Published in final edited form as:

J Nerv Ment Dis. 2012 September ; 200(9): 766–772. doi:10.1097/NMD.0b013e318266ba3f.

Are There Meaningful Differences between Major Depressive Disorder, Dysthymic Disorder, and their Subthreshold Variants?

Michael T. Moore, Ph.D.¹ and Timothy A. Brown, Psy.D.¹

¹Center for Anxiety and Related Disorders, Boston University, Boston, Massachusetts, USA

Abstract

A number of researchers have proposed adding an increasing number of subthreshold variants of Major Depressive Disorder (MDD) as new mood disorders. However, this research has suffered from a number of theoretical and methodological flaws which the current investigation has attempted to address. Individuals with MDD ($n = 470$) were compared to individuals with subthreshold MDD ($n = 57$). Individuals suffering from MDD reported consistently more severe symptoms, albeit of small magnitude, as well as differences in comorbidity with only two disorders. Results also indicated that diagnosis did not significantly predict rate of symptom change when MDD was compared with its subthreshold variant. Taken together, the aforementioned evidence suggests that small differences exist between MDD and its subthreshold variant. In addition, the extent to which the latter serve as useful analogs for the former may depend upon the variables under study.

Keywords

Depression; Diagnostic Assessment; Minor Depressive Disorder; Major Depressive Disorder; Dysthymia

Introduction

Two key objectives of a nosology of psychological disorders are that all instances of psychological disorder are represented by a diagnostic construct, and that diagnostic constructs are relatively homogeneous units. The current nosology, as represented by the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV*; American Psychiatric Association [APA], 2000), has ensured that all instances of psychopathology have a corresponding diagnostic label via the specifier “not otherwise specified” (NOS). The NOS specifier is used in cases where a psychological disorder is present (i.e., the symptoms cause clinically significant distress or impairment), but criteria for a specific diagnosis have not been met. The use of NOS diagnoses ensures that everyone with a psychological disorder receives a diagnosis that can be used to secure reimbursement from insurance companies. This widespread access to reimbursement for services ensures that everyone suffering from psychopathology has access to needed healthcare. The impact

Corresponding Author: Michael T. Moore, Center for Anxiety and Related Disorders, Boston University, 648 Beacon St., 6th Fl., Boston, MA 02215, Telephone: (617) 353-9610, Fax: (617) 353-9609, mtmoore@bu.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Disclosure

Neither author has any commercial associations that would serve as conflicts of interest.

of NOS diagnoses is highlighted by their prevalence, estimated to be over 5% in the case of DDNOS (one-month point prevalence, compared to 2.3% for both major depressive disorder [MDD] and dysthymic disorder [DYS]; Judd, Rapaport, Paulus, & Brown, 1994).

While NOS diagnoses serve the nosological goal of inclusion, they tend to be more heterogeneous with regard to symptom presentation as a result of a lack of exclusionary criteria (e.g., a group of individuals given an eating disorders NOS diagnosis will include individuals whose symptom presentation resembles anorexia and bulimia nervosa, as well as binge eating disorder). In this sense, NOS diagnoses represent a failure of the current diagnostic system to validly categorize all instances of psychopathology. The variability present among those labeled with NOS diagnoses may preclude the reliable identification of risk factors, markers for treatment response and prognosis; in short, the diagnostic label does not provide the researcher or the clinician with much useful information. One solution to this problem, in the case of the mood disorders, lies in the creation of an increasing number of diagnoses that would otherwise have been categorized as DDNOS (Angst, 1990; Fekadu et al., 2008; Judd, Rapaport, Paulus, & Brown, 1994; Rapaport & Judd, 1998; Sadek & Bona, 2000). The difficulty with this approach lies in the limited research that has investigated if these proposed mood disorders are distinct entities (as would be assumed by proposing them as separate disorders) or merely subtle variations of existing diagnoses (e.g., less severe versions of MDD or DYS). The current investigation seeks to address this gap in the literature and critically evaluate differences between threshold and subthreshold mood disorder diagnoses. Specifically, our investigation is concerned with variations in clinical manifestations (those associated with significant distress or role impairment) of subthreshold unipolar depression (those not meeting criteria for MDD or DYS).

Minor depressive disorder has been the most widely researched newly proposed mood disorder thus far (see Pincus, Davis, & McQueen, 1999, for a review). The criteria for minor depressive disorder are identical to MDD, with the exception that at least two, but less than five (the number necessary for a diagnosis of MDD), of the nine associated symptom criteria are necessary for a diagnosis (APA, 2000). Other proposed diagnostic variations on MDD include recurrent brief depressive disorder (APA, 2000) and subsyndromal symptomatic depression (Judd et al., 1994). The majority of the research on subthreshold forms of depression has attempted to justify a diagnosis based on prevalence and disability (Jaffe, Froom, & Galambos, 1994; Johnson, Weissman, & Klerman, 1992; Judd et al., 1994; Fekadu et al., 2008; Maier et al., 1994; Rapaport & Judd, 1998; Weiller, Boyer, Lepine, LeCrubier, 1994). However, very little research comparing threshold and subthreshold forms of depression has been done. Past research investigating differential symptom profiles between MDD and subthreshold MDD has been largely unsupportive of such a distinction (Broadhead et al., 1990; Judd et al., 1994; Sherbourne et al., 1994). However, Rapaport and colleagues (2002) found that minor depressive disorder was more often characterized by mood and cognitive, rather than neurovegetative, symptoms. Only one previous study has investigated evidence for differential comorbidity between threshold and subthreshold depressive disorders. Broadhead and colleagues (1990) found a significant difference in the rate of comorbidity between MDD and minor depressive disorder, and anxiety disorders (MDD: 44%, minor depressive disorder: 24%).

Prior research examining differential change in symptoms over time between MDD and its subthreshold variants has failed to find any such distinctions (Horwath et al., 1992; Judd, Akiskal, & Paulus, 1997; Judd et al., 1998; Meier, Gansicke, & Weiffenbach, 1997). The research that has looked at the course of subthreshold depression by itself over one year has found that between 28% and 50% remit completely and between 6% and 42% develop MDD (Hance et al., 1996; Judd et al., 1994). However, these statistics are more consistent

with the view that subthreshold depressive diagnoses should be more parsimoniously characterized as either premorbid manifestations or partial remittances of MDD.

In addition to the lack of research examining differences between subthreshold and threshold forms of depression, much of the literature on subthreshold forms of depression has assessed them with questionnaires (Coulehan et al., 1990; Froom et al., 1995; Jaffe et al., 1994; Mino et al., 1994; Tollefson et al., 1993) or with structured diagnostic interviews administered by lay interviewers with minimal training in diagnostic assessment (Broadhead et al., 1990; Fekadu et al., 2008; Hance et al., 1996; Judd et al., 1994; Judd et al., 1997; Weiller et al., 1994). The problem with the use of both methods of assessment lies in the difficulty in differentiating a subthreshold depressive diagnosis from MDD in partial remission, DYS, or adjustment disorder. None of the aforementioned studies examining differences between threshold and subthreshold depression have assessed these conditions with structured clinical interviews conducted by well-trained interviewers.

Hypotheses

The current investigation sought to determine if MDD and DYS differ from their subthreshold variants with regard to symptom presentation, comorbidity, change over time, and underlying personality dimensions which confer risk for both mood and anxiety disorders. With regard to symptom presentation, the view that subthreshold depressive psychopathology represents one, or a set of, unique diagnostic entities is most consistent with the view that they are characterized by a different set of symptoms from either MDD or DYS. As a result, this view would predict that symptom endorsements between MDD, DYS, and subthreshold variants of both disorders should differ. Demonstration that subthreshold depressive states were less characterized by neurovegetative symptoms, replicating the work of Rapaport et al. (2002), would be consistent with the notion of these states as unique diagnostic entities. Similarly, this view would predict increased comorbidity for threshold, versus subthreshold, depression, replicating what was found by Broadhead and colleagues (1990).

With regard to change in depression over time, prior studies (Horwath et al., 1992; Judd, Akiskal, & Paulus, 1997; Judd et al., 1998; Meier, Gansicke, & Weiffenbach, 1997) have only examined change between diagnostic states over time. The benefit of using symptoms, versus diagnostic status, as a measure of change over time is increased sensitivity. Again, the view that subthreshold depressive states represent one, or a set of, distinct diagnostic entities would predict differences in course between threshold and subthreshold depressive diagnoses. Specifically, it would be reasonable to predict that subthreshold depression would be associated with increased symptom improvement and a less chronic course of illness. In the current investigation, symptoms of depression were assessed at intake, six-, and 12-month follow-up and rates of change of these symptoms were compared.

Finally, the view that MDD, DYS, and their subthreshold variants represent distinct diagnostic entities is most consistent with the view that each is represented by a distinct set of risk factors. Past research involving differential risk factors between threshold and subthreshold depressive states has investigated demographic factors (e.g., Broadhead et al., 1990; Judd et al., 1994, 1997). The current investigation attempted to go beyond this by examining personality risk factors that have been shown to confer risk for mood disorders. Both neuroticism and behavioral inhibition/activation were selected as the personality dimensions most relevant to the differentiation of threshold and subthreshold depression as they have been consistently linked to depression in past research (Brown, 2007; Brown, Chorpita, & Barlow, 1998; Henriques & Davidson, 1991; Kasch, Rottenberg, Arnow, & Gotlib, 2002; Rosellini, Lawrence, Meyer, & Brown, 2010). Evidence of differential personality correlates between MDD, DYS, and their subthreshold variants would be

consistent with the view of subthreshold depressive states as unique, distinct diagnostic entities.

Methods

Participants and Procedures

Data were obtained from participants ($N = 595$) who presented for assessment or treatment of an anxiety, mood disorder, or both, at the Center for Anxiety and Related Disorders at Boston University. A slightly larger proportion of women were present in this sample (59%, $n = 348$) and the average age was 33.64 years ($SD = 12.63$). The sample was predominantly Caucasian (85%), however other racial/ethnic groups were represented (Latino/Hispanic: 5%, $n = 32$; African-American: 5%, $n = 27$; Asian/Pacific Islander: 4%, $n = 27$; Other: 1%, $n = 5$). Individuals were selected to participate if they were diagnosed with either a current MDD, DYS, or DDNOS specified at intake using a semistructured clinical interview. The most frequent diagnoses given were: MDD - 78%, DYS - 14.5%, DDNOS - 6.6%, social phobia - 57.6%, generalized anxiety disorder - 29.6%, panic disorder with agoraphobia - 21.5%, obsessive-compulsive disorder - 15.1%, and specific phobia - 11.9%. Adjustment Disorder was differentiated from other diagnoses, but was not encountered frequently enough to warrant separate analysis ($>1\%$). As per DSM convention, diagnoses given the specifier “in partial remission” were counted so long as the disorder was rated at a clinical level. One-hundred and sixty of our total sample (27%) carried either a principle or co-principle diagnosis of MDD, DYS, or DDNOS. In addition to this diagnostic interview, participants were asked to complete self-report measures of symptoms of depression, general anxiety, worry, neuroticism, and behavioral activation/inhibition. Follow-up self-report questionnaires were also administered at both six- and 12-month post-intake assessments. An initial sample of 302 participants agreed to provide follow-up data. This sample was reduced by 36% of the total sample by the six-month follow-up and 51% of the total sample by the 12-month follow-up. Comparisons of drop-outs to completers revealed no differences on any intake measure of psychopathology.

Measures

The *Anxiety Disorders Interview Schedule for DSM-IV: Lifetime version* (ADIS-IV-L; Di Nardo, Brown, & Barlow, 1994) is a semistructured clinical interview designed to assess for the presence of the *DSM-IV* anxiety, mood, somatoform, and substance use disorders. The ADIS-IV-L provides dimensional assessment of the criteria for the aforementioned *DSM-IV* diagnoses, as well as symptoms associated with these diagnoses and also provides each diagnosis with a clinical severity rating (CSR). Ratings for *DSM-IV* criteria, associated symptoms, and CSR's are all made on a scale ranging from zero to eight. A reliability study (Brown, Di Nardo, Lehman, & Campbell, 2001), which contained a subset of the current sample ($n = 362$) and involved two independent administrations of the ADIS-IV-L, found good to excellent inter-rater reliability for current diagnoses ($\kappa = .67$ to $.86$), with the exception of DYS ($\kappa = .36$).

Participants were classified according to ADIS-IV-L diagnoses and CSR. The MDD group ($n = 470$) was composed of individuals who met *DSM-IV* criteria for a diagnosis of MDD (i.e., corresponding to a CSR of four or higher). A similar classification scheme was used for the DYS group ($n = 86$). Individuals diagnosed with both MDD and DYS were excluded to prevent individuals from being included in multiple groups. The subthreshold MDD group (subMDD; $n = 17$) was composed of individuals who met *DSM-IV* criteria for DDNOS (i.e., corresponding to a CSR of four or higher) and whose presentation most closely approximated MDD. A similar classification scheme was used for the subthreshold DYS (subDYS; $n = 22$) group.

The subMDD group was examined in detail to determine the proportion of the group that corresponded to each of the proposed subthreshold mood diagnoses. The majority of the group met the proposed criteria for minor depressive disorder (71%, $n = 12$), with the remainder of the group meeting the proposed criteria for subsyndromal symptomatic depression (29%, $n = 5$). No cases were determined to meet the proposed criteria for recurrent brief depression. The data for all 17 participants are presented below, however, identical results were obtained when data only for individuals who met criteria for minor depressive disorder were utilized.

The *Beck Depression Inventory* (BDI; Beck & Steer, 1987) is a 21-item measure assessing the presence and severity of depressive symptoms. Each item is coded from zero to three where higher scores indicate increased severity. A meta-analysis of BDI studies has demonstrated good internal consistency ($\alpha = .84$) and excellent test-retest reliability ($r = .93$; Beck & Steer, 1987).

The *Behavioral Inhibition/Activation Scales* (BIS/BAS; Carver & White, 1994) is a 24-item measure assessing two general motivational systems that are thought to underlie behavior. The first is thought to regulate appetitive motives, which involve moving the individual towards pleasant stimuli (the behavioral activation system [BAS]). The second is thought to regulate aversive motives, which involve moving the individual away from aversive stimuli (the behavioral inhibition system [BIS]). Items are rated on a scale which ranges from one to four with increasing scores indicating an increased tendency to utilize that particular system. The BIS/BAS has demonstrated convergent and discriminant validity with measures of personality, temperament, positive and negative affect (Carver & White, 1994).

The *Penn State Worry Questionnaire* (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) is a 16-item self-report scale that is designed to measure trait worry. Items are rated on a scale which ranges from one to five with increasing scores indicating more problematic worry. The PSWQ has been shown to differentiate between varying levels of worry and between generalized anxiety disorder and post-traumatic stress disorder in a sample of college undergraduates (Meyer, Miller, Metzger, & Borkovec, 1990). In this same study, PSWQ scores were found to possess high test-retest and internal consistency reliability and did not correlate significantly with measures of anxiety, depression, or social desirability. Research into the factor structure of the PSWQ (Brown, Antony, & Barlow, 1992) has found it to be unifactorial in a large sample of outpatients with mood and anxiety disorders.

The *NEO – Five Factor Inventory* (NEO-FFI; Costa & McCrae, 1992) is a 60-item measure designed to measure all of the Big Five personality traits (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness). Only the neuroticism scale was used in the current investigation. The NEO-FFI has demonstrated adequate internal consistency in past research ($\alpha = .68 - .86$, Costa & McCrae, 1992; $\alpha = .86 - .90$, Robins, Fraley, Roberts, & Trzeniewski, 2001). In addition, a five factor structure, with disorder constructs as indicators, fit the data well in a clinical sample very similar to the present investigation (Rosellini & Brown, in press).

Results

As mentioned previously, individuals with subclinical depressive diagnoses (CSRs < 4) were excluded to help ensure that subthreshold depression was not confounded with subclinical depression. However, excluding these individuals does not ensure equivalent diagnostic severity between the four groups (MDD, DYS, subMDD, subDYS). A comparison of CSR's between the threshold and subthreshold groups at intake revealed that the subthreshold groups had significantly lower CSRs than the MDD and DYS groups,

$t(593) = 4.83, p < .001$, Cohen's $d = .40$. This strong relationship is consistent with the view that subthreshold variations of MDD are better conceptualized as less severe forms of MDD than separate diagnostic entities in their own right.

A comparison of intake ADIS-IV-L severity ratings of MDD criteria between MDD and subMDD groups was conducted to attempt to identify different symptom profiles between groups. Given the number of symptom comparisons, inflation of Type I error was controlled for via Holm's procedure (Holm, 1979). These results yielded small, but statistically significant differences, with larger values being found for the MDD group (see Table 1). A comparison of intake ADIS-IV-L severity ratings of DYS criteria between DYS and subDYS groups, however, resulted in less consistent differences (see Table 2). The severity rating for the hallmark criteria for DYS ("depressed mood for most of the day, for more days than not...for at least two years" [p. 380, APA, 2000]) was rated higher for the DYS, compared to the subDYS, group with this result corresponding to Cohen's convention for a large effect (1992). The remainder of the severity ratings were not significantly different between groups. Symptoms of depression were also compared between groups using the BDI. A small, statistically significant difference was found between MDD and subMDD groups on the BDI, $t(457) = 2.29, p = .02, d = .21$. A similar pattern of findings, but with a larger difference between groups, was found when DYS and subDYS groups were compared, $t(104) = 2.09, p = .04, d = .41$.

Underlying personality traits, that have been shown to confer increased risk for the mood disorders (i.e., behavioral activation and inhibition and neuroticism), were also compared between groups. Results indicated small and largely nonsignificant differences in behavioral activation (MDD > subMDD; $t[438] = 1.10, p = .29$, Cohen's $d = .11$) and inhibition (MDD < subMDD; $t[441] = -.75, p = .45, d = .07$) and a small, but significant, difference in neuroticism (MDD > subMDD; $t[454] = 2.90, p = .004, d = .27$). In contrast, differences between DYS and subDYS groups were more variable. Nonsignificant differences associated with small effects were found for both behavioral activation (DYS < subDYS; $t[102] = 1.23, p = .27, d = .24$) and inhibition (DYS < subDYS; $t[102] = 1.11, p = .27, d = .22$), while small-to-medium effects were found for neuroticism at a trend level (DYS < subDYS; $t[104] = 1.71, p = .09, d = .34$).

Differential patterns of comorbidity between threshold and subthreshold groups were examined next. Comparison of MDD and subMDD groups revealed significantly different comorbidity with specific phobia (see Table 3) and generalized anxiety disorder (GAD), when the *DSM-IV* diagnostic hierarchy rule is ignored. However, these two differences are no longer statistically significant when the Holm's procedure was applied to adjust for the number of diagnostic comparisons (see Table 3). With respect to GAD, the *DSM-IV* hierarchy rule specifies that a diagnosis of GAD may not be given when the disorder "... occur[s] exclusively during a Mood Disorder, a Psychotic Disorder, or a Pervasive Developmental Disorder" (p. 476, APA, 2000). Comparison of DYS and subDYS groups revealed a pattern of comorbidity very similar to that found between MDD and subMDD groups (see Table 4). However, in the comparison of DYS and subDYS groups, differences in comorbidity with GAD, both ignoring and adhering to the *DSM-IV* hierarchy rule, as well as specific phobia were found. Similar to the aforementioned results, however, none of these differences were statistically significant after the Holm's procedure was employed.

Finally, change in symptoms of depression over 12 months was compared between both threshold and subthreshold groups using latent variable growth curve modeling (LGM). The BDI was used as the outcome variable in these analyses and intercept and slope latent variables were created using BDI total scores at intake, six-month, and 12-month assessments as indicators. The slope latent variable was created such that the paths to the

intake and 12-month indicators were fixed to zero and one, respectively, and the path to the six-month indicator was freely estimated. Both latent variables were regressed onto a diagnostic group observed variable (coded such that subthreshold diagnosis = 0 and threshold diagnosis = 1) to determine if diagnostic group was predictive of either the rate of change in BDI scores over time (slope) or pre-treatment BDI scores (intercept). In addition, the slope was regressed onto the intercept latent variable to control for any pre-treatment differences in the outcome variable. Error variances for the three BDI indicators were constrained to be equal. Acceptable fit was obtained for this model in both the MDD/subMDD, $\chi^2(3) = .20$, $p = .98$, CFI = 1.00, RMSEA = .00 (CFit $p = 1.00$), SRMR = .01, and DYS/subDYS groups, $\chi^2(3) = 1.66$, $p = .65$, CFI = 1.00, RMSEA = .00 (CFit $p = .73$), SRMR = .05. For participants in the MDD and subMDD groups, group membership was found to significantly predict intake-level BDI scores (unstandardized $\gamma = 4.38$, $p < .05$). The path predicting the rate of change in BDI scores from group membership, however, was not statistically significant (unstandardized $\gamma = -2.89$, $p = .51$). Similar results were found using DYS/subDYS groups, where the path predicting the intercept latent variable was statistically significant (unstandardized $\gamma = 3.55$, $p < .05$), while that predicting the slope latent variable was not (unstandardized $\gamma = 2.26$, $p = .54$). In both models, the results indicated that having a threshold versus a subthreshold diagnosis was associated with higher BDI total scores at intake but was unrelated to change in symptoms of depression over time.

Discussion

A variety of new diagnostic entities differing only slightly from existing criteria for MDD have been proposed and justified primarily on the basis of prevalence and impairment (e.g., Hance et al., 1996; Keller et al., 1995; Miranda & Munoz, 1994; Sadek & Bona, 2000; Simon & Von Korff, 1995). The current investigation sought to establish if subMDD/minor depressive disorder and subthreshold DYS differed in symptom presentation, underlying personality traits, comorbidity, and course from their threshold variants. Such differences are suggested in positing these subthreshold conditions as diagnostic entities in-and-of themselves as opposed to conceptualizing them as premorbid or residual manifestations of existing mood disorders. We failed to find support for such differences between MDD and subMDD in a large, diverse sample of treatment-seeking participants. We failed to find individual criteria that strongly differentiated threshold MDD from subMDD. Differences in personality risk-factors also failed to strongly differentiate these conditions. In addition, no significant differences in comorbidity with any of the anxiety disorders, the most commonly comorbid with both MDD and DYS (Brown, Campbell, Lehman, Grisham, & Mancill, 2001; Clark, 1989), were found. However, it should be noted that this lack of significant results could be due to the small sample sizes in the subthreshold groups and resultant lack of power. Finally, participants with MDD or DYS did not differ significantly from their subthreshold variants in how they responded to treatment over a two-year follow-up interval.

Where differences between MDD and subMDD were detected, they were generally of small magnitude. These differences were expected on the grounds that subMDD is defined as being less severe (in terms of number of symptoms) than MDD. The aforementioned results, which demonstrate the difficulty in separating the issue of diagnostic thresholds from diagnostic severity, support this conclusion. As a result of the correlation between number of symptoms and their severity, some differences between threshold and subthreshold groups are inevitable. However, positing that minor depressive disorder should be considered a separate diagnosis suggests that any differences with MDD would be due to factors other than the different number of symptoms which are required for a diagnosis (a merely quantitative distinction). Our results are most consistent with the notion that subMDD/minor depressive disorder is merely a slightly less severe form of MDD. Unlike the results comparing MDD with subMDD, comparisons between DYS and subDYS were generally

larger in magnitude. DYS participants were rated more severely on criterion A for DYS than their subDYS counterparts, with this result equal to Cohen's (1992) convention for a large effect. DYS participants endorsed less behavioral activation (the two components of drive and reward responsiveness) and these results corresponded to medium and small-to-medium effects, respectively. Despite this, no differences were found between DYS and subDYS participants with regard to comorbidity with anxiety disorders or response to treatment.

Taken together, the results of the current investigation support minor differences in both number of symptoms of depression and clinical severity between subthreshold and threshold depressive states. More substantive differences in symptom presentation, comorbidity, and change over time were not detected. These findings are relevant to the old debate regarding how psychopathology is best characterized: by an array of diagnostic entities that are only measured with regard to their presence or absence, or by a limited number of dimensions possessing greater variability. The current investigation suggests that subthreshold depression is merely a milder version of its threshold counterpart and that depression could be better captured dimensionally, as opposed to several seemingly unrelated separate diagnoses. This debate is particularly timely in that it is part of a set of revisions being suggested for the upcoming *DSM-V*. Authors have been suggesting for decades that a dimensional measurement system be added to the current categorical one on the grounds that it more validly captures the variability present in psychopathology (e.g., Brown & Barlow, 2009; Kendell, 1975; Widiger, 1992). Our results are consistent with that suggestion.

Limitations

The current investigation represents the first investigation into clinically meaningful, distinctions between MDD and minor depressive disorder/subMDD and DYS and its subthreshold counterpart. In addition, this investigation was conducted using a thorough diagnostic assessment of a large sample of treatment-seeking participants. Despite these strengths, a number of limitations deserve mention. While it would have been ideal to evaluate all of the various subthreshold variants of MDD, an insufficient number of participants meeting criteria for recurrent brief depressive disorder or subsyndromal symptomatic depression were present in our sample to permit separate analysis. While it is not surprising that individuals who do not experience depressed mood or anhedonia or do not experience symptoms for two weeks or more would not necessarily present for treatment (prior studies of recurrent brief depressive disorder and subsyndromal symptomatic depression utilized primarily epidemiological, primary care, or community samples), it is unfortunate that these comparisons could not be made. In addition, the small sizes of the two subthreshold groups (subMDD: $n = 17$, subDYS: $n = 22$) limits our ability to generalize the results of the current investigation to other groups or to make definitive statements about the nature of subthreshold depression. While effect size statistics were utilized to minimize the impact of the small subthreshold samples, it is possible that a lack of power influenced our results, particularly in the analyses regarding comorbidity. It should be noted, however, that the difficulty in identifying cases of subthreshold depression in such a large treatment-seeking sample may itself be taken as evidence against subthreshold MDD being classified as a separate disorder. The current investigation differed from past studies in the use of both a treatment-seeking sample and structured clinical interview. It is possible that cases of MDD or DYS in remission were misclassified as subthreshold MDD in previous studies and/or that subthreshold MDD is not present to a large degree in a treatment-seeking sample; neither possibility supports the claim that subthreshold depressive states warrant separate diagnosis. Finally, while the attrition present over the follow-up interval appears to be of random, it is possible that differential attrition on a factor(s) unmeasured at intake could have influenced the results reported above.

Conclusions

Currently, minor depressive disorder is listed in an appendix of *DSM-IV* under the heading “Criteria Sets and Axes Provided for Further Study.” This heading is used to denote proposed, additional diagnoses that require evaluation. The current study is the first to both evaluate differences between threshold and subthreshold depression and assess diagnostic status in a manner that can truly differentiate subthreshold MDD from closely related and often confused conditions. The results of this study are not consistent with the view that minor depressive disorder is distinct from MDD. In addition, our study is added to a growing list that suggests that psychopathology is better characterized by a limited number of dimensionally measured variables than by multiple, distinct categories.

Acknowledgments

Funding for this study was provided by NIMH Grant R01-39096.

References

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed.. Washington, DC: Author; 2000. text revision
- Angst J. Recurrent brief depression: A new concept of depression. *Pharmacopsychiatry*. 1990; 23:63–66. [PubMed: 2187211]
- Beck, AT.; Steer, RA. Manual for the Beck Depression Inventory. San Antonio, TX: The Psychological Corporation; 1987.
- Broadhead WE, Blazer DG, George LK, Tse LK. Depression, disability days, and days lost from work in a prospective epidemiological survey. *JAMA*. 1990; 264:2524–2528. [PubMed: 2146410]
- Brown TA. Temporal course and structural relationships among dimensions of temperament and DSM-IV anxiety and mood disorder constructs. *J Abnorm Psychol*. 2007; 116:313–328. [PubMed: 17516764]
- Brown TA, Antony MM, Barlow DH. Psychometric properties of the Penn State Worry Questionnaire in a clinical anxiety disorders sample. *Behav Res Ther*. 1992; 30:33–77. [PubMed: 1540110]
- Brown TA, Barlow DH. A proposal for a dimensional classification system based on the shared features of the DSM-IV anxiety and mood disorders: Implications for assessment and treatment. *Psychol Assess*. 2009; 21:256–271. [PubMed: 19719339]
- Brown TA, Campbell LA, Lehman CL, Grisham JR, Mancill RB. Current and lifetime comorbidity of the DSM-IV anxiety and mood disorders in a large clinical sample. *J Abnorm Psychol*. 2001; 110:585–599. [PubMed: 11727948]
- Brown TA, Chorpita BF, Barlow DH. Structural relationships among dimensions of the DSM-IV anxiety and mood disorders and dimensions of negative affect, positive affect, and autonomic arousal. *J Abnorm Psychol*. 1998; 107:179–192. [PubMed: 9604548]
- Brown TA, Di Nardo PA, Lehman CL, Campbell LA. Reliability of DSM-IV anxiety and mood disorders: Implications for the classification of emotional disorders. *J Abnorm Psychol*. 2001; 110:49–58. [PubMed: 11261399]
- Carver CS, White TL. Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *J Per Soc Psychol*. 1994; 67:319–333.
- Clark, LA. The anxiety and depressive disorders: Descriptive psychopathology and differential diagnosis. In: Kendall, PC.; Watson, D., editors. *Anxiety and depression: Distinctive and overlapping features*. San Diego: Academic; 1989.
- Cohen J. A power primer. *Psychol Bull*. 1992; 112:155–159. [PubMed: 19565683]
- Costa, PT.; McCrae, RR. NEO PI-R Professional Manual: Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI). Odessa, FL: Psychological Assessment Resources; 1992.
- Coulehan JL, Schulberg HC, Block MR, Janosky JE, Arena VC. Depressive symptomatology and medical co-morbidity in a primary care clinic. *Int J Psychiatr*. 1990; 20:335–347.

- Di Nardo, PA.; Brown, TA.; Barlow, DH. Anxiety Disorders Interview Schedule for DSM-IV: Lifetime version (ADIS-IV-L). San Antonio, TX: Psychological Corporation; 1994.
- Fekadu A, O'Donovan MC, Atalay A, Kebede D, Church S, Johns L, Medhin G, Prince M, Shibre T. Validity of the concept of minor depression in a developing country setting. *J Nerv Ment Dis*. 2008; 196:22–28. [PubMed: 18195638]
- Froom J, Aoyama H, Hermoni D, Mino Y, Galambos N. Depressive disorder in three primary care populations: United States, Israel, Japan. *Fam Pract*. 1995; 12:274–278. [PubMed: 8536829]
- Hance M, Carney RM, Freedland KE, Skala J. Depression in patients with coronary heart disease: A 12-month follow-up. *Gen Hosp Psychiatr*. 1996; 18:61–65.
- Henriques JB, Davidson R. Left frontal hypoactivation in depression. *J Abnorm Psychol*. 1991; 100:535–545. [PubMed: 1757667]
- Holm S. A simple sequentially rejective multiple test procedure. *Scand J Stat*. 1979; 6:65–70.
- Horwath E, Johnson J, Klerman GL, Weissman MM. Depressive symptoms as relative and attributable risk factors for first-onset major depression. *Arch Gen Psychiatry*. 1992; 49:817–823. [PubMed: 1417435]
- Jaffe A, Froom J, Galambos N. Minor depression and functional impairment. *Arch Fam Med*. 1994; 3:1081–1086. [PubMed: 7804493]
- Johnson J, Weissman MM, Klerman GL. Service utilization and social morbidity associated with depressive symptoms in the community. *JAMA*. 1992; 267:1478–1483. [PubMed: 1538538]
- Judd LL, Akiskal HS, Maser JD, Zeller PJ, Endicott J, Coryell W, Paulus MP, Kunovac JL, Leon AC, Mueller TI, Rice JA, Keller MB. A prospective 12-year study of subsyndromal and syndromal depressive symptoms in unipolar major depressive disorders. *Arch Gen Psychiatry*. 1998; 55:694–700. [PubMed: 9707379]
- Judd LL, Akiskal HS, Paulus MP. The role and clinical significance of subsyndromal symptomatic depressive symptoms (SSD) in unipolar major depressive disorder. *J Affect Disord*. 1997; 45:5–18. [PubMed: 9268771]
- Judd LL, Rapaport MH, Paulus MP, Brown JL. Subsyndromal symptomatic depression: A new mood disorder? *J Clin Psychiatry*. 1994; 55:18–28. [PubMed: 8077164]
- Kasch KL, Rottenberg J, Arnow BA, Gotlib IH. Behavioral activation and inhibition systems and the severity and course of depression. *J Abnorm Psychol*. 2002; 111:589–597. [PubMed: 12428772]
- Keller MB, Klein DN, Hirschfeld RM, Kocsis JH, McCullough JP, Miller I, First MB, Holzer CP, Keitner GI, Marin DB. Results of the DSM-IV mood disorders field trial. *Am J Psychiatr*. 1995; 152:843–849. [PubMed: 7755112]
- Kendell, RE. The role of diagnosis in psychiatry. Oxford, England: Blackwell; 1975.
- Meier W, Herr R, Lichtermann D, Gänssicke M, Benkert O, Faust G. Brief depression among patients in general practice: Prevalence and variation by recurrence and severity. *Eur Arch Psychiatr Clin Neurosci*. 1994; 242:89–92.
- Meier W, Gänssicke M, Weiffenbach O. The relationship between major and subthreshold variants of unipolar depression. *J Affect Disord*. 1997; 45:41–51. [PubMed: 9268774]
- Meyer TJ, Miller ML, Metzger RL, Borkovec TD. Development and validation of the Penn State Worry Questionnaire. *Behav Res Ther*. 1990; 28:487–495. [PubMed: 2076086]
- Mino Y, Aoyama H, Froom J. Depressive disorders in Japanese primary care patients. *Fam Pract*. 1994; 11:363–367. [PubMed: 7895962]
- Miranda J, Munoz R. Intervention for minor depression in primary care patients. *Psychosom Med*. 1994; 56:136–142. [PubMed: 8008800]
- Pincus HA, Davis WW, McQueen LE. 'Subthreshold' mental disorders: A review and synthesis of studies on minor depression and other 'brand names.' *Br J Psychiatr*. 1999; 174:288–296.
- Rapaport MH, Judd LL. Minor depressive disorder and subsyndromal depressive symptoms: Functional impairment and response to treatment. *J Affect Disord*. 1998; 48:227–232. [PubMed: 9543213]
- Rapaport MH, Judd LL, Schettler PJ, Yonkers KA, Thase ME, Kupfer DJ, Frank E, Plewes JM, Tollefson GD, Rush AJ. A descriptive analysis of minor depression. *Am J Psychiatr*. 2002; 159:637–643. [PubMed: 11925303]

- Robins RW, Fraley RC, Roberts BW, Trzesniewski KH. A longitudinal study of personality change in young adulthood. *J Pers.* 2001; 69:617–640. [PubMed: 11497032]
- Rosellini AJ, Brown TA. The NEO-Five Factor Inventory: Latent structure and relationships with dimensions of anxiety and depressive disorders in a large clinical sample. *Assessment.* (in press).
- Rosellini AJ, Lawrence AE, Meyer JF, Brown TA. The effects of extraverted temperament on agoraphobia in panic disorder. *J Abnorm Psychol.* 2010; 119:420–426. [PubMed: 20455614]
- Sadek N, Bona J. Subsyndromal symptomatic depression: A new concept. *Depress Anxiety.* 2000; 12:30–39. [PubMed: 10999243]
- Sherbourne CD, Wells KB, Hays RD, Rogers W, Burnam MA, Judd LL. Subthreshold depression and depressive disorder: Clinical characteristics of general medical and mental health specialty outpatients. *Am J Psychiatr.* 1994; 151:1777–1784. [PubMed: 7977885]
- Simon GE, Von Korff M. Recognition, management, and outcomes of depression in primary care. *Arch Fam Med.* 1995; 4:99–105. [PubMed: 7842160]
- Tollefson GD, Souetre E, Thomander L, Potvin JH. Comorbid anxious signs and symptoms in major depression: Impact on functional work capacity and comparative treatment outcomes. *Int Clin Psychopharmacol.* 1993; 8:281–293. [PubMed: 8277149]
- Weiller E, Boyer P, Lepine J-P, LeCrubier Y. Prevalence of recurrent brief depression in primary care. *Eur Arch Psychiatr Clin Neurosci.* 1994; 244:174–181.
- Widiger TA. Categorical versus dimensional classification: Implications from and for research. *J Pers Disord.* 1992; 6:287–300.

Table 1

Intake ADIS-IV-L severity ratings for MDD and subMDD participants

Criterion	Group	M (SD)	<i>t</i> (df)	<i>p</i> -value	Holm's Adjusted <i>p</i> -value	Cohen's <i>d</i>
Dysphoria	MDD	4.59 (1.43)				
	subMDD	3.31 (2.02)	3.55 (481)	.001	.006	.28
Anhedonia	MDD	4.16 (1.79)				
	subMDD	3.00 (2.45)	2.53 (481)	.01	.013	.20
Weight Change	MDD	1.98 (2.14)				
	subMDD	.88 (1.89)	2.16 (481)	.03	.05	.17
Sleep Disturbance	MDD	3.94 (2.09)				
	subMDD	2.63 (2.28)	2.50 (481)	.01	.016	.20
Psychomotor Agitation/Retardation	MDD	2.64 (2.11)				
	subMDD	1.06 (1.34)	3.11 (481)	.002	.007	.25
Fatigue	MDD	4.35 (1.82)				
	subMDD	2.88 (2.16)	3.09 (481)	.002	.008	.25
Worthlessness/Guilt	MDD	4.15 (2.10)				
	subMDD	2.63 (2.90)	2.83 (481)	.005	.01	.23
Thinking/Concentration Difficulty	MDD	4.09 (1.96)				
	subMDD	2.25 (1.88)	3.70 (481)	.001	.006	.30
Suicidal Ideation	MDD	1.33 (1.86)				
	subMDD	.25 (.78)	2.57 (480)	.01	.025	.21

Table 2

Intake ADIS-IV-L severity ratings for DYS and subDYS participants

Criterion	Group	M (SD)	t (df)	p-value	Holm' Adjusted p-value	Cohen's d
Dysthymia	DYS	4.69 (.83)				
	subDYS	3.59 (1.30)	4.76 (105)	.001	.007	.79
Appetite Disturbance	DYS	2.06 (2.04)				
	subDYS	1.14 (1.83)	2.03 (105)	.04	.01	.34
Sleep Disturbance	DYS	3.14 (2.15)				
	subDYS	2.82 (2.02)	.65 (105)	.52	.025	.11
Fatigue	DYS	3.87 (2.10)				
	subDYS	3.73 (1.91)	.31 (105)	.76	.05	.05
Low Self-Esteem	DYS	4.87 (1.39)				
	subDYS	4.09 (2.16)	2.14 (105)	.03	.008	.35
Concentration Difficulty	DYS	4.13 (1.64)				
	subDYS	3.55 (2.02)	1.41 (105)	.16	.0125	.23
Hopelessness/Pessimism	DYS	4.36 (1.78)				
	subDYS	4.05 (1.56)	.77 (105)	.45	.016	.13

Table 3

Comparison of patterns of comorbidity between MDD and subMDD groups and intake ADIS-IV-L diagnoses

Diagnosis	% with Diagnosis	χ^2	p-value	Holm's Adjusted p-value
	MDD	subMDD		
AnxNOS	3.40	.00	.60	.44
Ag wo/PD	2.13	.00	.37	.54
GAD	32.98	35.29	.04	.84
GAD wo/hierarchy	61.49	35.29	4.71	.03
OCD	16.60	23.53	.56	.45
PDA	21.49	35.29	1.82	.18
PTSD	8.09	.00	1.49	.22
SPEC	12.13	29.41	4.41	.04
SOC	55.32	52.94	.04	.85

Note: For all χ^2 , $df=1$; AnxNOS = anxiety disorder not otherwise specified; Ag wo/PD = agoraphobia without a history of panic disorder; GAD = generalized anxiety disorder; GAD wo/hierarchy = generalized anxiety disorder, ignoring the *DSM-IV* hierarchy rule; OCD = obsessive-compulsive disorder; PDA = panic disorder with agoraphobia; PTSD = post-traumatic stress disorder; SPEC = specific phobia; SOC = social phobia.

Table 4

Comparison of patterns of comorbidity between DYS and subDYS groups and intake ADIS-IV-L diagnoses

Diagnosis	% with Diagnosis	χ^2	p-value	Holm's Adjusted p-value
	DYS	subDYS		
AnxNOS	1.16	4.55	1.10	.29
				.0125
Ag wo/PD	1.16	.00	.26	.61
				.025
GAD	10.47	27.27	4.14	.04
				.006
GAD wo/hierarchy	50.00	27.27	3.65	.06
				.006
OCD	9.30	.00	2.2	.14
				.008
PDA	22.09	9.09	1.89	.17
				.01
PTSD	4.65	.00	1.06	.30
				.016
SPEC	5.81	18.18	3.51	.06
				.007
SOC	68.60	68.18	.001	.97
				.05

Note: For all χ^2 , $df=1$; AnxNOS = anxiety disorder not otherwise specified; Ag wo/PD = agoraphobia without a history of panic disorder; GAD = generalized anxiety disorder; GAD wo/hierarchy = generalized anxiety disorder, ignoring the *DSM-IV* hierarchy rule; OCD = obsessive-compulsive disorder; PDA = panic disorder with agoraphobia; PTSD = post-traumatic stress disorder; SPEC = specific phobia; SOC = social phobia.