Personality Pathology Factors Predict Recurrent Major Depressive Disorder in Emerging Adults

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Objective: Prior investigations consistently indicate that personality pathology is a risk factor for recurrence of major depressive disorder (MDD). Lack of emipircal support, however, for the Diagnostic and Statistical Manual of Mental Disorders (DSM) Fourth Edition organization of Axis II disorders supports the investigation of empirically derived factors of personality pathology as predictors of recurrence. **Method:** A sample of 130 previously depressed emerging adults (80% female; aged 18 to 21 years) were assessed for personality disorder symptoms at baseline. Participants were then followed for 18 months to identify MDD recurrence during the first 2 years of college. **Results:** Based on a previous factor analysis of DSM personality disorder criteria, eight personality pathology factors were examined as predictors of MDD recurrence. Survival analysis indicated that factors of interpersonal hypersensitivity, antisocial conduct, and social anxiety were associated with increased risk of MDD recurrence. **Conclusions:** These findings suggest that an empirically based approach to personality pathology organization may yield useful predictors of MDD recurrence during emerging adulthood.
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It is well established that adolescent depression confers greater risk for major depressive disorder (MDD) relapse and recurrence, as well as heightened risk for psychiatric comorbidity (Birmaher et al., 1996). Often the depressive recurrences arise during the next key developmental period, emerging adulthood, which occurs from 18 to 29 years of age (Arnett, 2000, 2004). Lewinsohn, Rohde, Klein, and Seeley (1999) found that approximately 45% of adolescents with MDD had a subsequent depressive episode between age 19 and 24 years of age. In a separate investigation, almost two-thirds of adolescents that experienced depression between 14 and 16 years of age experienced another depressive episode by age 21 (Fergusson & Woodward, 2002). Given this high rate of depressive recurrence during emerging adulthood, Rohde, Lewinsohn, Klein, Seeley, and Gau (2013) recommended that this developmental period should be a primary focus of MDD research. The investigators further noted that the field of depression research is at risk for overemphasizing the importance of adolescent depression and neglecting work on course of depression during emerging adulthood. The present study examines predictors of depressive recurrence as previously depressed individuals enter emerging adulthood.

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Among potential vulnerability factors, Axis II pathology has emerged as one of the most consistent predictors of MDD relapse and recurrence. Comorbid personality pathology has consistently been associated with earlier age of onset of depression and longer duration of depressive episodes (Black, Bell, Hulbert, & Nasrallah, 1988; Fava et al., 1996; Ramklint & Ekselius, 2003; Shea, Glass Pilkonis, Watkins, & Docherty, 1987). Personality pathology predicts a less stable course of depression and poorer prognosis in pharmacological and psychosocial treatments for depression (Levenson, Wallace, Fournier, Rucci, & Frank, 2012; Mulder, 2002).

Prospective studies have explored Axis II clusters and disorders as predictors of depressive recurrence. Alnaes and Torgersen (1997) found that, of the 11 Diagnostic and Statistical Manual of Mental Disorders Third Edition (DSM-III) personality disorders, borderline personality disorder diagnosis was significantly more frequent in patients that experienced a depressive relapse than those that reported sustained recovery. Lewinsohn, Rohde, Seeley, Klein, and Gotlib (2000) found further evidence that borderline personality disorder symptoms specifically predicted MDD recurrence in participants with adolescent-onset MDD. Ilardi, Craighead, and Evans (1997) found that patients with Axis II disorders had only 13% the survival time to MDD relapse of patients without personality disorders. Additionally, Cluster B and Cluster C dimensional scores were related to decreased survival time. Hart, Craighead, and Craighead (2001) identified total Axis II pathology as a predictor of recurrence of MDD in young adults; Cluster B dimensional score also was related to increased risk of recurrence. In a 6-year prospective study, Grilo and colleagues (2010) found that individuals with comorbid borderline PD or comorbid obsessive-compulsive PD had shorter time to MDD relapse than those without a comorbid PD. Coexisting PD was associated with a 50% greater chance of relapse. Most recently, Craighead, Sheets, Craighead, and Madsen (2011) reported that total Axis II pathology predicted MDD recurrence in emerging adults, but none of the DSM-IV personality disorder cluster scores predicted depression recurrence.

This line of research provides evidence that personality pathology is a reliable predictor of risk for recurrence in previously depressed young adults. However, personality cluster scores encompass multiple personality disorders and numerous Axis II symptoms. Inconsistencies concerning the predictive validity of the DSM personality disorder clusters suggest that other organizational structures might better identify the specific personality factors that drive the effect of personality pathology on depression.

Because the DSM Axis II classification system was rationally rather than empirically derived, a number of investigators have employed factor analysis to examine the organization of Axis II disorders and symptoms. Overall, these studies provide evidence that the current DSM system of clusters and disorders does not adequately represent the structure of personality pathology (for review, see Sheets & Craighead, 2007). A limited number of studies that use clinician-rated PD assessments have examined the factor structure of the Axis II personality pathology at the level of the individual personality disorder criteria (Morey, 1988; Nestadt et al., 1994; Nestadt et al., 2006; Sanislow et al., 2002; Torgersen, Skre, Onstad, Edvardsen, & Kringlen, 1993). The majority of these studies reported empirical structures for the DSM personality disorder criteria that did not reflect the current organization. The DSM's current cluster organization was not predictive of MDD recurrence in the current sample of emerging adults (Craighead et al., 2011). Given that the DSM system does not correspond to recent empirically derived structures of personality pathology, it is possible that an empirically derived organization of personality pathology may better predict the recurrence of major depression.

In a prior investigation, a factor structure for DSM-IV personality disorder symptoms was identified through exploratory factor analysis (Muralidharan, Sheets, Madsen, Craighead, & Craighead, 2011; Sheets, 2009). As expected, this factor structure did not directly correspond to the current DSM Axis II organization. In the present study, we predicted that the estimated personality pathology factor scores obtained through the prior factor analysis would predict heightened risk for recurrence. This is the first known study to test empirically derived Axis II pathology factors as predictors of MDD recurrence in young adults. Ultimately, the purpose of this project is to identify vulnerabilities to depressive recurrence in emerging adulthood to inform the development of depression prevention programs.

Table 1
Sample Characteristics: Demographic and Clinical Variables

Variable	*N* (%)
Gender	
Female	104 (80)
Male	26 (20)
Race	
Caucasian	92 (70.77)
African American	1 (0.77)
Latino	14 (10.77)
Asian	10 (7.69)
Native American	1 (0.77)
Did not identify	12 (9.23)
Past suicidality	
Yes	86 (66.15)
No	44 (33.85)
Past treatment for MDD	
Yes	56 (43.41)[a]
No	73 (56.59)
Current Axis I disorder	
Yes	23 (17.69)
No	107 (82.31)
	M (SD)
BDI-II	12.30 (7.13)

Note. MDD = major depressive disorder; BDI-II = Beck Depression Inventory (2nd ed.); M = mean; SD = standard deviation.
[a]n = 129 due to missing data.

Method

Participants

Participants were students at a large, public university in the United States. All participants were recruited via mail and email during the summer before their first year of college. Table 1 presents demographic and clinical data for the sample ($N = 130$). The first 50 participants were randomly assigned to the assessment only condition of a larger study examining a group intervention for depression prevention. To collect additional data on predictors of depression recurrence, 80 additional participants were recruited directly for assessment only; the latter group followed assessment procedures that were identical to the randomly assigned participants. All participants met DSM-IV diagnosis of at least one past major depressive episode (MDE), but they had recovered from depression when they enrolled in the study. Recovery was defined as a period of 2 months or longer, during which the individual no longer met DSM-IV diagnostic criteria for MDD and experienced no more than two depressive symptoms. Additional inclusion criteria were being 18–21 years of age and full-time, first-year student status. Exclusion criteria included: current mood disorder (i.e., major depressive disorder or dysthymic disorder); history of bipolar mood disorder; current substance dependence disorder; history of any psychotic disorders; imminently suicidal and therefore in need of immediate treatment; currently in psychotherapy treatment; or currently taking an antidepressant medication.

Measures

Structured Clinical Interview for DSM-IV (SCID), Research Version. The SCID (First, Spitzer, Gibbon & Williams, 2001) is a commonly used semistructured interview, which assesses current and lifetime diagnoses of Axis I disorders. A random 20% of interviews from the

larger project were evaluated for interrater reliability; MDD diagnosis reliability was moderately satisfactory ($\kappa = 0.66$).

Longitudinal Interval Follow-Up Evaluation (LIFE)–Modified. The LIFE (Keller et al., 1987) is a semistructured interview created to assess the longitudinal course of DSM-IV Axis I symptoms and disorders. Specific dates of onset, remission, relapse, and recurrence are recorded. Fifteen percent of the interviews from the larger project were evaluated for reliability; interrater reliability of MDD diagnosis was excellent ($\kappa = 0.94$).

International Personality Disorder Examination (IPDE). The IPDE (World Health Organization, 1996) is a 99-item semistructured clinical interview that produces both dimensional and categorical scores for the DSM-IV Axis II personality disorders. Twenty percent of the interviews from the larger project were assessed for inter-rater reliability across six interviewers. The intraclass correlation (Case 1; Shrout & Fleiss, 1979) for the IPDE total dimensional score was 0.95. As previously reported (Muralidharan et al., 2011), the individual DSM-IV personality disorder criteria assessed through this interview were factor analyzed, which yielded eight factors, labeled interpersonal hypersensitivity, antisocial conduct, unscrupulousness, social anxiety, identity disturbance, suspiciousness, misperception, and social avoidance.

Beck Depression Inventory II. The BDI-II (Beck, Steer, & Brown, 1996) is a 21-item self-report measure designed to assess the severity of depression symptoms. The scale had good internal consistency in this study (Cronbach's alpha = 0.84).

Assessment Staff

Advanced graduate students in clinical psychology conducted all clinical interviews. The clinical interviewers participated in formal training for the SCID as part of the assessment course curriculum. All interviewers participated in a half-day training seminar to begin formal training for the IPDE. Interviewers then viewed and scored three videotaped interviews previously rated by an experienced interviewer. Intraclass correlation coefficients for the IPDE dimensional score were required to equal 0.80 or higher on the three scored interviews before beginning study assessments.[1] During the assessment phases of the project, the clinical raters and a PhD-level clinical psychologist with extensive SCID and IPDE experience met weekly for diagnostic consensus conference in which agreement was reached on all diagnoses.

Procedure

Baseline assessments were conducted in two, 2-hour sessions. At session one, participants completed the consent form, the BDI-II (Beck et al., 1996), and the SCID-IV (First et al., 2001).[2] The IPDE was conducted at the second session (World Health Organization, 1996). By assessing Axis II pathology at baseline, enrolled participants were out of episode for depression and mood-state effects of personality symptom report could be avoided (Zimmerman, 1994). At the end of the second session, participants received monetary compensation for completing the baseline phase of assessments.[3]

Six, 12, and 18 months after the baseline assessment, participants were contacted and asked to continue their participation in the study. At each 90-minute follow-up assessment, participants

[1]Ten of the 218 interviews were conducted by four interviewers who did not complete the IPDE interrater reliability ratings before conducting interviews. These four interviewers were included in the interrater reliability checks conducted at study completion.

[2]Participants also completed other self-report and brief interview assessments, at baseline and follow-up, which were not closely related to the aim of this study and thus were not included in analyses.

[3]The first 50 participants were paid $36 for the baseline assessment and each of the follow-up assessments. The later 80 participants were paid $40 for the baseline assessment and $30 for follow-up assessments.

completed a follow-up consent form and the LIFE (Keller et al., 1987). At the end of each follow-up session, participants received monetary compensation.

Results

Of the 130 participants, 37 (28.24%) experienced a new MDE during their first 2 years of college. The average length of survival before recurrence in college was 401.8 days (13.2 months). Twenty-seven participants (21%) were lost to follow-up over the 18-month assessment period. The average length of follow-up was 479.9 days (15.8 months). Study completers were followed for an average of 553.1 days (18.2 months). Completers were compared on all demographic and predictor variables with the 27 participants that were lost to follow-up. The two groups did not significantly differ on demographic or clinical variables (gender, ethnicity, history of suicidality, prior treatment for depression, or current Axis I disorder). Only baseline BDI score predicted dropout versus study completion, $\chi^2(1, N = 130) = 8.43$, $p = 0.004$. Participants who dropped out of the study during the follow-up phase were more likely to have a higher baseline level of depressive symptomatology.

Predictors of Major Depressive Disorder Recurrence

The aim of the present study was to examine the personality pathology factors generated through factor analysis as potential predictors of MDD recurrence. In the previously conducted factor analysis (Muralidharan et al., 2011; Sheets, 2009), principal factors extraction with varimax rotation yielded eight factors: (a) interpersonal hypersensitivity (difficulty empathizing with others due to hypersensitivity to rejection and abandonment); (b) antisocial conduct (behavioral antisocial characteristics including conduct disorder criteria); (c) unscrupulousness (cognitive antisocial characteristics including disregard for the safety of others); (d) social anxiety (feelings of inadequacy, social inhibition); (e) identity disturbance (poor sense of self, narcissism); (f) suspiciousness (paranoia, lack of interest in relationships), (g) misperception (odd beliefs and perceptual experiences); and (h) social avoidance (severe avoidance of interpersonal interaction). A standard factor-loading cutoff of 0.40 was used to determine which variables to consider in interpreting the rotated factor pattern.[4] All factors were well-defined as indicated by squared multiple correlations (SMCs) of the variables with each factor ranging from 0.88 to 0.93. The high SMCs demonstrated internal consistency of the factors. Factor scores to be used in survival analysis were calculated through SAS FACTOR (SAS Institute, Inc., 2002).

Because of the known relationship of subsyndromal depressive symptoms and MDD recurrence (Fergusson, Horwood, Ridder, & Beautrais, 2005; Judd, Akiskal, & Paulus, 1997), baseline BDI was entered as a covariate in the survival analysis, to examine the predictive validity of personality factors over and above the relationship of baseline depressive symptoms with MDD recurrence. Additionally, it was important to include this variable as a covariate because it predicted censoring due to dropout. Prediction of MDD recurrence was tested using a semiparametric proportional hazards (Cox regression) model using the SAS PHREG procedure. First, squared multiple correlations for the variables in the survival model were examined to check for multicollinearity. To test the assumption of proportionality of hazards before proceeding with analysis, the interaction of time and each predictor variable was tested. None of the variables violated this assumption.

It was hypothesized that the empirically derived personality factors would form a model that predicted risk of MDD recurrence in emerging adulthood. After adjusting for baseline depressive symptomatology (BDI score), the set of personality pathology factors produced through factor analysis formed a significant omnibus model of MDD recurrence, χ^2 (9, $N = 130$) = 20.44, $p = 0.02$. Based on the R^2 statistic originally proposed by Cox and Snell (1989) and later described for survival analysis by Allison (1995), survival time was moderately predicted by this model, $R^2 = 0.14$. Additionally, when controlling for the other factors and baseline depressive

[4]Details about the resulting factor structure including factor loadings are available from the first author.

Table 2
Cox Proportional Hazards Model of Depression Recurrence

	Wald χ^2	*p*	Hazard ratio	95% CI
Model fit	20.44	**0.02**		
BDI-II	11.32	**0.001**	1.08	[1.03, 1.14]
Interpersonal hypersensitivity	4.42	**0.04**	1.27	[1.02, 1.58]
Antisocial conduct	5.00	**0.03**	1.82	[1.08, 3.07]
Unscrupulousness	0.33	0.57	1.10	[0.80, 1.51]
Social anxiety	4.80	**0.03**	1.51	[1.05, 2.19]
Identity disturbance	0.71	0.40	0.83	[0.53, 1.29]
Suspiciousness	0.005	0.95	0.99	[0.67, 1.45]
Misperception	0.03	0.87	1.05	[0.56, 1.98]
Social avoidance	0.02	0.89	0.98	[0.67, 1.41]

Note. CI = confidence interval; BDI-II = Beck Depression Inventory (2^{nd} ed.).

symptomatology, three of the personality pathology factors were unique predictors of survival time. The empirically derived factors of interpersonal hypersensitivity, antisocial conduct, and social anxiety were positively associated with hazard of recurrence, such that higher scores on each factor were associated with higher risk for recurrence. In contrast, the DSM's current cluster organization was not predictive of MDD recurrence in the current sample of emerging adults (Craighead et al., 2011). Table 2 presents the results of the survival analysis.

Discussion

Given the high rate of depressive recurrence, investigators are compelled to identify predictors of recurrent depression during emerging adulthood (Rohde et al., 2013). Previous studies have established that a total measure of personality pathology predicts future depressive episodes (e.g., Hart et al., 2001). However, inconsistencies in the predictive validity of the DSM personality disorder clusters and disorders suggest that an empirically derived organization may better identify the specific factors driving the effect of personality pathology on depression. Indeed, the DSM's current cluster organization was not predictive of MDD recurrence in the current sample of emerging adults (Craighead et al., 2011), but empirically derived factors formed a significant model that predicted MDD recurrence in emerging adults. The factors of interpersonal hypersensitivity, antisocial conduct, and social anxiety uniquely predicted risk for depressive recurrence. Higher scores on each of these factors were associated with higher risk for MDD recurrence during the first two years of emerging adulthood, a time of vulnerability when young adults are transitioning away from the family home.

The empirically derived factor interpersonal hypersensitivity may reflect underlying deficits in ability to establish interpersonal connection and ability to empathize. The items loading most strongly on this factor (fear of abandonment, lack of empathy, feelings of envy) imply chronic interpersonal difficulties and relationship instability, characteristics often associated with DSM-IV cluster B disorders. Given the demonstrated relationship of interpersonal stress and major depression (Daley, Rizzo, & Gunderson, 2006), it is possible that the interpersonal hypersensitivity factor encapsulates a more specific component driving the previously reported effect of cluster B pathology on the course of major depression (Alnaes & Torgersen, 1997; Hart et al., 2001; Ilardi et al., 1997; Lewinsohn et al., 2000). Previous investigations indicate that the relationship between depression and interpersonal conflict is reciprocal and self-sustaining (Coyne, 1976). Emerging adults who are overly sensitive to others' judgments and the quality of their interactions (those likely to score highly on the interpersonal hypersensitivity factor) paradoxically are likely to create more interpersonal conflict as they attempt to manage relationships. Frequent interpersonal stress then maintains substantial vulnerability for depression (Davila, Hammen, Burge, Paley, & Daley, 1995).

The second personality pathology factor identified as a risk factor for depression recurrence was antisocial conduct during early adolescence. A broad body of research confirms the relationship of conduct disorder and increased risk for depression among adolescents and young adults (e.g., Pine, Cohen, Gurley, Brook, & Ma, 1998; for review, see Wolff & Ollendick, 2006). One established theory of this relationship suggests that conduct problems interfere with the development of psychological competencies and lead to negative reactions from others (Capaldi, 1991, 1992; Capaldi & Stoolmiller, 1999). Early experiences of failure in social interactions, poor academic performance, strained parent-child relationship, and/or peer rejection create vulnerability for depression. These results provide further support that failure to develop social competence during early adolescence places individuals at higher risk for recurrence of depression during emerging adulthood.

The final personality pathology factor related to risk for recurrence of major depression was the social anxiety factor. Previous findings indicate that comorbid social anxiety frequently precedes the onset of major depression (e.g., Kessler, Stang, Wittchen, Stein, & Walters, 1999). Furthermore, adolescents and young adults with social anxiety and depression are more likely to experience subsequent (or persistent) depression at follow-up and experience a more difficult course of depression (Stein et al., 2001). Emerging adults, as they first experience independence from their family homes, require peer social support to help cope with new stresses. The feelings of inadequacy and avoidance behaviors associated with social anxiety discourage emerging adults from establishing these networks, which then places them at greater vulnerability to depression. Social anxiety encourages social isolation, which significantly increases the risk for depression.

Taken together, these findings highlight the significance of positive social relationships during emerging adulthood when young adults individuate from the family unit. The results suggest that individuals who are likely to generate interpersonal conflict (emerging adults high on the interpersonal hypersensitivity and antisocial conduct factors) and individuals who are likely to avoid social interaction (emerging adults high on social anxiety) are particularly vulnerable to the recurrence of depression. Engaging in these maladaptive social behaviors within the context of college life may place individuals at risk for depression recurrence.

In future research, exploration of mediators of the relationship between personality factors and recurrence of depression would enhance our understanding of the effect of Axis II pathology on major depression and inform treatment planning. Research based on the stress-generation hypothesis indicates that Cluster B personality disorder symptoms create greater risk for depression through the generation of interpersonal stress (Daley et al., 2006). Future research examining chronic interpersonal stress and episodic interpersonal stress as mediators of the relationship between personality factors and depression would inform future depression prevention efforts. Additionally, these predictive factors describe a pattern of failed social interactions or the anticipation of such failures. It is evident that social competence relates to the generation of interpersonal stress, which predicts depressive symptoms (Davila et al., 1995; Herzberg et al., 1998). The findings suggest that depression intervention and prevention programs for emerging adults will benefit from incorporating strategies to enhance coping with interpersonal rejection, to improve social skills deficits, and to reduce social avoidance.

There are limitations of this study examining a self-selected, previously depressed, emerging adult sample. The results may not generalize to individuals who experience their first depressive episode later in life. Nonetheless, the literature indicates that previously depressed emerging adults are at significant risk for recurrence of depression and need to be targeted for intervention prior to or early in the course of MDD (Fergusson & Woodward, 2002; Lewinsohn et al., 1999; Rohde et al., 2013).

Methodological advantages of the study's design include the application of a standardized clinical interview to assess personality pathology, the assessment of personality pathology while participants were not experiencing major depression, and the recruitment of participants at high risk for depressive recurrence due to early onset of depression. This research is innovative because it represents the first attempt to test latent factors of DSM-IV Axis II pathology as predictors of MDD recurrence. This investigation represents an additional step in explaining the effect of comorbid personality pathology on the course of MDD and treatment prognosis.

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