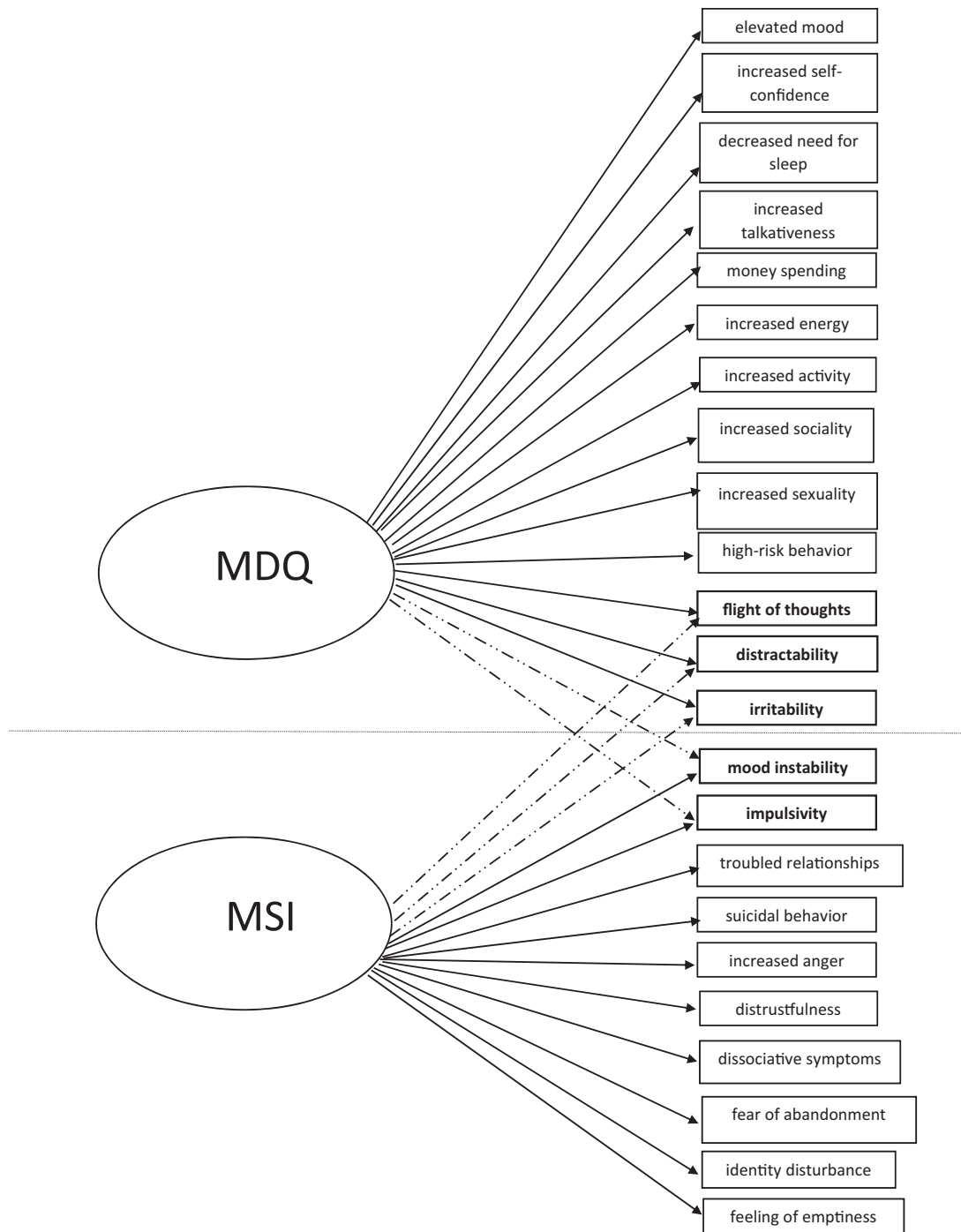
3.2. Correlation analysis

A moderate statistically significant correlation (r = 0.431, P < 0.001) was found between the MDQ and MSI total scores. Item-by-item correlations are shown in Table 3. More specifically, the MSI items of "impulsivity" and "mood instability" correlated significantly and coherently with all MDQ items, with r coefficients ranging from 0.263 to 0.397.

3.3. Factor analysis

In the two-factor IRT model, all MDQ and MSI items predictably loaded on their respective factors (all P < 0.01), Based on Modification Indexes, two MSI items had significant cross-loadings on the MDQ factor (both P < 0.01): "impulsivity" and "mood instability." Three MDQ items in turn had significant cross-loadings with the MSI factor (all P < 0.01): "irritability", "flight of thoughts", and "distractibility" (Fig. 1).

3.4. Correlation analysis in diagnostic subgroups

The correlation between the MDQ and MSI emerged independently of the diagnosis and more prominently for patients with

Table 3
Item-by-item correlations between the MDQ and MSI in patients (n = 313).

MDQ	MSI									
	Troubled relationships	Suicidal behaviour	Impulsivity	Mood instability	Increased anger	Distrustfulness	Dissociative symptoms	Emptiness	Identity disturbance	Fear of abandonment
Elevated mood	0.105	0.100	0.304**	0.381**	0.107	0.154**	0.178**	0.140*	0.100	0.069
Irritability	0.281**	0.134*	0.277**	0.263**	0.237**	0.187**	0.066	−0.007	0.040	0.132*
Increased self-confidence	0.041	0.082	0.310**	0.328**	0.079	0.139*	0.089	0.145**	0.066	0.118*
Decreased need for sleep	0.059	0.172**	0.254**	0.351**	0.101	0.169**	0.206**	0.148*	0.058	0.088
Talkativeness	0.050	0.043	0.256**	0.277**	0.127*	0.154*	0.146**	0.110	0.166**	0.140*
Flight of thoughts	0.018	0.047	0.276**	0.376**	0.121*	0.142*	0.186**	0.163**	0.135*	0.026
Distractibility	0.023	0.083	0.175**	0.301**	0.178**	0.212**	0.310**	0.194**	0.188**	0.087
Increased energy	0.124*	0.149**	0.358**	0.311**	0.154**	0.112*	0.167**	0.087	0.080	0.128*
Increased activity	0.092	0.118*	0.310**	0.311**	0.123*	0.115*	0.142*	0.082	0.065	0.096
Increased sociality	0.026	0.058	0.229**	0.307**	0.074	0.132*	0.153*	0.171**	0.104	0.088
Increased sexuality	0.080	0.112*	0.296**	0.327**	0.176**	0.078	0.085	0.133**	0.125*	0.044
High risk behaviour	0.110	0.176**	0.260**	0.397**	0.109	0.121*	0.193**	0.120*	0.105	0.070
Money spending	0.188**	0.141*	0.371**	0.339**	0.158**	0.140*	0.227**	0.116*	0.081	0.040

MDQ: Mood Disorder Questionnaire; MSI: McLean Screening Instrument.

[*] P < 0.05.

[**] P < 0.005.

Fig. 1. Factor analysis of MDQ and MSI. Solid arrows indicate the items receiving content from only one questionnaire; dashed arrows indicate the items receiving content from both questionnaires. MDQ: Mood Disorder Questionnaire; MSI: McLean Screening Instrument.

BPD and BD than for others. r values between total scores of MSI and MDQ and details of item-by-item analysis are shown in Table 4.

4. Discussion

We found a moderate correlation between total scores of self-reported symptoms of bipolar disorder (BD) on the Mood Disorder Questionnaire (MDQ) and borderline personality disorder (BPD) on the McLean Screening Instrument (MSI) among patients with mood disorders treated in psychiatric specialized units. In the item-by-item analysis, the most consistent correlation emerged between the MSI items of "mood instability" and "impulsivity" and all MDQ items. In the factor analysis, the items of "flight of thoughts", "distractibility" and "irritability" appeared to overlap.

To our knowledge, this is the first study on the phenomenological overlap between BP and BPD based on the self-report screening instruments MSI and MDQ. Strengths of our study included the relatively large number of patients and the representativeness of mood disorder patients recruited from specialized psychiatric care. However, there were also several limitations. First, the response

Table 4
Correlation analysis between the MDQ and MSI within diagnostic subgroups.

Subgroup	n	r between total scores of MDQ and MSI	Main findings from item-by-item analysis. Correlations were[**] as listed below
All patients with BP and BPD	147	0.274[*]	Moderate between MSI "mood instability" and all MDQ items; weak between MSI "impulsivity" and "irritability" and "money spending"
BD with comorbid BPD	17	0.410[*]	Strong between MSI "mood instability" and MDQ "elevated mood", "irritability"; moderate between MSI "impulsivity" and MDQ "money spending", "interpersonal disputes", "irritability"
All patients with BD	99	0.349[*]	Weak between MSI "mood instability" and all MDQ items
BD-I	36	0.296[*]	Moderate between MDQ "irritability" and MSI "interpersonal disputes", "increased anger". Moderate between MSI "mood instability" and MDQ "decreased need for sleep", "flight of thoughts", "increased activity", etc.
BD-II	55	0.475[*]	Moderate between MSI "mood instability" and all MDQ items. Moderate between MSI "impulsivity" and "decreased need for sleep", "increased energy", "talkativeness", "increased self-confidence"
BD without comorbid BPD	82	0.355[*]	Weak or moderate between MSI "mood instability" and all MDQ items
UD and comorbid BPD	39	0.328[*]	Weak between MSI "impulsivity" and MDQ "increased self-confidence", "talkativeness", "increased energy", etc. Moderate between MSI "mood instability" and MDQ "irritability"
UD without BPD	144	0.502[*]	Weak between MSI "impulsivity" "mood instability" and all MDQ items
BPD	65	0.404[*]	Moderate between MSI "mood instability"; "impulsivity" and MDQ "irritability", "increased energy", "increased activity"
Excluding group "others"	283	0.429[*]	Weak or moderate between MSI "mood instability", "impulsivity" and all MDQ items

BD: bipolar disorder; BD-I: bipolar disorder type 1; BD-II: bipolar disorder type 2; BPD: borderline personality disorder; UD: unipolar depression; MDQ: Mood Disorder Questionnaire; MSI: McLean Screening Instrument.

[*] $P < 0.005$.
[**] r value not shown.

rate was 35%, likely due to the survey being conducted within routine service facilities. Nevertheless, the analysis of representativeness indicated no significant differences in terms of age or sex between our cohort and the whole population of patients treated in the years 2011 and 2012. Second, the clinical diagnoses were not verified with structured clinical diagnostic interview instruments. However, all patients had been diagnosed with mood disorders in psychiatric settings specialized in their treatment, and all available relevant diagnostic information on each patient was re-evaluated by the authors. Moreover, the focus of this study was in responses to screens, not diagnoses per se.

Problematic boundaries between BD and BPD as well as difficulties in their differential diagnostics have been topics of numerous discussions for a long time [1,16,23,24,37]. The moderate correlation between the total scores of the screening instruments MDQ and MSI indicates partial similarity in self-reported features of BD and BPD. In the item-by-item analysis, the MSI items of "mood instability" and "impulsivity" correlated consistently with all MDQ items. Furthermore, for patients with both BPD and BD, particularly BD type II, the correlation was shown to be stronger than for other groups.

Mood instability and impulsivity are core features of BPD, but both can also be observed in patients with BD [3,5,9,22,27]. Some experts have postulated cyclothymic affective temperament to underlie disorders of emotional regulation in both BPD and BD [25,28]. Nevertheless, some distinctions in the nature of "affective instability" and "impulsivity" in BD and BPD have been described [4,9,10,14,15,22]. Our study indicates that the symptomatic overlap between BD and BPD in "impulsivity" and "mood instability" is also revealed in self-reports. Consequently, patients with self-reported "impulsivity" and "mood instability" may score higher on the MDQ even in the absence of bipolarity. On the other hand, patients with a history of hypomania may score higher on the MSI, leading to false interpretation of BPD.

Factor analysis revealed significant cross-loadings with five items (see Fig. 1). As a result, a patient scoring high on the MSI may also score high on the MDQ, probably due to difficulties in distinguishing from the hypomania items of "irritability", "flight of thoughts" and "distractibility". Correspondingly, patients scoring high on the MDQ may have increased MSI scores due to misinterpretation of the MSI items of "mood instability" and "impulsivity". Thus, MSI and MDQ scores associate with each other due to these symptoms, which may easily lead into erroneous diagnostic conclusions, unless both aspects of psychopathology are carefully evaluated.

The use of these screening instruments is based on the patient's own estimation of the presence or absence of symptoms. Several factors may influence patients' ability to answer to the scales questions, including well described impairments in social cognition [20,26,30], autobiographical memory disruptions [7,33] and current mood, among others. Our results indicate an overlap in the self-reported features of "flight of thoughts", "distractibility" and "irritability" on the MDQ and "mood instability" and "impulsivity" on the MSI. Despite this overlap, the majority of the other items on both questionnaires involve specific features of each disorder, which can help to distinguish between them.

Both the MDQ and MSI were created to improve recognition of a specific disorder. When interpreting the results of screening it is likely useful to evaluate how patient's answers are distributed between overlapping and non-overlapping items of the MDQ and MSI. Even more important clinically is not to limit evaluation only on one specific diagnostic tool, but to consider alternative explanations for apparent psychopathology, and to conduct careful, comprehensive clinical interviews to differentiate between BPD and BD, or to ascertain their concurrent presence.

5. Conclusions

The MDQ and MSI measure partly the same dimensions in patients with mood disorders. The self-reported symptoms of "affective instability", "impulsivity", "irritability", "flight of thoughts" and "distractibility" are shared and may lead to misinterpretations of

screenings. However, non-overlapping items on both questionnaires are more specific to the disorders for which they are designed, and thus, could be given more weight in differential diagnosis.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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