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The structure of lifetime manic–hypomanic spectrum

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Abstract

Background—The observation that bipolar disorders frequently go unrecognized has prompted the development of screening instruments designed to improve the identification of bipolarity in clinical and non-clinical samples. Starting from a lifetime approach, researchers of the Spectrum Project developed the Mood Spectrum Self-Report (MOODS-SR) that assesses threshold-level manifestations of unipolar and bipolar mood psychopathology, but also atypical symptoms, behavioral traits and temperamental features. The aim of the present study is to examine the structure of mania/hypomania using 68 items of the MOODS-SR that explore cognitive, mood and energy/activity features associated with mania/hypomania.

Methods—A data pool of 617 patients with bipolar disorders, recruited at Pittsburgh and Pisa, Italy was used for this purpose. Classical exploratory factor analysis, based on a tetrachoric matrix, was carried out on the 68 items, followed by an Item Response Theory (IRT)-based factor analytic approach.

Results—Nine factors were initially identified, that include Psychomotor Activation, Creativity, Mixed Instability, Sociability/Extraversion, Spirituality/Mysticism/Psychoticism, Mixed Irritability, Inflated Self-esteem, Euphoria, Wastefulness/Recklessness, and account overall for 56.4% of the variance of items. In a subsequent IRT-based bi-factor analysis, only five of them (Psychomotor Activation, Mixed Instability, Spirituality/Mysticism/Psychoticism, Mixed Irritability, Euphoria) were retained.

Conclusions—Our data confirm the central role of Psychomotor Activation in mania/hypomania and support the definitions of pure manic (Psychomotor Activation and Euphoria) and mixed manic (Mixed Instability and Mixed Irritability) components, bearing the opportunity to identify patients with specific profiles for a better clinical and neurobiological definition.

Keywords

Mania; Hypomania; Factor analysis; Bipolar disorder; Item Response Theory; Mood disorders

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Conflict of interest

The authors of this paper do not have any commercial associations that might pose a conflict of interest in connection with this manuscript.

1. Introduction

Epidemiological studies suggest that bipolar disorders affect up to 5% of the general population (Akiskal et al., 2000; Angst et al., 2003; Judd and Akiskal, 2003). However, several authors have shown that treatment for bipolar disorder is not started until up to 10 years after onset (Lish et al., 1994) and that patients typically contact multiple physicians before receiving an adequate diagnosis (Thomas, 2004; Kupfer et al., 2002). The under-diagnosis of hypomania and mania may delay the recognition of illness and the start of appropriate treatment, therefore worsening the prognosis (Cassano et al., 1999; Angst et al., 2005). Much of the delay is due to depression occurring prior to mania and to the fact that bipolar II patients usually do not present for *treatment* of hypomania, which is rarely perceived as a source of distress and is typically associated with *improved* functioning (Akiskal et al., 2000; Benazzi, 2003; Benazzi, 2004; Akiskal and Benazzi, 2006). It is, therefore, possible that a number of subtle manifestations of mania are not identified because existing instrument are targeted to DSM-IV criteria and lack adequate sensitivity for capturing the phenomenological nuances of hypomania (Benazzi, 2007a). Moreover, unrecognized bipolarity is a very common source of antidepressant-refractory depression (Sharma et al., 2005; Inoue et al., 2006) and suicidality during antidepressant drug treatment (Rihmer and Akiskal, 2006).

In the attempt to improve the recognition of bipolarity, self-report instruments, such as the HCL-32 (Angst et al., 2005) and Mood Disorder Questionnaire (Hirschfeld et al., 2000), have been developed to screen clinical and non-clinical samples for hypomania. The most common way to study hypomania and mania is by interviewing patients when depressed or ask patients to fill out questionnaires about past hypomanic or manic symptoms during relative euthymia (Akiskal et al., 2000; Akiskal et al., 2001; Benazzi and Akiskal, 2003a).

A number of studies have suggested a two-factor structure of hypomania: one factor including positive-productive symptoms and one factor including problems-causing symptoms (Akiskal et al., 2001; Hantouche et al., 2003; Angst et al., 2003; Benazzi and Akiskal, 2003b), also defined as “sunny” and “dark“ symptoms of hypomania (Akiskal et al., 2003; Benazzi, 2004). Studies on mania suggested a more diversified factor structure, including hyperactivity, decreased sleep, rapid/pressured speech and hyper-verbosity (Bauer et al., 1991; Cassidy et al., 1998a,b; Disaver et al., 1999; Serretti et al., 1999; Akiskal et al., 2001; Swann et al., 2001; Perugi et al., 2001a,b; Cassidy et al., 2002; Sato et al., 2002; Gonzalez-Pinto et al., 2003; Gonzalez-Pinto et al., 2004; Benazzi, 2004), and a number of other dimensions, such as hypersexuality, extravagance, religiosity or violent and assaultive behaviors (see Goodwin and Jamison, 2007, for a review). However, evidence favoring them is less robust because of the small number of subjects investigated.

All studies mentioned above have the great merit of establishing the central role of psychomotor activation in mania and of demonstrating the similarity between the structure of inter-depressive episode mania/hypomania factors and intradepressive mania/hypomania factors, thus further supporting the stability of mania/hypomania factors. However, in the majority of cases, authors focused on full blown symptoms of a single episode with the exception of Serretti et al. (1999) who performed a factor analysis of the presence/absence of *lifetime* manic symptoms.

Starting from a lifetime ‘spectrum’ approach to mood disorders, researchers of the Spectrum Project have developed a self-report instrument (MOODS-SR) (Fagiolini et al., 1999; Dell’Osso et al., 2002) based on a dimensional approach to psychopathology that considers as clinically relevant not only threshold-level manifestations of unipolar and bipolar mood psychopathology, but also atypical symptoms, behavioral traits and temperamental features

(i.e. the biological or constitutional core of personality features that refer to reactivity, variability, and intensity of emotional dispositions), that are associated with established diagnostic constructs (Cassano et al., 1999). Therefore, the approach has the advantage of evaluating less commonly investigated manifestations of mania. A novel aspect of this "spectrum model" is that these symptoms and traits may occur throughout the lifetime, sometimes in isolation, rather than as part of a temporally circumscribed clinical syndrome (Cassano et al., 2002). Using this broader conceptualization of mood spectrum, we selected a number of spectrum features relevant to the phenomenology of mania/hypomania. The aim of the present study is to examine of the structure of mania/hypomania in patients with bipolar disorders using classical factor analysis and an Item Response Theory (IRT)-based factor analytic approach.

2. Methods

2.1. Participants

The sample includes 617 patients with bipolar disorders (447 bipolar I, 170 bipolar II or NOS; 390 F, 227 M, mean age = 43.3, SD = 14.2, range 19–84) collected in 4 studies, one in the US and three in Italy (see Table 1). The clinical phase at the index assessment was euthymic in 385 patients (62%) and acute in 232 patients (38%, of whom 18% depressed, 12% mixed, 6% manic or hypomanic, 2% not specified).

2.2. Instruments

The MOODS-SR questionnaire, developed in English and Italian, was derived from the corresponding structured interview (Fagiolini et al., 1999) and is focused on the presence of manic and depressive symptoms, traits and lifestyles that may characterize the 'temperamental' affective dysregulation that make up both fully syndromal and sub-threshold mood disturbances. The latter includes symptoms that are either isolated or clustered in time and temperamental traits that are present throughout individual's lifetime. The MOODS-SR consists of 161 items coded as present or absent for one or more periods of at least 3–5 days in the lifetime. Items are organized into 3 manic–hypomanic and 3 depressive domains each exploring mood, energy and cognition, plus a domain that explores disturbances in rhythmicity (i.e. changes in mood, energy and physical well-being according to the weather, the season and the phase of menstrual cycle, etc.) and in vegetative functions, including sleep, appetite and sexual function. The sum of the scores on the three manic–hypomanic domains constitutes the score for the manic–hypomanic component and that for the three depressive domains the depressive component. The instrument can be downloaded from the web site www.spectrum-project.org.

For the purpose of the present report, we selected 68 items from the MOODS-SR lifetime version, 62 encompassing manic symptoms and features and 6 exploring rhythmicity/vegetative function features. The instrument was administered in the American version to 436 patients and in the Italian version to 181 patients.

2.3. Statistical analyses

Frequency of endorsement and biserial correlation were first computed for each item. The biserial correlation denotes the correlation of the item with the total score. It is an index for measuring the item discriminating power that ranges from −1 to +1. The higher the biserial correlation between the item and the total score, the more effective the item is in separating the scores of patients.

An exploratory factor analysis was conducted using tetrachoric correlation coefficients. These coefficients measure the association between dichotomous items and are based on the

assumption that the response to any particular item can be thought of in terms of the crossing of a threshold on an underlying latent continuous distribution (i.e., the latent trait). Respondents with a response strength greater than the threshold will answer 'yes,' otherwise they will respond 'no.' By assuming that the response process is normally distributed and knowing the proportion of subjects that respond affirmatively to the items, tetrachoric correlations for all distinct 68(68−1)/2 = 2278 pairs of items were estimated. The matrix of tetrachoric correlations was then subjected to unweighted least squares factor analysis and then rotated obliquely using the promax method of Hedrickson and White (1964). This was done under the assumption that the resulting factors would be correlated. Factors with a latent root >1 were extracted. Items with a cross-loading on multiple factors were assigned to the factor with the highest loading.

In addition to classical exploratory factor analysis, an IRT-based factor analysis approach was adopted to analyze the data. While classical factor analysis makes use of information derived from pair-wise correlations of items, IRT-based factor analysis make use of all information in each patient's pattern of item responses, *i.e.* item pairs, triplets, quadruplets, etc. and is therefore called full-information factor analysis. The disadvantage of this procedure is that it is limited in terms of the number of factors that can be estimated, typically no more than 5 or 6 dimensions. Furthermore, when the number of latent dimensions (k) is large and the number of items is large (n), a minimum of $n(k+1)$ subjects is required to accurately estimate the unknown parameters in the model, and in general the number of subjects should be on the order of ten times the number of items (see Gibbons et. al., 2007). For example, with 68 items and 9 factors, there are 680 unknown parameters, which exceeds the number of subjects that we have to estimate these parameters from. As a result, the unrestricted full-information item factor analysis model could not be estimated for these data. As a reasonable alternative, we therefore tested some restricted 'bi-factor' solutions that require the estimation of a lower number of parameters (a maximum of $3n$ parameters) and are appropriate when it can be hypothesized that an item correlates both with a general factor and a single sub-domain such as psychomotor activation (see Gibbons et. al., 2007; Gibbons et. al., 2008). Analyses were conducted using TESTFACT, Version 4.0 (2003).

3. Results

The mean for the mania total score was 37.2 (SD 14.3) and did not differ by gender (males: mean = 36.6 SD = 15.7; females: mean = 37.5, SD = 13.3), but did by site, with higher scores at Pittsburgh site (mean 40.1, SD = 13.6 vs. 30.0, SD = 13.3, t-test = 8.4, $p < 0.001$) and by clinical status, with patients in an acute episode endorsing more items (mean = 42.2, SD = 11.9 vs. mean = 34.3, SD = 14.6, t-test = 6.8, $p < 0.001$).

The frequency of endorsement of the 68 items of the manic component of mood spectrum is provided in Table 2. Items are organized by decreasing frequency. In our sample, euphoric mood, irritability and being full of energy are the most commonly endorsed. Vice versa, the most uncommon or 'difficult' items (according to IRT terminology), i.e. those endorsed at higher levels of severity of mania, are those related to extrasensory perceptions, mystical experiences, elevated mood when taking medications and hearing inspiring voices.

3.1. Classical factor analysis

Using the criterion of the latent root >1, nine factors were extracted, accounting overall for 56.4% of the variance of the 68 items. Factor loadings obtained using oblique (promax) rotation are shown in Table 3, arranged in decreasing order within factors.

Based on items contents, factors were labeled as:

3.1.1. Factor 1. Psychomotor Activation—This factor includes a number of symptoms that span flight of ideas, increased energy levels and activity, with principal loadings on “too many thoughts at once” (0.835), “racing thoughts” (0.781), “constantly active” (0.732), “shifting interests” (0.669) and vigorous (0.644).

3.1.2. Factor 2. Creativity—This factor includes features of artistic creativity and sensitivity, with principal loading on “very artistic and creative” (0.896), “bursts of inspiration or creativity” (0.864), “sensitive to the forms and harmony in nature” (0.781) and “mentally very sharp, brilliant and clever” (0.605).

3.1.3. Factor 3. Mixed Instability—This factor includes sexual promiscuity, alcohol-related mood changes and irritability, frequently changing job, residences, friends and hobbies with principal loading on “changed sexual partners” (0.779), “tended to ignore everyday rules and social etiquette” (0.664), “more interested in sex” (0.644) and “irritable or elevated mood when you were abusing alcohol” (0.633).

3.1.4. Factor 4. Sociability/Extraversion—This factor includes features of optimism, sociability and extraversion, with principal loading on “always intense romantic life” (0.828), “confidence, enthusiasm and energy” (0.752), “warm, extroverted and sociable” (0.705) and “intense romantic life” (0.650).

3.1.5. Factor 5. Spirituality/Mysticism/Psychoticism—This factor includes ecstatic experiences and psychotic symptoms of mania, with principal loading on “unusually spiritual or mystical” (0.745), “mystical experiences or visions” (0.712), “direct access to the truth” (0.701), “ESP” (0.649) and “hearing inspiring voices” (0.647).

3.1.6. Factor 6. Mixed Irritability—This factor includes irritability associated with the use of medications and with medical illnesses, with principal loadings on “irritable or elevated mood when you had a medical problem such as a flu or a cold” (0.678) and “irritable or elevated mood when you took medications” (0.638).

3.1.7. Factor 7. Inflated Self-esteem—This factor describes excessive self-esteem, with principal loading on “always right, incapable of making mistakes” (0.710) and “thinking you could make decisions for others” (0.607).

3.1.8. Factor 8. Euphoria—This factor is aligned to the symptoms of mood elevation with loadings on “making puns or plays on words” (0.756), “high sense of humor” (0.676), “making a lot of jokes” (0.574), “enthusiastic for the smallest thing” (0.554), and “persistently good or high” (0.514).

3.1.9. Factor 9. Wastefulness/Recklessness—This factor describes the tendency to spend more money than one can afford and risk-taking behaviors such as driving recklessly, with principal loading on “gave lots of presents, even when you really couldn’t afford them” (0.771), “pleasurable and easy to buy things” (0.730) and “spending too much money; driving recklessly” (0.630).

The correlations of factors are provided in Table 4. Values range from 0 to 0.63, indicating that the oblique solution was appropriate for this factor structure. Using Cohen’s criteria for the interpretation of the strength of an association between two variables (r = 0.10–0.29 low, r = 0.30–0.49 medium, r = 0.50–0.69 high, r = 0.70–1 very high), factor 1 (Psychomotor Activation) was highly correlated with factor 2 (Creativity), factor 3 (Mixed Instability), factor 7 (Inflated Self-esteem) and factor 9 (Wastefulness/Recklessness) and had a medium

correlation with the other factors. Euphoria (factor 8) was highly correlated with Sociability/Extraversion (factor 4) and has a medium correlation with Creativity (factor 2) and Psychomotor Activation (factor 1).

3.2. Item bi-factor analysis

In order to determine whether the item subgroups derived using classical factor analysis constituted a more parsimonious description of mania with respect to the unidimensional model we compared different models. In the unidimensional model (Model 1) all items correlated only with one general factor and in the other dimensional models each item was allowed to load on the general factor and no more than one item subgroup (Psychomotor Activation, Creativity,Mixed Instability, Sociability/Extraversion, Spirituality/Mysticism/Psychoticism, Mixed Irritability, Inflated Self-esteem, Euphoria, Wastefulness/Recklessness). The unidimensional model, which includes 136 parameters — one for the intercept and one for the slope of each item—had a BIC index of fit of 45997.47 and a −2 log-likelihood of 45695.18. The percentage of variance accounted for by the general factor was 12.5%. A 5-dimensional model (Psychomotor Activation, Spirituality/Mysticism/Psychoticism, Mixed Irritability, Mixed Instability, Euphoria), which includes 177 parameters, one intercept and two slopes for each item, had the best BIC index of fit of 45014.78 and a −2 log-likelihood of 44621.36. The percentage of variance accounted by the general factor was 23.4% and that accounted by item groups is 1%. The chi-square testing the H1 hypothesis that the 5-dimensional model provides an adequate description of the data against the null hypothesis that the unidimensional model provides an adequate description of the data was 1075.14 (37768.22–36693.08), with 41 degrees of freedom and with $p < 0.001$. Therefore, the null hypothesis was formally rejected.

Scores on the 5 factors identified by this model were compared between acute and euthymic patients. Acute patients had significantly higher scores on 4 of the five factors (Psychomotor Activation, Euphoria, Mixed Instability and Mixed Irritability) at the Bonferroni-corrected significance level of 0.01.

4. Discussion

In our study, based on a sizeable pool of subjects with bipolar disorders and using items drawn from a validated instrument, a nine-factor solution was initially identified with classical factor analysis using a sound methodology for dichotomous items. Our solution accounted for 56.4% of variance of the items, in line with other studies that explored the factor structure of mania (Cassidy et al., 1998a; González-Pinto et al., 2003; Serretti et al., 1999). A subsequent IRT-based factor analysis determined that a model including five of these factors provided a better fit to the data compared to a unidimensional model. The five-factor solution included Psychomotor Activation, Spirituality/Mysticism/Psychoticism, Mixed Irritability, Mixed Instability and Euphoria. To our knowledge, this is the first study investigating factors of mania using an IRT-based approach in a lifetime self-report instrument, such as the MOODS-SR, which captures a broad range of mania/hypomania symptoms, isolated or clustered, temperamental manifestations and atypical features.

The first factor retained using the IRT-based approach, *Psychomotor Activation*, includes “core” symptoms of mania, featuring most of the DSM-IV criteria for a manic episode. Of note, five out of nine MOODS-SR items reflecting DSM-IV criteria for manic episode loaded on this factor (see Tables 2 and 3). This factor showed a moderate to strong correlation with all the others factors (Table 4), suggesting that psychomotor activation is a key element for all the other aspects of mania and hypomania, in line with most of the literature (Murphy and Beigel, 1974; Double, 1990; Cassidy et al., 1998a; Cassidy et al., 2002; Hantouche et al., 2003; Benazzi, 2004; Angst et al., 2005; Koukopoulos et al., 2005;

Benazzi, 2007b, Picardi et al., 2007). Notably, our data showed that increase in energy with reduced sleep (item 136) is an important feature of psychomotor activation. Some authors reported that reduced need for sleep is an independent factor (Cassidy et al., 1998a; González-Pinto et al., 2003) and other studies (Serretti et al., 1999) argue that it is part of psychomotor activation. However, none of these studies has included increase in energy with reduced sleep in the psychomotor activation. In our opinion, the factor *Psychomotor Activation*, along with *Euphoria*, represent the pure components of mania. In fact, *Euphoria* parallels the euphoric-grandiose symptom cluster, described also by Beigel and Murphy (1971) that brings to mind images of happy, laughing, and flirtatious patients with mania. Notably, item 51 “persistently good or high” is the most frequently reported symptom in our population (87.6%). Since Robertson’s (1890) description of hilarious mania, this group of symptoms has always been identified with mania (Malhi and Yatham, 2007) and can be considered a core symptom of pure mania (Benazzi and Akiskal, 2003a,b).

Conversely, *Mixed Instability* and *Mixed Irritability* delineate the unstable/irritable components of mixed mania (Cassidy et al., 1998b; Cassidy et al., 2008). Of note, these attributes consist of trait mood lability that, as suggested by Akiskal (2005), are all characteristic of Kretschmer’s description of the cyclothymic temperament (Kretschmer, 1936). The factor *Mixed Instability* includes a number of features that mirror “instability” in mood, work, friendships and personal relationships. Changing sexual partners, unstable mood when using alcohol, frequently changing job, residence, friends or hobbies have been widely described among bipolar patients. In DSM-IV, increased sexual interest is subsumed under the general category of “pleasurable activities” however, this factor goes beyond the concept of “pleasurable activity” emphasizing aspects of instability. Further, our data suggest that all these aspects are closer to the cognitive and neurobiological processes underlying mania rather than being temperamental aspects. The other factor, *Mixed Irritability*, features rapid mood changes, hostility and irritability while taking medications other than those prescribed for mood problems and during medical illnesses. The association with the typical mixed component of mania is suggested by item 50 ‘crying and laughing at the same time’. Notably, hostility is one of the most frequently reported symptoms (see Table 2, 85.7% of patients). In fact, in our experience, these symptoms may often persist as residual or isolated symptoms.

In our study we did not identify a depressive component because items belonging to depression were not included in the analysis. Moreover, classic mixed states such as anxious mania, excited depression, manic stupor, depression with flight of ideas, inhibited mania or mania with thought poverty could not be identified. However, our data are of relevance because they further support clinical observations on the central role of irritable-unstable mood for the diagnosis of mania using a dimensional lifetime approach. Current classificatory systems (ICD-10 and DSM-IV) place less emphasis on irritable mood which is considered implicitly less important for the establishment of a diagnosis of mania (Cassidy et al., 2008). Nonetheless, patients with mixed mania need to be promptly recognized and treated and growing evidence suggest that mixed mania is correlated with high rates of psychotic symptoms and hospitalization (Perugi et al., 2001a,b) and high suicide risk (Dilsaver et al., 1994).

Spirituality/Mysticism/Psychoticism is another factor retained by the IRT-based approach. Religiosity has been rarely investigated, with relevant studies dating back to Carlson and Goodwin (1973) or Loudon et al. (1977). However, it is known that the feeling of well-being, experienced by patients withmania, is often accompanied with a sense of benevolence and a “heightened sense of reality”, as defined by Henderson and Gillespie (1956). Of note, this factor includes the item “feelings of being invulnerable” (item 121) that is typical of mood-congruent psychosis. In our opinion, these symptoms cannot be referred only to pure

mania or to the mixed mood components of mania, because they bridge a number of different psychopathological states. In fact, these symptoms have been often attributed to clinical entities other than bipolar disorder such as schizoaffective disorder, delusional disorder, substance-induced psychotic disorder and organic psychoses. Further, it is important to emphasize that these symptoms, while apparently belonging to the mixed components of mania, may also occur as residual or isolated symptoms.

Finally, it is important to underline that the IRT-based approach tests the best fitting model and it does not imply that all factors not retained do not belong to the manic spectrumbut, conversely, that they are so highly correlated with the primary dimension that they cannot be identified as separate dimensions. This is further confirmed by the high correlation of the items belonging to these factors with the total score (see Table 2). In fact, creativity, inflated self-esteem, sociability and extraversion have been frequently described in the context of bipolar disorders, representing full blown symptoms, but also an adaptive set of temperamental traits when occurring in moderation (Akiskal et al., 1983; Akiskal et al., 1998; Akiskal and Akiskal, 2007; Goodwin and Jamison, 2007).

Several potential limitations of our study need to be acknowledged. One is that 62% of the patients were assessed in the euthymic phase and 38% in the acute phase.While clinical status has a potential impact on the reliability of patients' report of lifetime signs and symptoms of mania, data from a group of individuals participating in the STEP-BD study who completed the lifetime MOODS-SR questionnaires at baseline and again when their clinical status changed (e.g. from euthymia to depression or from depression to hypomania) indicate that the endorsement of lifetime manic symptoms is stable over time and is not sensitive to changes in clinical status, provided that subjects are not assessed in a full blown and severe manic episode (Fagiolini, in preparation). Therefore, the fact that participants in our study who were assessed during an acute episode endorsed more items than those assessed in a euthymic state may simply indicate that the former had a more severe form of bipolar disorder.

Another limitation is the use of a database including mood spectrum assessments in English and Italian. While the lack of equivalence of self-report instruments across languages is usually a source of concern in cross-cultural studies, the mood spectrum assessment was developed simultaneously in Italian and English by the bilingual team of the Spectrum Project, which ensured the correspondence of items. A further limitation is that the MOODSSR does not include items related to very severe forms of mania seen in acute inpatient wards and characterized by high levels of excitement, aggressiveness or catatonia. These symptoms, however, are better assessed through direct observation than using a self-report instrument because patients who have experienced these extreme manifestations of mania tend to forget or deny these experiences. Moreover, severe mania is becoming less frequent as a result of the improved diagnostic ability and the availability of drugs preventing its occurrence.

A number of issues warrant consideration in future research. The identification of patients with specific profiles on multiple factors could be used to achieve higher precision in brain imaging or neurobiological studies than is currently achieved using subjects with the same DSM-IV diagnosis. Moreover, it is likely that a better psychopathological characterization of patientsmay inform treatment selection and result in better treatment outcome.

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Table 1

Clinical and demographic characteristics of the study sample ($N = 617$)

Studies	Diagnosis and inclusion criteria	Current status	*N*	% F	Age, mean (SD)	Interview
Fagiolini et al. (2007)	306 Bipolar I	204 euthymic	435	64.7%	44.6 (14.8)	SCID
	129 bipolar II or NOS, adults, both genders	113 depressed				
		71 mixed				
		34 manic or hypomanic				
		13 Not specified				
Mauri et al. in preparation	Bipolar I, adult women	Euthymic	27	100%	31.9 (6.9)	MINI
Mula et al. in preparation	53 Bipolar I and 32 bipolar II, both genders, adults, age 18–70	Euthymic	85	51.7%	44.3 (12.6)	SCID
Sbrana et al. (2005)	64 Bipolar I and 6 bipolar II, age 18–66	Euthymic	70	52.8%	37.7 (11.6)	SCID

Table 2

Frequency of endorsement of items and biserial correlation of items with the total score of mania/hypomania spectrum (MOODS-SR items reflecting DSM-IV criteria are highlighted in bold)

Item	Item endorsement in the 617 patients	Biserial correlation of items with the total score
29. Persistently good or high	0.876	0.626
77. Vigorous	0.818	0.753
114. Good about how you looked	0.712	0.637
37. Warm, extroverted and sociable	0.758	0.527
115. Mentally very sharp, brilliant and clever	0.699	0.759
31. Even the smallest thing could you very enthusiastic	0.759	0.600
38. Confidence, enthusiasm and energy	0.716	0.583
111. Sensitive to the forms and harmony in nature	0.579	0.481
109. Very artistic and creative	0.679	0.654
30. High sense of humor and irony	0.721	0.556
110. Bursts of inspiration ore creativity	0.639	0.680
136. More energetic with less sleep	0.599	0.465
32. Liked to make puns or plays on words	0.631	0.494
69. Desire to reconnect with people	0.674	0.579
113. Homework improved a lot	0.607	0.630
116. Self-assured, charismatic	0.648	0.724
68. Urge to communicate	0.619	0.508
76. Assertive	0.615	0.664
51. Argumentative or hostile	0.857	0.733
112. Curious and interested everything and everybody	0.569	0.652
143. Not tired even without sleeping	0.682	0.543
35. Pleasurable and easy to buy things	0.718	0.676
78. Very impatient	0.807	0.728
42. Always intense romantic life	0.265	0.342
49. Mood changing rapidly from happy to sad	0.718	0.694
160. Sensitive to heat, cold or pain	0.515	0.355
74. Shifting interests	0.797	0.612
157. More interested in sex	0.630	0.656
40. Center of attention	0.554	0.747
41. Intense romantic life	0.528	0.629
44. Full of plans	0.651	0.693
45. Difficulty saying NO to job opportunities	0.564	0.620
72. Racing thoughts	0.809	0.740
47. Risk taking	0.468	0.620
48. Devil's advocate	0.492	0.553
75. Social–political–religious activity	0.340	0.403
134. Irritable if routine was disrupted	0.571	0.461
33. Making a lot of jokes	0.498	0.649

Item	Item endorsement in the 617 patients	Biserial correlation of items with the total score
79. Constantly active	0.687	0.643
125. Irresponsible	0.550	0.638
73. Too many thoughts at once	0.743	0.672
39. Doing a lot of entertaining, either at home or in restaurants	0.366	0.570
50. Crying and laughing at the same time	0.542	0.545
117. Always right, incapable of making mistakes	0.440	0.623
34. Intrusive, insulting or tactless	0.460	0.618
70. Talkative	0.685	0.668
119. Unappreciated	0.536	0.651
120. Unusually high self-esteem	0.467	0.731
127. Spending too much money; driving recklessly	0.786	0.795
158. Changed sexual partners	0.297	0.486
36. Gave lots of presents, even when you really couldn't afford them	0.550	0.589
52. Trouble controlling temper	0.645	0.607
118. Thinking you could make decisions for others	0.357	0.595
43. Dramatic, extravagant very high fashion	0.373	0.542
121. Strong and invulnerable	0.332	0.580
53. Irritable or elevated mood when you had a medical problems such as the flu or a cold	0.347	0.398
55. Irritable or elevated mood when you were abusing alcohol	0.369	0.556
56. Irritable or elevated mood when you increased your use alcohol	0.433	0.614
126. Made important decisions very rapidly	0.451	0.585
71. Noisy	0.378	0.544
122. Unusually spiritual or mystical	0.345	0.585
128. Tended to ignore everyday rules and social etiquette	0.308	0.616
46. Frequently changing: job, residence, friends, hobbies	0.494	0.541
54. Irritable or elevated mood when you took medications	0.178	0.386
123. Direct access to the truth	0.287	0.562
124. Hearing inspiring voices	0.117	0.281
129. Mystical experiences or visions	0.206	0.564
130. ESP	0.242	0.524

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Table 3

Factor loadings derived from a 9-factor solution with promax rotation (MOODS-SR items reflecting DSM-IV criteria are highlighted in bold)

	PA	CR	MIX1	SE	SM	MIX2	HS	EU	WR
73. Too many thoughts at once	**0.835**	−0.089	−0.030	0.078	0.005	0.303	0.051	−0.210	−0.092
72. Racing thoughts	**0.781**	0.061	0.034	−0.141	0.071	0.051	−0.049	0.005	0.040
79. Constantly active	**0.732**	−0.115	−0.122	0.106	0.019	−0.138	0.084	0.082	0.022
74. Shifting interests	**0.669**	−0.009	0.140	−0.117	0.025	0.071	−0.107	0.031	0.018
77. Vigorous	**0.644**	0.105	−0.039	0.158	0.012	−0.185	−0.033	0.237	−0.107
143. Not tired even without sleeping	**0.587**	−0.114	−0.063	0.145	0.007	0.010	−0.027	−0.142	0.222
70. Talkative	**0.581**	0.009	0.050	0.024	−0.110	0.033	0.167	0.069	−0.044
78. Very impatient	**0.538**	0.045	0.186	−0.138	0.004	0.045	0.234	−0.043	−0.002
136. More energetic with less sleep	**0.503**	−0.011	−0.001	−0.037	0.088	−0.076	−0.132	−0.058	0.211
125. Irresponsible	**0.467**	−0.113	0.329	−0.063	0.185	−0.081	0.131	−0.140	0.042
68. Urge to communicate	**0.380**	0.330	0.004	0.075	0.214	0.069	−0.188	−0.020	−0.242
71. Noisy	**0.357**	−0.289	−0.027	0.158	0.192	0.157	0.180	0.023	0.076
69. Desire to reconnect with people	**0.306**	0.258	0.054	0.078	0.181	0.080	−0.100	0.034	−0.137
76. Assertive	**0.286**	0.192	0.065	0.215	0.039	−0.249	0.155	0.152	−0.136
109. Very artistic and creative	−0.012	**0.896**	−0.010	−0.053	0.037	0.017	0.020	−0.057	−0.067
110. Bursts of inspiration or creativity	0.002	**0.864**	0.080	−0.057	−0.026	0.076	−0.031	−0.088	0.014
111. Sensitive to the forms and harmony in nature	−0.132	**0.781**	−0.173	−0.055	0.122	0.144	0.051	0.056	−0.130
115. Mentally very sharp, brilliant and clever	−0.018	**0.605**	0.099	0.109	0.053	−0.109	0.076	0.081	0.035
116. Self-assured, charismatic	−0.117	**0.598**	−0.011	0.235	0.008	−0.059	0.213	−0.027	0.068
112. Curious and interested everything and everybody	0.096	**0.500**	−0.073	0.084	0.089	0.132	0.175	−0.063	−0.069
114. Good about how you looked	−0.036	**0.440**	0.167	0.234	0.014	−0.048	−0.142	0.017	0.167
113. Homework improved a lot	0.210	**0.407**	−0.071	0.036	0.029	0.021	−0.137	0.130	0.184
44. Full of plans	0.304	**0.392**	0.050	−0.119	−0.205	−0.060	0.090	0.079	0.243
75. Social–political–religious activity	0.156	**0.258**	−0.151	−0.019	0.234	−0.048	−0.029	0.044	0.050
158. Changed sexual partners	−0.072	−0.174	**0.779**	0.342	−0.054	−0.035	−0.038	−0.049	0.017
128. Tended to ignore everyday rules and social etiquette	−0.044	−0.120	**0.664**	−0.015	0.153	−0.017	0.135	0.058	0.096
157. More interested in sex	0.031	0.183	**0.644**	0.184	−0.007	−0.085	−0.171	−0.002	0.090
55. Irritable or elevated mood when you were abusing alcohol	−0.049	0.136	**0.633**	−0.007	0.106	0.192	0.023	0.060	−0.218
56. Irritable or elevated mood when you increased your use alcohol	0.100	0.061	**0.599**	−0.030	0.184	0.178	−0.142	0.097	−0.089

	PA	CR	MIX1	SE	SM	MIX2	HS	EU	WR
126. Made important decisions very rapidly	−0.021	0.060	**0.432**	−0.092	0.061	−0.100	0.107	−0.104	0.415
46. Frequently changing: job, residence, friends, hobbies	0.035	0.044	**0.369**	0.060	−0.081	0.146	0.197	−0.140	0.136
47. Risk taking	0.130	0.103	**0.327**	0.126	−0.132	−0.018	0.307	−0.113	0.025
42. Always intense romantic life	−0.070	−0.122	0.123	**0.828**	−0.070	0.056	−0.023	−0.050	−0.138
38. Confidence, enthusiasm and energy	0.036	0.078	−0.077	**0.752**	−0.072	−0.052	0.135	0.089	−0.130
37. Warm, extroverted and sociable	0.054	0.115	0.012	**0.705**	−0.109	−0.006	−0.165	0.244	−0.124
41. Intense romantic life	0.092	−0.076	0.391	**0.650**	0.016	−0.033	−0.097	−0.064	−0.016
40. Center of attention	−0.024	−0.109	0.200	**0.536**	0.015	0.083	0.284	0.079	0.059
39. Doing a lot of entertaining, either at home or in restaurants	−0.190	0.174	−0.035	**0.478**	0.109	0.097	0.114	−0.004	0.155
43. Dramatic, extravagant very high fashion	0.025	0.138	−0.107	**0.261**	0.025	0.152	0.113	−0.044	0.243
122. Unusually spiritual or mystical	0.011	0.235	0.202	−0.155	**0.745**	−0.016	−0.106	−0.038	0.019
129. Mystical experiences or visions	0.047	−0.068	0.075	−0.067	**0.712**	0.140	0.031	0.190	−0.061
123. Direct access to the truth	−0.076	0.219	0.013	−0.045	**0.701**	−0.096	0.182	0.070	−0.125
130. ESP	−0.091	−0.029	0.183	−0.007	**0.649**	0.213	−0.045	−0.017	0.124
124. Hearing inspiring voices	0.202	−0.315	−0.186	0.112	**0.647**	0.071	0.084	−0.024	−0.076
120. Unusually high self-esteem	−0.020	0.181	0.128	0.023	**0.530**	−0.119	0.262	−0.030	0.074
121. Strong and invulnerable	0.151	−0.026	−0.064	0.014	**0.527**	−0.172	0.275	−0.047	0.114
53. Irritable or elevated mood when you had medical problems such as the flu or a cold	−0.053	−0.006	0.009	−0.081	0.031	**0.678**	0.044	0.078	0.218
54. Irritable or elevated mood when you took medications	−0.325	0.029	0.049	0.096	0.203	**0.638**	−0.095	0.048	0.333
50. Crying and laughing at the same time	0.369	0.029	−0.164	−0.014	−0.145	**0.484**	0.025	0.087	0.232
49. Mood changing rapidly from happy to sad	0.312	0.006	0.103	0.096	−0.146	**0.465**	0.101	0.013	0.137
51. Argumentative or hostile	0.214	0.164	0.215	−0.062	−0.180	**0.449**	0.323	−0.025	−0.015
160. Sensitive to heat, cold or pain?	0.156	0.128	−0.041	0.162	0.151	**0.436**	−0.108	−0.072	−0.070
134. Irritable if routine was disrupted	0.239	−0.118	0.269	−0.110	0.056	**0.302**	−0.017	0.015	0.118
117. Always right, incapable of making mistakes	0.048	−0.040	−0.095	0.034	0.219	−0.134	**0.710**	0.009	0.067
118. Thinking you could make decisions for others	−0.283	0.120	−0.031	0.021	0.305	−0.014	**0.607**	0.045	0.132
52. Trouble controlling temper	0.152	−0.020	0.154	0.019	−0.075	0.291	**0.578**	0.032	−0.221
119. Unappreciated	0.230	0.223	−0.228	−0.091	0.200	0.121	**0.546**	−0.074	−0.053
48. Devil's advocate	−0.067	0.071	0.202	0.065	−0.166	0.143	**0.514**	0.107	−0.075
34. Intrusive, insulting or tactless	0.124	−0.048	0.228	−0.118	−0.030	−0.041	**0.450**	0.300	−0.031
32. Liked to make puns or plays on words	−0.157	0.049	−0.073	0.032	0.109	0.061	0.161	**0.756**	−0.096

	PA	CR	MIX1	SE	SM	MIX2	HS	EU	WR
30. High sense of humor and irony	−0.116	−0.013	0.007	0.118	0.021	0.040	0.067	**0.676**	0.091
33. Making a lot of jokes	0.017	−0.223	0.059	−0.010	0.118	0.099	0.334	**0.574**	0.093
31. Even the smallest thing could you very enthusiastic	0.274	−0.027	−0.050	0.064	−0.087	0.028	−0.163	**0.554**	0.244
29. Persistently good or high	0.089	−0.024	0.137	0.156	0.031	−0.046	−0.184	**0.514**	0.213
36. Gave lots of presents, even when you really couldn't afford them	0.076	−0.062	−0.103	0.040	−0.044	0.370	−0.064	0.030	**0.771**
35. Pleasurable and easy to buy things	0.112	−0.085	0.049	−0.156	−0.083	0.185	0.029	0.254	**0.730**
127. Spending too much money; driving recklessly	0.019	0.067	0.469	−0.211	0.157	0.068	−0.024	−0.047	**0.630**
45. Difficulty saying no to job opportunities	0.236	0.282	−0.061	0.003	−0.216	0.197	0.124	−0.041	**0.309**

PA = Psychomotor Activation, CR = Creativity, MIX1 = Mixed Instability, SE = Sociability/Extraversion, SM = Spirituality/Mysticism/Psychoticism, MIX2 = Mixed Irritability, HS = Inflated self-esteem, EU = Euphoria, WR = `Wastefulness/Recklessness.

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Table 4

Correlations between nine factors identified with classical factor analysis

	Psychomotor Activation	Creativity	Mixed Instability	Sociability/ Extraversion	Spirituality/ Mysticism/ Psychoticism	Mixed Irritability	Inflated Self-esteem	Euphoria	Wastefulness/ Recklessness
Psychomotor Activation	1.000								
Creativity	0.630	1.000							
Mixed Instability	0.563	0.434	1.000						
Sociability/Extraversion	0.460	0.543	0.340	1.000					
Spirituality/Mysticism/Psychoticism	0.412	0.444	0.242	0.320	1.000				
Mixed Irritability	0.299	0.168	0.317	−0.030	0.140	1.000			
Inflated Self-esteem	0.541	0.484	0.514	0.447	0.321	0.146	1.000		
Euphoria	0.468	0.476	0.319	0.515	0.265	0.094	0.366	1.000	
Wastefulness/Recklessness	0.542	0.514	0.374	0.551	0.309	−0.011	0.447	0.387	1.000

White: low correlations, light grey: medium correlations, dark grey: high correlations.