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Development and validation of a Manic Thought Inventory

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Abstract

Objective: This article describes the development and psychometric evaluation of the Manic Thought Inventory (MTI), a patient-driven self-report inventory to assess the presence of typical (hypo)manic cognitions.

Methods: The initial item pool was generated by patients with bipolar disorder (BD) type I and assessed for suitability by five psychiatrists specialized in treating BD. Study 1 describes the item analysis and exploratory factor structure of the MTI in a sample of 251 patients with BD type I. In study 2, the factor structure was validated with confirmatory factor analysis, and convergent and divergent validity were assessed in an independent sample of 201 patients with BD type I.

Results: Study 1 resulted in a 50-item version of the MTI measuring one underlying factor. Study 2 confirmed the essentially unidimensional underlying construct in a 47-item version of the MTI. Internal consistency of the 47-item version of the MTI was excellent ($\alpha = 0.97$). The MTI showed moderate to large positive correlations with other measures related to mania. It was not correlated with measures of depression.

Conclusion: The MTI showed good psychometric properties and can be useful in research and clinical practice. Patients could use the MTI to select items that they recognize as being characteristic of their (hypo)manic episodes. By monitoring and challenging these items, the MTI could augment current psychological interventions for BD.

KEYWORDS
bipolar disorder, mania, manic episode, Manic Thought Inventory, manic thoughts, psychological interventions, questionnaire

1 | INTRODUCTION

Over the past decades, it has been recognized that the etiology of bipolar disorder (BD) is affected by an interplay of biological, psychological, and social factors. Therefore, current treatment guidelines emphasize the value of psychological interventions, such as psychoeducation, Cognitive Behavioral Therapy (CBT), Interpersonal and Social Rhythm Therapy (IPSRT), and Mindfulness-Based Cognitive Therapy (MBCT) to augment pharmacological treatment in the management of BD.[1,2] Evidence suggests that these interventions are helpful in the prevention and treatment of depressive episodes, but there is little evidence that they can also be helpful in the prevention of (hypo)manic episodes.[3,4] This is a missed opportunity because manic episodes are the core syndrome of BD. In order to improve treatment outcome, it is necessary to include manic polarity next to depressive polarity in the psychological treatment of BD. Negative cognitions have been shown to increase the likelihood of developing future depressive episodes,[5] and cognitive interventions for BD have focused on modifying these negative cognitive styles.[6] As most of these interventions have been developed in the context of major depressive disorder,[7] naturally more attention has been paid to negative cognitions and/or schemata and beliefs. Research, however, suggests that mania-related dysfunctional cognitions and beliefs may also play a role in the occurrence and persistence of (hypo)mania. For example, patients with BD show elevated positive appraisals of internal states[8] and a tendency to ruminate on positive moods,[9] which increases the likelihood to develop future (hypo)manic episodes.[10] In order to help clinicians target mania-related dysfunctional beliefs, it is important to have instruments that help them to gain insight into the frequency, severity, and nature of specific manic cognitions that are prevalent during these (hypo)manic episodes.

Several instruments have already been developed to assess mania-related dysfunctional cognitions and beliefs. The Cognition Checklist for Mania—Revised (CCL-M-R), developed by Beck et al.[11] is a 29-item self-report questionnaire that measures cognitions related to four dimensions of mania: the self (e.g., *Everything I do is great*); relationships (e.g., *Everybody loves me*); high-risk behavior (e.g., *Life is dull without excitement*); and goal-driven activities (e.g., *I have enough energy to do anything I want to do*). Items of the CCL-M-R were generated by gathering expert opinions about manic statements. The Hypomanic Interpretations Questionnaire (HIQ) is a 10-item self-report questionnaire that assesses positive appraisals of (hypo)manic experiences (e.g., *If I felt my thoughts were going too fast I would probably think it was because I am intelligent and full of good ideas*).[12] Items of the HIQ were selected from descriptions of manic symptoms in the DSM-IV,[13] the General Behavior Inventory,[14] and the Internal States Scale.[15] The Hypomanic Attitudes and Positive Predictions Inventory (HAPPI), developed by Mansell and Jones,[16] is a 30-item self-report questionnaire that measures self-relevant positive appraisals of internal states (e.g., *When I feel more active I realize that I am a very important person*). Items of the HAPPI were generated from three sources: (1) the cognitive model of the ascent into mania,[17] (2) therapy manuals, chapters, and journal articles, and (3) clinical expert opinion. All these questionnaires have been shown to be reliable and valid instruments to assess dysfunctional beliefs and appraisals associated with mania in patients with BD.[11,12,16]

All three questionnaires are, however, also mainly theory-driven, generated by existing theory and expert opinions, which of course is a strength if we are interested in using these questionnaires in research on cognitive models of BD. However, the downside of using theory-driven questionnaires is that their content is determined by experts and not by patients.[18] In a clinical context, content validity may be better served by it being based on patient rather than expert opinion. In patient-driven questionnaires, content and wording of the items may be closer to the actual experience of patients, making them more intuitive and recognizable than those derived from theory and expert opinion.[19] To date, no questionnaires assessing manic cognitions have been developed from patients' perspectives.

The aim of the current study was to develop a patient-driven inventory to assess the presence of typical manic cognitions in patients with BD. The inventory was developed in several stages. In study 1, we describe generating the item pool of the Manic Thought Inventory (MTI) and the results of exploratory factor analysis (EFA) and internal consistency using a cross-sectional sample of 251 patients with BD type I. In study 2, we validated the factor structure in a new cross-sectional sample of 201 patients with BD type I by performing a confirmatory factor analysis (CFA) and assessing the convergent and divergent validity of the MTI with other measures of mania and depression.

1.1 | Item pool generation

Items were generated by patients with BD type I who participated in a multicenter randomized controlled trial (RCT) on the efficacy of MBCT for BD in the Netherlands (NCT03507647).[20] This study used the following inclusion criteria: a diagnosis of BD type I, confirmed with the Structural Clinical Interview for DSM-IV Disorders SCID-I[21]; at least two confirmed lifetime depressive episodes; at least one mood episode within the year prior to baseline; a baseline score on the Young Mania Rating Scale YMRS[22]; of ≤12; and no severe manic episode within 3 months prior to baseline. As part of MBCT, patients were invited to write down the five most prevalent thoughts that occurred when they were experiencing a manic episode. In total, 27 patients with BD type I, who were currently euthymic, gave permission to use their cognitions as items in the current study, resulting in 149 patient-derived items. These items were assessed for suitability by five psychiatrists specialized in treating BD. From their clinical experience, they were asked to indicate on a scale of 1-4, for each item separately, whether an item was typical (where 1 = not at all and 4 = very typical) and prevalent (where 1 = specific and 4 = often) for patients with BD. Items were removed when at least four out of five psychiatrists indicated that an item was atypical (score 1 or 2) and/or not prevalent enough (score 1 or 2). In this way, the item pool was reduced to 70 items, which together composed the first version of the MTI. A 5-point Likert-type scale was added, ranging from 1 (not at all) to 5 (all the time).

2 | STUDY 1

Study 1 describes the item analysis and explorative factor analysis of the preliminary MTI items.

2.1 | Methods

2.1.1 | Procedure and participants

The study was approved by the Institutional Review Board of Radboud University Medical Center (2019-5261). The MTI was tested in patients with BD type I recruited from the Electronic Health Record of three Dutch outpatient clinics for BD (Pro Persona, Altrecht, and PsyQ). Patients who were registered as being diagnosed with BD type I, as determined by their attending clinicians, were invited to participate in the current study. Patients were allowed to participate, regardless of their current mood state (i.e., manic, depressed, or euthymic). Patients were invited by their attending clinicians to participate in the current study. They received an email with information on the study and were asked to complete an online battery of questionnaires, consisting of the Quick Inventory of Depressive Symptomatology,[23] the Altman Self-Rating Mania scale,[24] and the MTI. The order of online questionnaires was the same for all patients. Important demographic and clinical information was collected about age, gender, lifetime manic and depressive episodes, and lifetime number of clinical admissions for mood episodes. Two weeks later, a reminder was sent. Data were collected between June and November 2020.

2.1.2 | Measures

The Quick Inventory of Depressive Symptomatology—Self Report (QIDS-SR)[23] is a 16-item self-report questionnaire measuring current depressive symptoms. A total score, ranging from 0 to 27, was computed, with higher scores indicating higher levels of current depression. In patients with BD, the internal consistency of the QIDS-SR has shown to be good ($\alpha = 0.81$).[25]

The Altman Self-Rating Mania scale (ASRM)[24] is a 5-item self-report questionnaire to assess current mania. A total score, ranging from 0 to 20, was computed, with higher scores indicating higher levels of current mania. In patients with BD, the internal consistency of the ASRM has shown to be acceptable ($\alpha = 0.79$).[24]

These questionnaires were followed by the draft MTI. In order to investigate whether the MTI truly captured the presence of manic cognitions, patients were asked to remember a period when they were in a manic state. See Appendix S1 for the exact instructions.

2.1.3 | Statistical analysis

Item analysis and EFA were performed with SPSS version 25.[26] Item response frequency distributions and intercorrelations between items were computed and analyzed. The distribution of item scores was assessed and items were considered for removal when responses demonstrated limited variability (≥70% of patients chose the same answer option). Item pairs that showed either low (<0.3) or high (>0.6) correlations were flagged for inspection. In order to identify the underlying factor structure, two types of exploratory dimension reduction techniques were carried out: (1) principal components analysis (PCA) with varimax rotation, and (2) maximum likelihood EFA with direct oblimin rotation.

2.2 | Results

In total, 1055 patients received the invitation to participate in the current study. Of these, 286 patients responded to the invitation. Patients who completed ≤75% of the MTI items ($N = 35$) were excluded from the analyses. Of 251 patients finally included in the current study, 60.6% were female, and the mean age was 49.0 years (SD = 13.1). The median number of lifetime episodes was 4 for manic and 3.5 for depressive episodes. The median number of lifetime admissions to a psychiatric clinic for a mood episode was 2.

2.2.1 | Item analysis and EFA

At the time of filling in the MTI, patients experienced on average mild manic symptoms (ASRM: $M = 2.1$, SD = 3.2) and mild depressive symptoms (QIDS-SR: $M = 6.9$, SD = 5.2). No items were omitted due to extreme responses (i.e., ≥70% of patients with the same answer option). Item pairs that showed either low (<0.3) or high (>0.6) correlations were discussed by the research team, including three psychiatrists, two psychologists, and one psychometrician, after which 20 items were omitted. The main reasons for omitting items were that items appeared to measure the same underlying construct or wordings were unclear.

The 50 remaining items were subjected to exploratory dimension reduction analyses. The first PCA with varimax rotation revealed seven underlying components with eigenvalues >1. However, the scree plot indicated one clear factor supported by a high eigenvalue (22.457) of the first factor and a much lower eigenvalue (2.295) and small additional explained variance (4.6%) of the second factor. All item loadings on the first component were ≥0.4. The maximum likelihood EFA with oblimin rotation revealed very similar results. Based on these statistical considerations, we concluded that all 50 items tapped into an essentially unidimensional underlying construct.

The resulting one-factor solution consisted of 50 items that explained 44.9% of the variance in the items. See Appendix S2 for an overview of the descriptive statistics and factor loadings of the PCA of the 50 items. Cronbach's alpha of the 50 items revealed an excellent internal consistency ($\alpha = 0.97$; 95% CI [0.969-0.979]).

3 | STUDY 2

The aim of study 2 was to cross-validate the factor structure of the 50-item MTI by performing a CFA in an independent sample of patients with BD type I. Furthermore, the convergent and divergent validity of MTI scores with other measures on mania and depression were assessed. It was hypothesized that the total score of the MTI would moderately to strongly correlate with other measures of mania. It was also hypothesized that the MTI would not correlate with measures of depression.

3.1 | Methods

3.1.1 | Procedure and participants

The study was approved by the Institutional Review Board of Radboud University Medical Center (2019-5261). Three Dutch outpatient clinics for BD participated in the current study (PsyQ location The Hague, GGZ inGeest, and Dimence). These were different sites than those included in study 1 in order to ensure that study 2 was conducted in an independent sample. The same inclusion criterion and procedure as described in Study 1 were used. Data were collected between April and September 2021.

3.1.2 | Measures

As in Study 1, patients were asked to remember a period when they were in a manic state. In order to be able to determine the convergent and divergent validity of the MTI, it was important that these questionnaires were administered in a similar way. Therefore, the instructions of all questionnaires were slightly altered so it included the following sentence: *Please take a moment to take your most recent manic episode in mind. In the questionnaire below, please indicate whether the following symptoms/thoughts were present during that manic episode*.

Convergent validity

In addition to the 50-item MTI, the following questionnaires were administered to determine convergent validity. The Altman Self-Rating Mania scale (ASRM)[24] is a 5-item self-report questionnaire to assess current mania. A total score, ranging from 0 to 20, was computed, with higher scores indicating higher levels of current mania. In patients with BD, the internal consistency of the ASRM has shown to be acceptable ($\alpha = 0.79$).[24]

The HAPPI[16] is a 30-item self-report questionnaire measuring self-relevant appraisals of internal states. Items are scored on a scale ranging from 0 (do not believe this at all) to 100 (believe this completely). A total mean score from the mean of the forward and reversed items was computed, with a higher score indicating stronger beliefs in hypomanic attitudes. In patients with BD, the internal consistency of the Brief version of the HAPPI has shown to be good ($\alpha = 0.86$).[16] At the moment of this study, no Dutch translation of the HAPPI was available. Therefore, the HAPPI was translated into Dutch and re-translated into English by two certified translators.

The Responses to Positive Affect questionnaire (RPA-NL)[9] is a 17-item measure assessing self-reported levels of dampening and self-focused and emotion-focused rumination in response to positive affect. The subscales of self-focused (e.g., rumination about positive self-qualities or personally relevant goals) and emotion-focused rumination (e.g., rumination on positive moods) were used to assess convergent validity. Items are scored on a 4-point Likert scale, ranging from 1 (almost never) to 4 (almost always). The total score of each domain was computed as a sum of the items involved. In patients with BD, the internal consistency of the self-focused and emotion-focused rumination domains has been found to be acceptable ($\alpha = 0.77$ and $\alpha = 0.78$, respectively).[27]

Divergent validity

Questionnaires assessing depressive symptoms, negative cognitions, negative rumination, and dampening of positive affect were administered to determine the divergent validity of the 50-item MTI. The QIDS-SR (Rush et al.[23]) is a 16-item self-report questionnaire measuring current depressive symptoms. A total score, ranging from 0 to 27, was computed, with higher scores indicating higher levels of current depression. In patients with BD, the internal consistency of the QIDS-SR has shown to be good ($\alpha = 0.81$).[25]

The Automatic Thoughts Questionnaire (ATQ)[28] is a 30-item self-report questionnaire measuring the frequency and occurrence of automatic negative cognitions on four domains: personal maladjustment, negative self-concepts and negative expectations, low self-esteem, and helplessness. Items are scored on a 5-point Likert scale, ranging from 1 (not at all) to 5 (all the time). A total score is computed as the sum of all items, with a higher score indicating a high level of automatic negative self-statements. In patients with current depression, the internal consistency has been shown to be excellent ($\alpha = 0.94$).[29]

The dampening subscale of the RPA (see above) was used to determine divergent validity. This subscale consists of eight items that measure the tendency to avoid or suppress positive emotions (e.g., *My streak of luck is going to end soon*). Items are scored on a 4-point Likert scale, ranging from 1 (almost never) to 4 (almost always). The total score was computed as a sum of the items involved. In patients with BD, the internal consistency of the dampening subscale has shown to be good ($\alpha = 0.86$).[27]

The Ruminative Response Scale—Brooding Subscale (RRS-br)[30] is a 5-item questionnaire measuring negative rumination, which was included to determine divergent validity. Items are scored on a 4-point Likert scale, ranging from 1 (almost never) to 4 (almost always). A total score was calculated as the sum of all items, with a higher score indicating higher levels of rumination. In patients with major depressive disorder, the internal consistency of the brooding subscale has been shown to be good ($\alpha = 0.83$).[31]

3.1.3 | Statistical analysis

A strict unidimensional CFA model for the MTI items was tested with the lavaan package[32] in R version 4.1.0.[33] We started with the 50-item MTI (Model 1), after which we removed additional items or added error correlation terms (Model 2) for items that showed a high modification index (MI > 10) indicating substantial error correlations and potential redundancy. Given the relatively small subject-to-item ratio and the ordinal nature of the item responses, robust weighted least squares mean and variance adjusted (WLSMV) estimation was used.[34,35] As the minimum fit function chi-square (χ^2) statistic is overly sensitive to misfit, multiple comparative and absolute indices were used to determine the goodness-of-fit, including the Tucker–Lewis index (TLI), the comparative fit index (CFI), the standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA).[36] For the TLI and CFI values of ≥0.90 and ≥0.95 were considered to indicate acceptable and good model fit, respectively. Values of ≤0.10 and ≤0.08 on the SRMR and RMSEA, respectively, were considered to indicate acceptable and good fit. Bivariate correlations between the sum scores of the 47 MTI items and the other measures were conducted with SPSS version 25.0 (IBM Corp.[26]). Person-mean imputation for missing item responses was used when there was ≤20% of missing data.[37]

3.2 | Results

In total, 662 patients received an invitation. Of these, 251 (37.9%) patients responded to the invitation. Again, patients who completed ≤75% of the MTI items were not included. Finally, 201 patients were included in the current study. Demographic and clinical variables were comparable to those included in Study 1: 122 (60.7%) females, mean age was 48.4 years (SD = 12.7), and median of lifetime episodes was 4 for manic and 5 for depressive episodes. The median of one lifetime admission for mood episodes was slightly lower than in Study 1.

3.2.1 | Confirmatory factor analysis

Model 1 showed a good model fit for SRMR and RMSEA, but an inadequate fit for other indices (see Table 1). Eight item pairs showed a MI ≥10. These item pairs were discussed by the research team, including three psychiatrists, two psychologists, and one psychometrician. Items were preserved when the content was considered to be more specific. In total, three items were removed. These residual 47 items were kept in the next model while allowing the error terms of the remaining five item pairs to correlate. This resulted in a slight improvement in fit, with the TLI and CFI showing borderline adequate fit. Internal consistency for the final 47-item model was excellent ($\alpha = 0.968$; 95% CI [0.961–0.974]).

3.2.2 | Convergent and divergent validity

See Table 2 for Pearson's correlation coefficients of the MTI and criterion measures. As expected, higher scores on the MTI were moderately to strongly associated with more manic symptoms, higher positive appraisals of internal states, and greater rumination in response to positive affect. Furthermore, as expected, the MTI was not correlated with depressive symptoms, automatic negative cognitions, negative rumination, and dampening of positive affect.

4 | GENERAL DISCUSSION

The aim of this study was to develop a patient-driven inventory assessing manic cognitions and investigate its psychometric qualities in two independent samples of patients with BD type I. Overall, the study resulted in a 47-item inventory assessing a unidimensional underlying construct with excellent internal consistency ($\alpha = 0.97$). The MTI was positively related to other measures of mania, but not to measures of depression.

There are several strengths of the current study. First, this is a patient-driven questionnaire. Therefore, the items might be closer to the actual experience of patients, making them more intuitive and recognizable than those derived from theory and expert opinion. Secondly, data were collected in large samples of patients with BD type I throughout the Netherlands, ensuring generalizability of the findings. Thirdly, the results of Study 1 were replicated in an independent sample. There are also some limitations. First, the MTI was developed in the context of an RCT on the efficacy of MBCT for BD, which might have resulted in a selection bias. Current mania was an exclusion criterion for that study, so items were generated by patients with BD who were currently in a euthymic rather than manic state. This might have resulted in a recall error. Secondly, due to the cross-sectional design of the current study, the test-retest stability and predictive validity of the MTI could not be assessed.

Despite these limitations, there are several ways in which the MTI can be implemented in clinical practice. The MTI can be helpful

TABLE 1 Confirmatory factor analysis of the Manic Thought Inventory.

	χ^2 (df)	*p*	TLI	CFI	SRMR	RMSEA [90% CI]
Model 1: 50 items	1724.34 (1175)	0.000	0.867	0.873	0.073	0.049 [0.04-0.05]
Model 2: 47 items	1443.01 (1029)	0.000	0.893	0.898	0.068	0.045 [0.04-0.05]

Abbreviations: CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; TLI, Tucker–Lewis index.

TABLE 2 Descriptive statistics and Pearson's correlation coefficients for MTI and criterion variables.

	M (SD)	*n*	MTI *r*
Convergent validity			
ASRM	12.83 (4.92)	153	0.687**
HAPPI	49.39 (9.78)	142	0.426**
RPA			
Self-focused rumination	10.33 (3.25)	159	0.676**
Emotion-focused rumination	13.43 (3.16)	159	0.571**
Divergent validity			
QIDS	10.04 (5.21)	151	0.010
ATQ	52.66 (21.87)	168	0.031
RRS-br	8.19 (3.02)	156	−0.063
RPA			
Dampening	12.89 (3.63)	159	−0.016

Note: Variability in sample size is due to missing data.

Abbreviations: ASRM, Altman Self-Rating Mania; ATQ, Automatic Thought Questionnaire; HAPPI, Hypomanic Attitudes and Positive Predictions Inventory; MTI, Manic Thought Inventory; QIDS, Quick Inventory of depressive symptomatology; RPA, Responses to Positive Affect; RRS, Ruminative Response Scale.

**$p < 0.01$.

in facilitating the recognition of early signs of (hypo)mania for patients, but also caregivers and practitioners. It offers the opportunity to add changed cognitions to the more commonly described affective and behavioral changes in a relapse prevention plan. This may be particularly relevant in subjects whose cognitions change earlier than their affective or behavioral states, during the process of developing a manic episode. The MTI could also be used during psychological interventions aimed at preventing relapse of future (hypo)manic episodes. Many of these interventions emphasize changes in behavior and coping. The MTI supports patients in identifying the type of manic cognitions they experience during a (hypo)manic episode, which might then be the target of a more cognitive approach. Even though these cognitions might not be as credible during a euthymic as during a (hypo)manic state, it still could be helpful to challenge them and formulate alternative, more helpful cognitions.

In terms of implications for future research, the first aim would be to validate the MTI for an English-speaking population as well. Secondly, it would be useful to investigate the possibility to shorten the inventory, as a 47-item, inventory can be burdensome for many patients[38] This could be achieved by using confirmatory factor analytic approaches such as those suggested by Marsh and colleagues.[39] Given that the current study showed that the MTI measures an essentially unidimensional underlying construct, item response theory methods could also be used to identify a shortened instrument that maintains adequate content coverage with maximum measurement precision. Eventually, future longitudinal studies could investigate whether adding the MTI as a self-management tool in clinical practice can help to detect early signs of impending mania and thereby prevent future (hypo)manic episodes. Furthermore, other interesting questions for future research might include whether the reported manic cognitions change throughout manic episodes or stay the same, whether specific cognitions correlate with other symptoms of mania, and whether there are specific clusters of manic cognitions that predict the course and severity of future manic episodes.

5 | CONCLUSION

The MTI is a patient-driven inventory to assess manic cognitions. Both explorative and confirmative factor analyses in two large independent samples of patients with BD type I have shown it to be a valid and reliable inventory. The MTI could be a useful tool in the recognition of early signs of relapse and psychological interventions to prevent relapse in BD. As manic episodes are distinctive in the diagnoses of BD, treatment outcome might be improved by focusing more on manic polarity rather than depressive polarity.

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DATA AVAILABILITY STATEMENT

Data will be made available in a public data respiratory upon publication: Data Archiving and Networked Services (DANS).

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REFERENCES

1. Kupka RW, Goossens P, van Bendegem M, et al. *Multidisciplinaire Richtlijn Bipolaire Stoornissen (Derde Herziene Versie)*. De Tijdstroom; 2015.
2. Yatham LN, Kennedy SH, Parikh SV, et al. Canadian network for mood and anxiety treatments (CANMAT) and International Society for Bipolar Disorders (ISBD) 2018 guidelines for the management of patients with bipolar disorder. *Bipolar Disord*. 2018;20(2):97-170.
3. Lovas DA, Schuman-Olivier Z. Mindfulness-based cognitive therapy for bipolar disorder: a systematic review. *J Affect Disord*. 2018;240:247-261.
4. Oud M, Mayo-Wilson E, Braidwood R, et al. Psychological interventions for adults with bipolar disorder: systematic review and meta-analysis. *Br J Psychiatry*. 2016;208(3):213-222.
5. Alloy LB, Abramson LY, Whitehouse WG, et al. Depressogenic cognitive styles: predictive validity, information processing and personality characteristics, and developmental origins. *Behav Res Ther*. 1999;37(6):503-531.
6. Basco MR, Rush AJ. *Cognitive-Behavioral Therapy for Bipolar Disorder*. 2nd ed. Guilford Press; 2005.
7. Jones S, Hayward P, Lam DH. *Cognitive Therapy for Bipolar Disorder: A Therapist's Guide to Concepts, Methods and Practice*. John Wiley & Sons; 2010.

8. Mansell W, Pedley R. The ascent into mania: a review of psychological processes associated with the development of manic symptoms. *Clin Psychol Rev*. 2008;28(3):494-520.
9. Feldman GC, Joormann J, Johnson SL. Responses to positive affect: a self report measure of rumination and dampening. *Cognit Ther Res*. 2008;32(4):507-525.
10. Gruber J, Eidelman P, Johnson SL, Smith B, Harvey AG. Hooked on a feeling: rumination about positive and negative emotion in interepisode bipolar disorder. *J Abnorm Psychol*. 2011;120(4):956-961.
11. Beck AT, Colis MJ, Steer RA, Madrak L, Goldberg JF. Cognition checklist for mania—revised. *Psychiatry Res*. 2006;145(2–3):233-240.
12. Jones S, Mansell W, Waller L. Appraisal of hypomania-relevant experiences: development of a questionnaire to assess positive self-dispositional appraisals in bipolar and behavioural high risk samples. *J Affect Disord*. 2006;93(1–3):19-28.
13. American Psychiatric Association, ed. *Diagnostic and Statistical Manual for Mental Disorders*. 4th ed. American Psychiatric Association; 1994.
14. Depue RA, Slater JF, Wolfstetter-Kausch H, Klein D, Goplerud E, Farr D. A behavioral paradigm for identifying persons at risk for bipolar depressive disorder: a conceptual framework and five validation studies. *J Abnorm Psychol*. 1981;90(5):381-437.
15. Bauer MS, Crits-Christoph P, Ball WA, et al. Independent assessment of manic and depressive symptoms by self-rating: scale characteristics and implications for the study of mania. *Arch Gen Psychiatry*. 1991;48(9):807-812.
16. Mansell W, Jones S. The brief-HAPPI: a questionnaire to assess cognitions that distinguish between individuals with a diagnosis of bipolar disorder and non-clinical controls. *J Affect Disord*. 2006;93(1–3):29-34.
17. Mansell W, Morrison AP, Reid G, Lowens I, Tai S. The interpretation of, and responses to, changes in internal states: an integrative cognitive model of mood swings and bipolar disorders. *Behav Cogn Psychother*. 2007;35:515-539.
18. Butt Z. In pursuit of empirically supported assessment for use in medical settings. *Clin Psychol: Sci Pract*. 2016;23(4):382-402.
19. Staniszewska S, Haywood KL, Brett J, Tutton L. Patient and public involvement in patient-reported outcome measures. *Patient*. 2012;5(2):79-87.
20. Hanssen I, Huijbers MJ, Lochmann-van Bennekom M, et al. Study protocol of a multicenter randomized controlled trial of mindfulness-based cognitive therapy and treatment as usual in bipolar disorder. *BMC Psychiatry*. 2019;19(130):1-10.
21. First MB, Spitzer RL, Gibbon M, Williams JBW. *Structured Clinical Interview for the DSM-IV Axis I Disorders (SCID-I)*. Biometric Research; 1996.
22. Young RC, Biggs JT, Ziegler VE, Meyer DA. Young mania rating scale. In: Rush Jr AJ, First MB, Blacker D, eds. *Handbook of Psychiatric Measures*. American Psychiatric Association; 2000:540-542.
23. Rush AJ, Trivedi MH, Ibrahim HM, et al. The 16-Item Quick Inventory of Depressive Symptomatology (QIDS), clinician rating (QIDS-C), and self-report (QIDS-SR): a psychometric evaluation in patients with chronic major depression. *Biol Psychiatry*. 2003;54(5):573-583.
24. Altman G, Hedeker D, Peterson JL, Davis JM. The Altman self-rating mania scale. *Soc Biol Psychiatry*. 1997;42:948-955.
25. Trivedi MH, Rush AJ, Ibrahim HM, et al. The inventory of Depressive Symptomatology, Clinician Rating (IDS-C) and Self-Report (IDS-SR), and the Quick Inventory of Depressive Symptomatology, Clinician Rating (QIDS-C) and Self-Report (QIDS-SR) in public sector patients with mood disorders: a psychometric evaluation. *Psychol Med*. 2004;34(1):73-82.
26. IBM Corp. *IBM SPSS Statistics for Windows, Version 25.0*. IBM Corp.; 2017.
27. Kraiss JT, Ten Klooster PM, Chrispijn M, Stevens AW, Kupka RW, Bohlmeijer ET. Psychometric properties and utility of the responses to positive affect questionnaire (RPA) in a sample of people with bipolar disorder. *J Clin Psychol*. 2019;75(10):1850-1865.
28. Hollon SD, Kendall PC. Cognitive self-statements in depression: development of an Automatic Thoughts Questionnaire. *Cognit Ther Res*. 1980;4(4):383-395.
29. Harrell TH, Ryon NB. Cognitive-behavioral assessment of depression: clinical validation of the Automatic Thoughts Questionnaire. *J Consult Clin Psychol*. 1983;51(5):721-725.
30. Treynor W, Gonzalez R, Nolen-Hoeksema S. Rumination reconsidered: a psychometric analysis. *Cognit Ther Res*. 2003;27:247-259.
31. Parola N, Zendjidjian XY, Alessandrini M, et al. Psychometric properties of the Ruminative Response Scale-short form in a clinical sample of patients with major depressive disorder. *Patient Prefer Adherence*. 2017;11:929-937.
32. Rosseel Y. *Package "lavaan" Version 05-22*. Department of Data Analysis, Ghent University; 2016.
33. R Core Team. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing; 2022.
34. Flora DB, Curran PJ. An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychol Methods*. 2004;9(4):466-491.
35. Moshagen M, Musch J. Sample size requirements of the robust weighted least squares estimator. *Methodology*. 2014;10:60-70.
36. Hu L-t, Bentler PM. Fit indices in covariance structure modeling: sensitivity to underparameterized model misspecification. *Psychol Methods*. 1998;3(4):424-453.
37. Bono C, Ried LD, Kimberlin C, Vogel B. Missing data on the Center for Epidemiologic Studies Depression Scale: a comparison of 4 imputation techniques. *Res Social Adm Pharm*. 2007;3(1):1-27.
38. McCarthy DM, Anderson KG. On the sins of short-form development. *Psychol Assess*. 2000;12(1):102-111.
39. Marsh HW, Ellis LA, Parada RH, Richards G, Heubeck BG. A short version of the self description questionnaire II: operationalizing criteria for short-form evaluation with new applications of confirmatory factor analyses. *Psychol Assess*. 2005;17(1):81-102.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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