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Do Major Depressive Disorder and Dysthymic Disorder confer differential risk for suicide?

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Abstract

Background—Although there has been a tremendous amount of research examining the risk conferred for suicide by depression in general, relatively little research examines the risk conferred by specific forms of depressive illness (e.g., dysthymic disorder, single episode versus recurrent major depressive disorder [MDD]). The purpose of the current study was to examine differences in suicidal ideation, clinician-rated suicide risk, suicide attempts, and family history of suicide in a sample of outpatients diagnosed with various forms of depressive illness.

Methods—To accomplish this aim, we conducted a cluster analysis using the aforementioned suicide-related variables in a sample of 494 outpatients seen between January 2001 and July 2007 at the Florida State University Psychology Clinic. Patients were diagnosed using DSM-IV criteria.

Results—Two distinct clusters emerged that were indicative of lower and higher risk for suicide. After controlling for the number of comorbid Axis I and Axis II diagnoses, the only depressive illness that significantly predicted cluster membership was recurrent MDD, which tripled an individual's likelihood of being assigned to the higher risk cluster.

Limitations—The use of a cross-sectional design; the relatively low suicide risk in our sample; the relatively small number of individuals with double depression.

Conclusions—Our results demonstrate the importance of both chronicity and severity of depression in terms of predicting increased suicide risk. Among the various forms of depressive illness examined, only recurrent MDD appeared to confer greater risk for suicide.

Keywords

Suicide; Depression; Dysthymia

Depression is one of the most extensively studied risk factors for suicidal behavior. However, most prior work has focused on major depressive disorder (MDD) rather than dysthymic disorder. Individuals diagnosed with dysthymia experience depressive symptoms of lower intensity and usually of longer duration than individuals with MDD. On the one hand, one might predict that individuals with dysthymia would have a lower risk for suicide compared to those with MDD because dysthymia is a less acute disorder. On the other hand, one might expect to find greater risk among individuals with dysthymia due to the longer course of illness.

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Alternatively, the similar features of the disorders might indicate equal risk across diagnostic categories.

There is relatively little research on the lifetime risk for death by suicide for individuals with dysthymia compared to individuals with MDD. A meta-analytic study (Harris & Barraclough, 1997) found a standardized mortality ratio of 1212 for individuals diagnosed with dysthymia (i.e., a 12-fold increase in risk compared to the general population). This rate was substantially lower than the rate found for MDD (i.e., 2035). It is important to note, however, that eight of the nine dysthymia studies included in this meta-analysis were conducted before 1986. This is a particularly important issue considering the fact that there are significant differences between the *DSM-III* (American Psychiatric Association, 1980) and *DSM-IV* (American Psychiatric Association, 1994) definitions of dysthymia. Thus, it is possible that suicide rates for dysthymia that were estimated using an earlier edition of the *DSM* may not directly apply to current definitions.

Suicidal ideation and attempts have also been examined in relation to diagnoses of MDD and dysthymia. The limited literature that does exist presents a mixed picture. For example, one study (Haykal & Akiskal, 1999) presented data on outpatients and found greater risk for non-lethal suicidal behavior for patients with dysthymia (using *DSM-III* criteria) compared to MDD. However, in this study, 84% of the patients with dysthymia had previously experienced a major depressive episode; this indicates that these patients would more accurately be described as experiencing “double depression” rather than dysthymia. Others have found that individuals with MDD have a higher risk for non-lethal suicidal behavior than those with dysthymia (Schulberg et al., 2005). Still others have found that the likelihood of suicide attempts and ideation does not differ between people with dysthymia and MDD, using *DSM-III* criteria (Szadoczky et al., 1994), *DSM-IV* criteria (Bernal et al., 2007), and a combination of patients diagnosed with *DSM-III* and *DSM-IV* criteria (Chioqueta & Stiles, 2003).

The above studies provide preliminary information; however, the results are inconclusive. Additionally, each of these studies has at least one of the following limitations: using *DSM-III* criteria, having a small sample of people with dysthymia, not reporting current suicidal ideation levels, not reporting number of past suicide attempts, or combining subtypes of MDD. The purpose of the current report is to address these limitations by presenting data on suicidal ideation, suicide attempts, family history of suicide, and clinician-rated suicide risk in a sample of outpatients diagnosed with single episode MDD, recurrent MDD, dysthymia, and double depression (i.e., comorbid dysthymia and MDD) using *DSM-IV* criteria. Given the mixed and inconclusive nature of the extant literature on this topic, we seek to describe differences in suicidal behavior in our sample of patients with dysthymia and MDD if they exist. Our data will not only help to address a gap in the literature, but will also inform risk assessment for clinicians.

In order to accomplish this aim, we first present descriptive data for each of the suicide-related variables, separated by diagnostic category. However, thinking about each suicide indicator and its relation to various depressive diagnoses separately could prove cumbersome for daily clinical use, and one of our aims was to provide useful heuristic data for clinicians in terms of suicide risk. One way to accomplish this aim is to determine whether our four suicide-related variables clustered meaningfully together to denote higher and lower risk groups, which provides a more parsimonious indicator of current suicide risk for the clinician. In order to do this, we conducted a cluster analysis, utilizing four indices of suicide risk (i.e., past suicide attempts, current suicidal ideation, clinician rating of suicide risk, and family history of suicidal behavior) as clustering variables. We then conducted a series of logistic regressions to determine if each depressive diagnosis was predictive of cluster membership.

Method

Participants

The current sample consisted of 494 (267 women; 3 individuals have missing data for gender) consecutive adult patients seen between January 2001 and July 2007 at the Florida State University (FSU) Psychology Clinic, an outpatient community mental health center. All adult patients sign an informed consent form that has been approved by the Florida State University IRB, by which they acknowledge that their responses to questionnaires may be utilized for research purposes. The participants' ages ranged from 17 to 62 years old ($M = 26.21$ years, $SD = 9.21$). The racial/ethnic composition of this sample was generally representative of the overall patient population of the FSU Psychology Clinic, and consisted of 76% White (non-Hispanic), 8% Hispanic, 8% Black/African-American, and 4.5% Other (e.g., Asian/Pacific Islander, Native American) patients. There was no racial/ethnic information for 3.5% of the sample. The majority of the sample did not have a depressive disorder diagnosis (i.e., had never been diagnosed with any form of depression; 69.5%, $n = 344$). Of the depressive disorders, there were 66 people (13%) with recurrent MDD, 33 people (7%) with dysthymia, 28 people (6%) with single episode MDD, 14 people (3%) with double depression (i.e., comorbid MDD and dysthymia), 7 people (1.5%) with recurrent MDD in partial remission, and 2 people with single episode MDD in partial remission (0.4%). Of the 14 people diagnosed with double depression, 11 had been diagnosed with recurrent MDD and three had been diagnosed with single episode MDD. Due to the small number of people diagnosed with single episode and recurrent MDD in partial remission, we did not examine this group separately in the analyses below, although they were included in the overall sample for the cluster analysis.

The FSU Psychology Clinic provides a variety of services, of which the most frequently requested are individual therapy and assessment services. Assessments services are generally utilized for evaluations (e.g., disability, gifted) and specific types of testing (e.g., intelligence, learning disorder, Attention Deficit/Hyperactivity Disorder). One hundred three people (21%) from the current sample were assessment patients. Additionally, 71 people (14%) from the current sample were ordered by a Florida court of law to receive services at the clinic.

Measures

Suicide-related Variables—Items 1–19 of the Beck Scale for Suicide Ideation (Beck & Steer, 1991; BSS) were used as a continuous, self-report measure of suicidal ideation. Item 20 of the BSS was utilized as a categorical indicator of past suicide attempts. Family history of suicide was used as a rough proxy for a genetic vulnerability for suicidal symptoms. On a self-report form, patients were asked whether their family had a history of suicide (yes or no). Clinician ratings of suicide risk were based on the FSU Psychology Clinic's standardized assessment protocol for rating suicide risk (Joiner et al., 1999). This variable was utilized as a continuous measure in our cluster analysis. Patients were asked about the nature of past and current suicidal symptoms (e.g., suicidal ideation, resolved plans and preparations, hopelessness, number of past attempts). The information gathered was then used on a continuous scale to designate an individual at low, low to moderate, moderate, moderate to high, high, high to severe, or severe risk for suicide (see Van Orden et al. 2008, for a more detailed account of the protocol). A random sample of 86 patients was selected for reliability analysis. Advanced graduate students with training in administering the standardized risk assessment protocol were given access to the risk assessment forms that had been administered by the patients' therapists. Each patient was rated by one of the three raters, who were blind to the original risk designation as well as patient identity. Inter-rater reliability between the blind raters and original clinician ratings was adequate (single measure intra-class correlation coefficient for absolute agreement = 0.84, $p = 0.00$). Furthermore, in our sample, the clinician

ratings were correlated with BSS scores ($r = .64, p = .000$) in the expected direction, which provides evidence for their validity.

Additional variables—Psychosocial functioning was assessed with the Global Assessment of Functioning (American Psychiatric Association, 2000; GAF) scale during the patients' screening session. GAF scores were only available for 483 patients (98%). We measured depressive symptoms with the Beck Depression Inventory (Beck et al., 1979; BDI); it was only available for 475 patients (96%). The Beck Anxiety Inventory (Beck & Steer, 1990; BAI) was utilized to assess anxiety-related symptoms and was only available for 393 patients (80%).

Psychiatric Diagnoses—Following screening, individual patients were seen by their assigned therapist for at least one intake session. During the intake session, Axis I diagnosis was determined through an interview conducted by advanced therapists in a doctoral training program with either the Mini International Neuropsychiatric Interview (Sheehan et al., 1998; MINI) for individuals seen before September 2005 and with selected modules from the Structured Clinical Interview for DSM-IV disorders (First et al., 1995; SCID-I) for individuals seen beginning in September 2005. These modules were determined by the information patients provided during the screening interview. Jones and colleagues (2005) provide data indicating that the prevalence of Axis I diagnoses determined using the SCID versus the MINI is very similar (e.g., 17.2% vs. 16.7% for Major Depressive Episodes; 4% vs. 2.9% for dysthymia), which indicates that it is appropriate to combine patients diagnosed using these different interviews. Axis II diagnoses were determined through the use of the SCID-II (First et al., 1997) and/or diagnostic interviews similar to the SCID-II.

Between the intake and first therapy session, diagnoses were decided upon by the therapist and supervisor following extensive review of the results of the diagnostic interviews and self-report measures completed during screening. In order to assess for the validity/reliability of these diagnoses, the first and second authors (T.W. & K.T.) each reviewed a randomly selected sample of 23 patient files for patients that were not originally assigned to them as student therapists (a total of 46 files). The raters were blind to the original therapist diagnosis and only used notes written during the intake sessions to decide upon a diagnosis. Kappa's ranged from 0.48–0.88 with the exception of MDD Recurrent (partial remission), which received a kappa of $-.02$. In this case, there was only one instance in which the rater gave this diagnosis and only one instance in which the original clinician gave this diagnosis, and these were for two different cases. Bruckner and Yoder (2006) discuss the limitations of kappa when evaluating the reliability of a phenomenon that occurs at a base rate that deviates significantly from 50% (i.e., kappas will be artificially low). The authors provide a means by which to estimate rater accuracy by estimating the base rate of the phenomenon in question (in this case the diagnosis) by averaging the base rate obtained by the two raters. Using this procedure, the accuracy of our diagnoses ranged from .90 and above for all diagnoses other than MDD recurrent (partial remission).

Procedure

All data were collected at the initial screening interview, with the exception of the patients' individual diagnosis(es). During the preliminary screening interview patients discussed their presenting problems and the appropriateness of the clinic's services for their problems with the screening therapist. The clinic only excludes individuals who imminently pose a threat to themselves or others and therefore need to be hospitalized. Post-stabilization, these patients often return to the clinic to receive outpatient services.

Only individuals with complete data for each of the suicide-related variables who completed an intake interview with a therapist were included in our sample. In order to have complete

data, a patient needed to complete the application for therapy, complete a screening interview, complete a battery of questionnaires at the screening interview, and attend intake sessions with his/her assigned therapist, which were necessary in order to determine patient diagnosis. All adult patients who completed the aforementioned tasks (and associated measures) were included in our sample.

Data Analysis

Cluster analysis is an exploratory data analytic procedure that attempts to uncover groups of individuals who “cluster” together based upon their similarity as measured by relevant variables. In the current study, we were interested specifically in variables related to suicidal behavior; our goal was to group a large group of clinical outpatients into clusters indicative of suicide risk. This procedure assigns each individual to a cluster of like individuals. Once this has been accomplished, the researcher is able to utilize this cluster membership variable in subsequent analyses. In our case, our aim was to determine if various forms of depressive illness are predictive of membership in a cluster that indicates higher risk for suicide. To accomplish this, we conducted a series of logistic regressions, with the cluster variable as the criterion variable and type of depressive diagnosis as the predictor (i.e., present versus absent), controlling for number of Axis I and Axis II diagnoses. The entire sample was utilized for all of our analyses.

We utilized the Macintosh SPSS version 16.0.2 (SPSS, 2008) to conduct our cluster analysis. Given that our clustering variables were a mixture of continuous (i.e., scores on the BSS, clinician ratings of suicide risk) and categorical (i.e., number of past suicide attempts, family history of suicide) variables, we opted to conduct a two-step cluster analysis, using the log-likelihood as our distance measure between clusters.

Results

Descriptive statistics and bivariate correlations for the measures utilized in the current study can be found in Table 1. We also provide 95% confidence intervals around the means (for the continuous clustering variables) and proportions (for categorical clustering variables), grouped by depressive diagnosis in Table 2. For all proportions described in this paper, we calculated 95% confidence intervals around the proportions using the procedure described by Lane (2008), applying the correction for continuity to adjust for the fact that the sampling distribution for proportions is not continuous.

In general, examination of the suicide-related variables individually indicated that among the various forms of depressive diagnoses, only individuals with recurrent MDD appeared to be distinct from non-depressed patients in terms of having higher levels of suicide-related variables. We do, however, feel that it is important to acknowledge that the small sample size of the double depression group limits our ability to make meaningful comparisons with this group. Indeed, examination of the descriptive statistics for individuals diagnosed with double depression indicates that their scores appear to be more similar to those in the recurrent MDD group than they are to individuals who are non-depressed, have dysthymia, or have been diagnosed with single episode MDD.

Cluster Analysis

We determined the optimal number of clusters for our data to be two, based upon the dramatic decrease in Bayesian Information Criterion (BIC) at this point (−631.30) and the fact that the ratio between distance measures was at a maximum with the two-cluster solution (this indicates the solution for which the clusters are most distinct from one another; Amato & Hohmann-Marriott, 2007). The ratio of distance measures was 2.70 for the two-cluster solution, compared

to 1.45 for the three-cluster solution. SPSS 16.0.2 provides output for each cluster indicator that illustrates whether it was important in determining cluster membership. This is demonstrated by whether the distribution of categorical variables in each cluster differs from the overall distribution and whether the mean of continuous variables in each cluster differs from the overall mean (Norusis, 2007). All four indicators were deemed to be important in determining cluster membership for both clusters.

Examining the characteristics of these clusters reveals that Cluster 1 ($n = 349$) appears to be the group at lower risk for suicide, whereas Cluster 2 ($n = 145$) is at higher risk. In Table 3 we provide descriptive statistics for the clustering variables separately for the clusters. Given that cluster analysis is a data-driven procedure, it is important to verify that the clusters that are generated are meaningful both theoretically and clinically. The descriptive statistics for our clusters give evidence for the clinical validity of the cluster designation; comparisons of the clusters on our indices of suicide risk reveal meaningful, clinically observable differences between the groups, with individuals in cluster 2 showing higher scores on all of the suicide-related variables.

As would be expected in a group of people at higher risk for suicide, the individuals in cluster 2 (i.e., the higher risk group) have higher scores on the BDI ($F[1, 473] = 82.26, p < .001$, Cohen's $d = .91$) and BAI ($F[1, 391] = 37.21, p < .001$, Cohen's $d = .68$) and lower Global Assessment of Functioning (GAF) scores ($F[1, 481] = 49.69, p < 0.001$, Cohen's $d = -.70$) than the individuals in cluster 1. In regards to demographic variables, the individuals in the higher risk cluster were significantly older ($F[1, 492] = 7.39, p < 0.01$, Cohen's $d = .27$). The clusters did not differ in terms of ethnicity ($\chi^2[4, N = 477] = 6.13, p = .19$) or by gender ($\chi^2[1, N = 491] = 2.95, p = .09$), although there was a trend toward Cluster 2 having a higher proportion of females than Cluster 1. See Table 3 for descriptive statistics and 95% confidence intervals for all of these variables.

Diagnostic Prediction of Cluster Membership

After categorizing each patient into these clusters, we proceeded to conduct logistic regressions with each of the depressive diagnoses as predictors and cluster membership as the criterion variable, the results of which are presented in Table 4. In each of these regressions, we entered the overall number of Axis I diagnoses (not including depressive diagnoses) and the number of Axis II diagnoses into step 1 to control for comorbidity; depressive diagnosis was entered into step 2. The overall number of comorbid Axis I diagnoses was not a significant predictor of whether an individual was a member of the higher versus the lower risk cluster ($B = .07$, $SE B = .13, p = .61$). However, the overall number of comorbid Axis II diagnoses was a significant predictor ($B = .87, SE B = .27, p = .001$), more than doubling the likelihood that an individual was a member of the higher risk cluster.

In terms of the depressive diagnoses, only the presence of recurrent MDD was a significant predictor of cluster membership ($B = 1.27, SE B = .27, p < .0001$). Specifically, individuals with recurrent MDD were three and one-half times more likely to be a member of the higher risk cluster than a member of the lower risk cluster, even after controlling for the number Axis I and Axis II diagnoses. This relationship also persisted after applying a Bonferroni correction for the number of regressions that we ran (i.e., reducing alpha to 0.0125). None of the other depressive diagnoses were significant predictors of cluster membership.

In sum, our cluster analysis revealed two clinically meaningful and distinct clusters of individuals at higher and lower risk for suicide. The only depressive diagnosis that was predictive of cluster membership was recurrent MDD; the number of comorbid Axis II diagnoses was also predictive.

Discussion

The purpose of the present study was to examine differences in current suicide risk variables among outpatients diagnosed with various depressive disorders according to *DSM-IV* criteria. To our knowledge, this is the first study that examines separate forms of depressive illness using multiple indicators of suicide risk (i.e., current ideation, past attempts, clinician ratings of suicide risk, family history of suicide). Our study is further notable in that our sample consisted of unselected community outpatients, which points to the external validity of our findings.

Only one depressive diagnosis was consistently associated with elevated suicide risk: recurrent MDD. A cluster analysis of the four suicide risk variables provided a method for classifying patients' suicide risk, as two distinct clusters of higher-risk and lower-risk patients emerged. Results based on the cluster analysis were similar to results examining the measures individually and showed that the presence of recurrent MDD significantly increased the likelihood of an individual being a member of the higher-risk cluster. In contrast, the presence of single episode MDD, dysthymia, or double depression did not predict cluster membership, although the small number of patients with double depression may have limited our power to detect a relationship. In sum, our results indicate that the presence of recurrent MDD is significantly associated with elevated suicide risk, whereas the presence of other forms of depressive illness does not necessarily indicate higher suicide risk compared to clinical outpatients with other mental disorders.

Previous research has shown that severity (Kessing, 2004), recurrence, (Merikangas et al., 1994; Oquendo et al., 2006), and chronicity (Szadoczky et al., 1994) of depression are predictive of fatal and non-fatal suicide attempts. Our finding that a severe, chronic, and recurrent form of depressive illness (i.e., recurrent MDD) was predictive of suicide risk is consistent with this prior work. If anything, the single episode MDD patients (i.e., severity without recurrence) exhibited slightly lower risk for suicide than non-depressed individuals, at least in terms of past suicide attempts. The dysthymia patients (i.e., chronicity with less severity) also tended to be at lower risk than the recurrent MDD group. It is important to note that our sample of patients with double depression (i.e., greater chronicity than recurrent MDD plus severity) did show high scores on the suicide risk variables relative to other groups, although these differences were not statistically significant.

Our study builds upon prior work in that we were able to examine diagnostic differences among multiple indicators of current suicide risk and were able to specifically examine individuals with dysthymic disorder. It is noteworthy that dysthymia seemed to be less severe in terms of suicide risk in our sample. In terms of dysthymia, it may be that our dysthymic sample represented a less severe group than previous studies of dysthymia and chronic depression. For example, in their studies of dysthymia, Klein and colleagues (Klein et al., 2006) reported that 78% of the participants with dysthymia also had superimposed MDD episodes, whereas none of our dysthymic patients had ever experienced a depressive episode (otherwise they would have been categorized as "double depression"). Thus, it may be that our sample of dysthymic participants represented an early stage in the development of the disorder, which could account for their less severe presentation. Indeed, it is important to keep in mind that our study was examining current levels of suicide risk as opposed to predictors of future suicide attempts. It very well could be that the individuals with dysthymia in our sample may appear to be at reduced risk for suicide currently but that their lifetime risk for suicide is higher, especially given the evidence that many people with dysthymia will eventually receive an MDD diagnosis. It is also possible that our findings are representative of individuals who have been diagnosed with pure dysthymia, which may not increase suicide risk, and that risk conferred by double

depression (i.e., dysthymia and MDD) is truly a function of MDD diagnosis as opposed to the co-occurrence of dysthymia and MDD.

Our results point to the importance of further research among the various subtypes of depressive illness. Despite the fact that dysthymic disorder and MDD are both characterized by dysphoric mood, these groups appear to represent different suicide risk category designation. Although we have provided rather compelling evidence that recurrent MDD differs from single episode MDD and dysthymia in terms of current suicide risk, further research is needed to determine whether double depression confers even greater risk than recurrent MDD. Our findings provide fertile ground for future longitudinal research on depressive diagnoses and suicidal behavior and more specific examinations of individuals diagnosed with double depression.

The clinical implications of these findings underscore the fact that a clinical diagnosis should not serve as a primary means of informing suicide risk assessment. Rather, attention should be given to a variety of risk factors, including but certainly not limited to diagnosis, particularly those that have the highest predictive utility (e.g., past suicidal behaviors combined with current resolved suicide plan characterized by clear or inferred intent; Joiner et al., 2005).

Several limitations of the study are important to note. As stated previously, the sample size of our double depression group was small, which yielded large confidence intervals. Furthermore, most of the individuals in this diagnostic group had been diagnosed with comorbid recurrent MDD and dysthymia. Future research should not only examine whether double depression in general confers greater risk than recurrent MDD but also whether various forms of double depression (i.e., recurrent MDD versus single episode MDD) confer greater suicide risk. Along these lines, previous researchers (e.g., Haykal & Akiskal, 1999) have found that dysthymia without comorbid MDD is rare in clinical settings. However, in our sample, “pure” dysthymia occurred more frequently than double depression. Although it is possible that this is due to misdiagnosis, we feel that it is unlikely that past major depressive episodes were missed by the majority of clinicians. Furthermore, if it were the case that most of our patients with dysthymia actually had double depression, we would expect the opposite of what we found; that is, people with dysthymia would appear to be more similar to those with recurrent MDD. Instead, we found that the individuals with double depression had similar risk for suicide (albeit with wide confidence intervals) to those with recurrent MDD, whereas the individuals with dysthymia appeared to have lower risk. Still, it is possible that our sample of individuals with dysthymia is not representative of all clinical populations; nevertheless, our results provide important information regarding suicide risk of those (possibly rare) individuals with pure dysthymia.

Another limitation of the current study is the relatively low rate of suicide risk in our sample compared to some other clinical settings, such as inpatient hospitals, although it is important to note that patients in our clinic have elevated suicide risk compared to most individuals in the general population. Furthermore, our study was cross-sectional. Thus, although we collected data on the course of depressive diagnoses during clinical interviews, patients may have had difficulty reporting past symptoms, and so we do not have as much information about course as a study with repeated assessments. Also, because the study was cross-sectional, we had no available data on deaths by suicide or future suicidal behavior. Finally, because cluster analysis is a data-driven procedure, it will be important to replicate the cluster analysis to determine if the same pattern of results holds in another sample.

Despite these limitations, our results offer an important examination of suicide risk across a variety of depressive diagnoses. Results suggest most depressive diagnoses did not reliably differentiate between higher and lower risk groups. Certain forms of depressive illness, most notably recurrent MDD, do appear to confer heightened suicide risk. Future studies are needed

to elaborate the mechanisms of this risk and its theoretical significance for our understanding of the disorders.

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Table 1
Descriptive Statistics and Intercorrelations between all variables

	1	2	3	4	5	6	7	8
1. BSS Score	--							
2. Clinician Ratings of Suicide Risk	.64**	--						
3. Number of Past Attempts	.42**	.59**	--					
4. Family History of Suicide	.09	.14**	.20**	--				
5. GAF	-.32**	-.36**	-.29**	-.15**	--			
6. BDI Score	.52**	.42**	.34**	.13**	-.56**	--		
7. BAI Score	.35**	.30**	.27**	.12*	-.37**	.58**	--	
8. Client Age	.15**	.15**	.14**	.10*	-.25**	.18**	.10*	--
Continuous Variables								
BSS Score	Mean 1.91	SD 4.58	Range 29	SEM .21	95% CI 1.50–2.31			
Clinician Risk Rating	1.17	0.44	3	.02	1.14–1.21			
GAF	64.46	12.42	78	.57	63.35–64.57			
BDI Score	14.75	11.62	57	.53	13.70–15.80			
BAI Score	14.70	12.50	54	.63	13.46–15.94			
Categorical Variables								
Number of past attempts								
0 attempts = 415 (84%)								
1 attempt = 56 (11%)								
2 or more attempts = 23 (5%)								
Family History of suicide								
No = 433 (88%)								
Yes = 61 (12%)								

Note. N = 494. BSS = Beck Scale for Suicidal Ideation; GAF = Global Assessment of Functioning; BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory. Family History is coded such that 0 = no family history of suicide and 1 = family history of suicide; Number of past attempts is coded such that 0 = no previous attempts; 1 = single attempt; 2 = 2 or more attempts.

**
p < .01

*
p < .05; all else p > .05.

Table 2
Descriptive statistics for the continuous and categorical clustering variables, separated by depressive diagnosis

Depressive Diagnosis	BSS score Mean (95% CI)	Clinician ratings of suicide risk Mean (95% CI)	Past suicide attempts 1 attempt Percentage (95% CI)	Past suicide attempts 2 or more attempt Percentage (95% CI)	Family History of Suicide Percentage (95% CI)
No Depression (<i>n</i> = 344)	1.17 (0.77–1.56) ^a	1.10 (1.07–1.14) ^a	7 (4–10) ^{a,b}	4 (2–6)	12 (8–16)
Dysthymia (<i>n</i> = 33)	1.94 (0.84–3.04) ^a	1.21 (1.06–1.36)	21 (6–36) ^b	6 (0–16)	6 (0–16)
Single Episode MDD (<i>n</i> = 28)	2.75 (0.86–4.64)	1.20 (1.01–1.38)	0 (0–2) ^a	0 (0–2) ^a	7 (0–18)
Recurrent MDD (<i>n</i> = 66)	5.05 (3.40–6.69)	1.51 (1.34–1.68)	24 (13–35) ^b	12 (03–21) ^b	20 (10–30)
Double Depression (<i>n</i> = 14)	4.07 (0–8.55)	1.32 (0.90–1.74)	21 (0–46)	0 (0–4)	21 (0–46)

^a *Note.* Significantly different from recurrent MDD (current)

^b Significantly different from single episode MDD (current). Unless specified otherwise, there were not significant differences across diagnostic categories.

Table 3
Descriptive statistics for the variables, separated by cluster

	Cluster 1 (n = 349)		Cluster 2 (n = 145)	
Continuous Variables	M(SD)	95% CI	M(SD)	95% CI
BSS Score	0.65(1.84)	0.45–0.84	4.93(7.10)	3.77–6.10
Clinician Risk Rating	1.01(0.06)	1.00–1.01	1.58(0.65)	1.47–1.68
BDI Score (N=475)	11.84(10.02)	10.77–12.92	21.62(12.27)	19.58–23.67
BAI Score (N=393)	12.34(11.33)	11.01–13.68	20.46(13.40)	17.97–22.94
GAF (N = 483)	66.91(11.41)	65.69–68.12	58.58(12.81)	56.45–60.70
Client Age	25.49(8.57)	24.59–26.40	27.95(10.42)	26.24–29.66
Categorical Variables	Cluster 1 (n = 349)		Cluster 2 (n = 145)	
Number of past attempts	n(%)	95% CI	n(%)	95% CI
0 attempts	349 (100%)	100–100%	66 (46%)	38–54%
1 attempt	0 (0%)	0–0%	56 (39%)	31–47%
2 or more attempts	0 (0%)	0–0%	23 (16%)	10–22%
Family History of suicide				
No	349 (100%)	100–100%	84 (58%)	50–66%
Yes	0 (0%)	0–0%	61 (42%)	34–50%
Gender				
Male	167(48%)	43–53%	57(39%)	31–47%
Female	179(52%)	47–57%	88(61%)	53–69%
Ethnicity (N = 477)				
American Indian/ Alaskan Native	6(2%)	0–4%	1(1%)	0–3%
Asian Pacific Islander	10(3%)	1–5%	5(4%)	0–8%
African American/Black	22(7%)	4–10%	15(11%)	6–17%
Hispanic/Latino	34(10%)	7–13%	7(5%)	1–9%
White/Non-Hispanic	264(79%)	74–84%	113(80%)	73–87%

Note. BSS = Beck Suicide Scale; BDI = Beck Depression Inventory, BAI = Beck Anxiety Inventory; GAF = Global Assessment of Functioning; M = Mean; SD = standard deviation; CI = Confidence Interval

Hierarchical logistic regression analysis predicting cluster membership (i.e., low risk versus high risk) for entire sample ($N = 494$).

Table 4

Step	Variable	Statistics at entry					Final Model					
		df	B	SE B	Wald	OR	p	B	SE B	Wald	OR	p
1 ^a	Comorbid axis I diagnoses	1	.07	.13	0.27	1.07	.61	.04	.14	0.10	1.04	.75
	Comorbid axis II diagnoses	1	.87	.27	10.86	2.39	.001	.77	.27	8.06	2.16	.005
2 ^b	Recurrent MDD	1	1.27	.28	21.10	3.54	.000	1.27	.28	21.10	3.54	.000
1 ^a	Comorbid axis I diagnoses	1	.07	.13	0.27	1.07	.61	.07	.13	0.31	1.08	.58
	Comorbid axis II diagnoses	1	.87	.27	10.86	2.39	.001	.87	.27	10.84	2.39	.001
2 ^c	Dysthymia	1	.25	.38	0.45	1.29	.50	.25	.38	0.45	1.29	.50
1 ^a	Comorbid axis I diagnoses	1	.07	.13	0.27	1.07	.61	.07	.13	0.27	1.07	.61
	Comorbid axis II diagnoses	1	.87	.27	10.86	2.39	.001	.87	.27	10.84	2.39	.001
2 ^d	Single episode MDD	1	.13	.42	0.10	1.14	.76	.13	.42	0.10	1.14	.76
1 ^a	Comorbid axis I diagnoses	1	.07	.13	0.27	1.07	.61	.08	.13	0.33	1.08	.57
	Comorbid axis II diagnoses	1	.87	.27	10.86	2.39	.001	.86	.27	10.30	2.35	.00
2 ^e	Double depression	1	.51	.56	0.81	1.66	.37	.51	.56	0.81	1.66	.37

Note. OR = Odds Ratio; MDD = Major Depressive Disorder.

^a $\chi^2 = 10.78$, $df = 2$, $p = 0.005$

^b $\chi^2 = 21.05$, $df = 1$, $p = 0.000$

^c $\chi^2 = 0.44$, $df = 1$, $p = .51$

^d $\chi^2 = 0.09$, $df = 1$, $p = .76$

^e $\chi^2 = 0.78$, $df = 1$, $p = .38$