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Research paper

Explicating the structure and relations of the Mood Disorder Questionnaire: Implications for screening for bipolar and related disorders☆

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ABSTRACT

Background: The Mood Disorder Questionnaire (MDQ; Hirschfeld et al., 2000) is a widely used screening measure in bipolar disorder research. Although this measure assesses a heterogeneous range of content, only limited prior research utilizing relatively small sample sizes has examined its factor structure.

Methods: The MDQ's structure was examined in 700 participants reporting current psychiatric treatment. We extended prior structural work on the MDQ by explicating relations between factors and a wide range of psychopathology and personality measures.

Results: The MDQ items were best captured by a two-factor structure consisting of dimensions labeled *Positive Activation* and *Negative Activation*. These two factors showed very different patterns of associations with personality, other psychopathology, and ratings of significant impairment, the last of which is a requirement for a positive MDQ screen using traditional scoring methods.

Limitations: Our study did not include clinician or informant ratings of bipolar disorder, preventing us from examining associations with such scores.

Conclusions: Our findings indicate that although the MDQ items cohere to define a total score, their structure is best modeled by meaningful Positive Activation and Negative Activation factors. Researchers and clinicians should be aware of these distinct sets of MDQ content, as high scorers on Positive Activation are less likely to identify past symptoms as problematic and show distinct clinical profiles from high scorers on Negative Activation.

1. Introduction

The underrecognition and misdiagnosis of bipolar spectrum disorders has been an intense area of interest over the last several decades due to research indicating difficulties associated with differentiating bipolar disorder (BD) from unipolar depression and other psychiatric disorders (Benazzi and Akiskal, 2003; Carta and Angst, 2016; Hirschfeld et al., 2000). Consequently, a number of screening measures of BD have been developed to address these diagnostic challenges, including the Mood Disorder Questionnaire (MDQ; Hirschfeld et al., 2000), the 32-item Hypomania Checklist (HCL-32; Angst et al., 2005), and the Mood Swings Questionnaire (MSQ; Parker et al., 2006). The psychometric properties of each of these measures has been investigated extensively (e.g., the HCL-32 and MSQ have been cited over 450 and 50 times, respectively, according to Google Scholar as of May 2017), with Hirschfeld et al. (2000) 13-item MDQ being the most widely cited to date (i.e., over 1100 times cited according to Google Scholar as of May 2017).

Despite its popularity, the MDQ's clinical usefulness has been questioned (e.g., Miller et al., 2004). Concerns have been raised about the MDQ's misapplication as a case-finding rather than screening measure (i.e., using the MDQ as a diagnostic proxy; see Zimmerman, 2012), and research suggests that the MDQ item content may not be specific to mania given that it is broadly related to a range of anxiety, trauma-related, substance use, eating, and impulse control disorders (Zimmerman et al., 2011). Indeed, examination of the MDQ's items indicates that it assesses a range of content, including increased energy, risky behavior, distractibility, and racing thoughts. This heterogeneity likely is due to the fact that the criteria defining hypomania/mania in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*; American Psychiatric Association, 1994) were used to guide the development of the MDQ's item content. Thus, given the

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heterogeneity of BD diagnostic criteria throughout various iterations of the *DSM* (Andrews et al., 2009), it has proven challenging to determine which content defining the MDQ and other measures informed by various *DSM*-based BD conceptualizations is specific to BD versus shared with a range of other forms of psychopathology (Stanton et al., 2017). Consequently, it is important to determine the specific dimensions modeled by the MDQ to improve understanding of what this screening measure does and does not assess.

Surprisingly, even though the MDQ has been widely used and appears to assess a heterogenous range of content, its item level structure has received little investigation. This is in contrast to the literatures on other BD screening measures, where for example, studies repeatedly have found that the HCL-32 is defined by distinct dimensions related to elated mood/energy and risk-taking/irritability (see Angst et al., 2010 for a review of this research). The limited research on the MDQ indicates that its factor structure may be similar in some ways to that of the HCL-32, as Benazzi and Akiskal (2003) found evidence for a two-factor structure they labeled as representing *Energized-Activity* (defined by items assessing increased energy/activity and decreased need for sleep) and *Irritability-Racing Thoughts* (defined by items assessing irritable mood, racing thoughts, and distractibility) in a sample of 181 outpatients with histories of unipolar depression and bipolar II disorder. Bech et al. (2011) present results indicating that the MDQ's items define dimensions they labeled *Active/Elevated* and *Risk-Taking/Irritable* in a sample of 59 patients with bipolar I disorder and 63 patients with unipolar depression. Although this structure shows some similarities with Benazzi and Akiskal's (2003) two-factor structure, it also displays some differences (e.g., racing thoughts and distractibility define Bech et al.'s, 2011 Active/Elated factor, whereas such item content defined the Irritability-Racing Thoughts factor in Benazzi and Akiskal, 2003). Unfortunately, neither study presented the full set of item loadings from their structural analyses, precluding more detailed structural comparisons. Importantly, however, these previous analyses indicate that the MDQ's content can be parsed into distinct factors.

1.1. The current study

Given the limited prior research on the MDQ's structure and the concerns raised about the specificity of its content, we aimed to explicate the nature and structure of the content defining the MDQ. This study builds upon prior research examining the MDQ's structure in several key ways. First, both prior studies examined its structure in relatively small samples (N = 181 in Benazzi and Akiskal, 2003 and N = 122 in Bech et al., 2011) for explicating the structure of assessment measures, wherein a minimum of 200–300 participants generally is recommended (see Clark and Watson, 1995). These relatively small sample sizes may have contributed to the observed discrepancies in factor structures across these studies. Second, this prior research focused on samples of individuals with fairly homogeneous sets of diagnoses (i.e., unipolar depression, BD); although these results undoubtedly made a contribution informing BD screening, it is important to examine the MDQ's structure in a broader sample given its use as screening measure across a range of clinical settings for individuals with diverse presenting concerns (Carta and Angst, 2016). Specifically, we examined the MDQ's factor structure in a large sample of individuals (N = 700) not selected on the basis of any diagnosis. Participants simply were selected for study inclusion based on receiving current psychotherapy and/or medication; accordingly, they may provide a more accurate representation of the diverse presenting issues observed in settings wherein clinical services are not restricted by diagnosis.

Additionally, whereas previous research did not examine associations between factors and other measures, we explicated the relations for our emergent factors with measures of hypomania/mania, other psychopathology, and normal-range personality. We also examined how our factors related to additional MDQ items assessing whether endorsed symptoms (a) were experienced concurrently in the past and (b) caused significant problems/psychosocial impairment. This represents an important consideration, given that past symptoms must have been experienced concurrently and have caused at least "moderate" impairment for a positive MDQ screen (Hirschfeld et al., 2000). If relations with these other MDQ screening items and other study measures differ substantially across factors, then important clinical information is provided. For instance, individuals primarily endorsing items assessing increased energy and activation may have a very different personality and clinical profile from those primarily endorsing concerns related to racing thoughts and distractibility; however, such nuances are obscured when focusing solely on MDQ total scores.

1.1.1. Study predictions

Based on our literature review, we expected the MDQ's items to define at least two interpretable factors marked strongly by energy/activity items and irritability items, respectively; however, we examined where other items (e.g., those assessing risk taking and racing thoughts) would load on a more exploratory basis given that prior research is inconsistent regarding the placement of these items (Bech et al., 2011; Benazzi and Akiskal's, 2003). We expected factors defined by item content related to increased energy/activity and irritability to display noteworthy positive relations with the personality traits of extraversion and neuroticism, respectively, given that these affective dimensions strongly define these traits (Stanton and Watson, 2014). We examined associations with other measures and self-rated impairment on an exploratory basis.

2. Method

2.1. Participants

This research was approved by the authors' university institutional review board, and informed consent was obtained from all participants. Participants were recruited through Amazon Mechanical Turk (AMT), and were screened for current psychotherapy and/or medication. In recent years, AMT, which allows "workers" who have an Amazon account to complete tasks for compensation, has become a widely used recruitment tool in psychological/psychiatric research as it provides an inexpensive and efficient method of data collection (Arditte et al., 2016; Miller et al., 2017). Samples from AMT have been found to yield data of equal or higher quality than those obtained in other convenience samples (e.g., undergraduate students) with regard to indicators such as test-retest reliability and internal consistency (Miller et al., 2017). Furthermore, Arditte et al. (2016) present findings suggesting that AMT workers report higher levels of depressive and anxiety symptoms than do participants from other convenience samples (e.g., samples recruited from the general community); given these findings and that participants in our sample were screened for treatment status, we expected them to report relatively high levels of psychopathology.

A total of 6271 participants completed a brief screening measure, which asked them to indicate if they currently were receiving psychiatric treatment, as well as a short series of other items included as fillers (e.g., items assessing various health behaviors) to obscure the screener's purpose. A total of 737 participants endorsed current therapy and/or medication in the screener and proceed to completed the full study and the MDQ. These participants required 59 min on average to complete the study. However, of these 737 participants, 35 did not endorse current treatment status when reassessed within the full study protocol and two additional participants failed to complete the MDQ. Consequently, data for these participants were removed prior to conducting analyses, reducing our final sample to 700 participants. Demographic information for these 700 participants is reported in Table 1.