The association between suicidal ideation and lifetime suicide attempts is strongest at low levels of depression

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ABSTRACT

Suicidal ideation and depression alone are poor predictors of subsequent engagement in suicidal behavior. Evidence suggests, however, that the lethargy associated with depression may serve as a protective factor against suicide attempts. The purpose of this study was to examine whether suicidal ideation and depression symptoms interact in relation to lifetime suicide attempts among a sample of psychiatric outpatients. A sample of 739 psychiatric outpatients (M_{age} = 27.26, 60.8% female, 73.3% White/European American) from a university-affiliated clinic completed a battery of self-report measures prior to their initial intake appointments. Consistent with hypotheses, a significant interaction emerged between suicidal ideation and depression symptoms in association with lifetime suicide attempts, such that the relationship between suicidal ideation and lifetime suicide attempts was strongest at low, as opposed to high, levels of depression. These findings align with previous research suggesting that lethargy may be a protective factor against suicide attempts, and conversely, that heightened arousal may serve as a suicide risk factor. Our results also point to a configuration of suicidal ideation and depression symptoms that might reflect higher suicide risk.

1. Introduction

Identifying individuals at highest risk for suicide is critical, given that over 800,000 individuals die by suicide each year (World Health Organization [WHO], 2014). Moreover, it is imperative to understand risk and protective factors that influence engagement in suicidal behavior, specifically, in the context of suicidal desire (Klonsky and May, 2014). Although many individuals have thoughts of suicide, far fewer go on to make a suicide attempt (Borges et al., 2012; Kessler et al., 1999), and suicidal ideation alone is an imprecise predictor of suicidal behavior (Borges et al., 2008; Fowler, 2012). Likewise, depression—which is oft-cited as a significant risk factor for suicide—is associated with suicidal desire, but it does not distinguish those who desire suicide from those who go on to make a suicide attempt (May and Klonsky, 2016). In recognition of the differentiation between factors predicting suicidal thoughts and factors predicting suicidal behaviors, several theories positioned with an ideation-to-action framework have been proposed, including the interpersonal theory of suicide (Van Orden et al., 2010), integrated motivational-volitional model of suicidal behavior (O'Connor, 2011), and three-step theory of suicide (Klonsky and May, 2015).

Beyond these theoretical frameworks, configurations of symptoms indicative of high suicide risk, consistent with ideation-to-action

frameworks, have been proposed. For instance, Joiner and Stanley (2016) theorized that acute suicidal crises are often characterized by the simultaneous activation of seemingly paradoxical yet compatible shutdown (i.e., dysphoric, withdrawn) and overarousal (i.e., high-energy, agitated) states. This pattern has been observed using the MMPI-2-RF in a sample of psychiatric outpatients with suicidal ideation, such that individuals high on RCd (i.e., demoralization, characterized by negative affectivity broadly, including depression and anxiety) and high on RC9 (i.e., hypomanic activation, characterized by high energy, sensation-seeking, and poor impulse control) were most likely to have made a suicide attempt (Stanley et al., 2018). Likewise, depressive mixed states with psychomotor agitation, otherwise referred to as "agitated unipolar depression" (Akiskal et al., 2005), marked by psychic and motor agitation, intense emotional tension, and/or crowded thoughts (Koukopoulos and Koukopoulos, 1999), have been strongly linked to suicidal behavior (Balázs et al., 2006; Popovic et al., 2015; Sani et al., 2011).

The lethargy that often accompanies depressive episodes may deter, and thus be protective against, suicidal behavior, in that those experiencing prominent depression symptoms, absent psychomotor agitation and irritability, may actually be at *lower* risk for making a suicide attempt because they lack the energy and motivation to engage in suicidal actions. This idea is consistent with past research examining unique

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associations of depression and suicidal ideation with a collection of other clinical symptoms associated with suicide risk (Rogers et al., 2016). Specifically, in a sample of psychiatric outpatients, suicidal ideation was uniquely related to thwarted interpersonal needs, fearlessness about death, externalizing symptoms, and lifetime suicide attempts after partialing out depression symptoms. In contrast, depression, in the absence of suicidal ideation, was unrelated to past suicidal behavior. Rogers et al. (2016) advocated for the distinction of two domains of suicidal ideation: "desire" (reflecting depression symptoms and passive ideations) and "will" /resolve (reflecting fearlessness, self-sacrifice, and externalizing symptoms, including high energy).

Together, these findings suggest that examination of suicidal ideation in the context of depression symptoms may be an avenue through which individuals at high risk for suicide may be detected. Importantly, measures of depression and suicidal ideation are brief and often integrated into clinics' standard batteries, making this a feasible method of quickly screening for suicide risk. Accordingly, the present study aimed to examine whether depression symptoms and suicidal ideation interact in relation to past suicide attempts (one potential marker of suicide risk; Borges et al., 2006; Bostwick et al., 2016). We specifically hypothesized that individuals at high levels of suicidal ideation and low levels of depression symptoms would be most likely to report a past suicide attempt. Further, we examined whether this interaction persisted beyond a variety of sociodemographic characteristics that have been linked to increased suicide risk (i.e., age, gender, race/ethnicity).

2. Methods

2.1. Participants and procedures

Participants were 739 psychiatric outpatients (60.8% female) receiving psychological services at a university-affiliated clinic in the southeastern United States. Although the clinic is university-affiliated, a large proportion of its clientele is from the surrounding community. Namely, in this sample, 45.6% of participants were not current undergraduate students. Due to the clinic's sliding scale fees, a notable portion of patients are of lower socioeconomic status. Exclusionary criteria are minimal: individuals are only referred elsewhere if they are suffering from an acute psychotic- or bipolar-spectrum disorder that is not medically stable or if they are at very imminent risk of harm to themselves or others; in these rare instances, inpatient hospitalization is arranged. Overall, individuals present with a variety of conditions that range in severity. In this sample, approximately half (45.6%) presented with current suicidal/death ideation, as evidenced by a non-zero score on any item of the Beck Scale for Suicide Ideation (BSS; Beck and Steer, 1991). Approximately one-quarter reported a history of suicide attempts (21.9%).

Ages ranged from 18 to 71 years ($M = 27.26$, $SD = 10.67$), and participants self-identified as primarily White/European American (73.3%), with 11.0% Hispanic, 10.7% Black/African American, 1.8% Asian/Pacific Islander, and 0.4% American Indian/Native American; 21 participants (2.8%) did not specify an ethnicity. Most participants reported never having been married (79.0%; 10.6% Married, 8.4% Divorced, 1.4% Separated, 0.7% Widowed). The sample was relatively well-educated, with 2.2% not having completed high school, 15.4% earning a high school diploma or its equivalent, 1.6% receiving vocational training, 53.3% completing some college, 19.4% earning a bachelor's degree, and 8.2% completing postgraduate training.

All outpatients seeking treatment completed a large battery of self-report questionnaires at intake prior to receiving psychological services. The data presented in this study are drawn from this battery of questionnaires; importantly, this study represents a secondary analysis of existing archival data, such that data were not collected for these specific hypotheses. Informed consent was obtained from all participants and was not a prerequisite to receiving psychological services; all procedures were approved by the university's Institutional Review Board.

2.2. Measures

2.2.1. Beck depression inventory – II (BDI-II; Beck et al., 1996b)

The BDI-II is a 21-item self-report measure that assesses the severity of depression symptoms within the past two weeks. Items are rated on a 4-point scale ranging from 0 to 3, with higher scores reflecting greater depression severity. Due to the specific analyses being conducted in this study, Item 9, which assesses the presence and severity of suicidal thoughts, was omitted from the total score. The BDI-II has demonstrated strong psychometric properties in previous research (Beck et al., 1996a); internal consistency was excellent ($α = 0.93$) in the present sample.

2.2.2. Beck scale for suicide ideation (BSS; Beck and Steer, 1991)

The BSS is a 21-item self-report measure that assesses the severity of suicidal ideation, intentions, and plans within the past week. Respondents rate each item on a 3-point scale ranging from 0 to 2, with higher scores reflecting more severe suicidal ideation and intent. The first 19 items of the BSS comprise a suicidal ideation total score, whereas Items 20 and 21 provide information on the presence of and wish to die during past suicide attempts. In this study, the BSS total score was utilized as a measure of suicidal ideation, and Item 20 (0 = I have never attempted suicide/1 = I have attempted suicide once/2 = I have attempted suicide two or more times) was used as a metric for the presence/absence (i.e., dichotomized as 0 = absence and 1 = presence) of past suicide attempts. Psychometric properties of the BSS are strong (Beck et al., 2006), and internal consistency in this sample was excellent ($α = 0.94$).

2.3. Data analysis

First, descriptive statistics and bivariate correlations were computed to determine the normality and interrelatedness of all variables. BSS suicidal ideation exhibited significant positive skew and underwent a logarithmic transformation to correct for non-normality, resulting in diminished skewness (0.97) and kurtosis (-0.40).[1] Descriptive statistics are presented prior to this transformation for ease of interpretation, but all multivariate analyses (i.e., bivariate correlations, moderation analyses) were conducted after this variable transformation. Moderation analyses were conducted using the PROCESS macro (Hayes, 2013). The PROCESS macro, which is appropriate for use with both continuous and binary outcome variables, uses a regression-based path analytic framework to test interactions; the macro automatically centers variables prior to conducting the moderation analysis and reports simple slopes and related confidence intervals to facilitate post-hoc probing of interactions. Interactions were probed at low (1 SD below the mean) and high (1 SD above the mean) levels of BDI-II depression. A variety of sociodemographic characteristics (age, sex, dummy-coded ethnicity) were included as covariates due to their associations with suicide attempts. Missing data were minimal (0.5%) and handled via listwise deletion (i.e., participants were excluded if they were missing values on any variable in analyses, with 6 participants in this sample being excluded from moderation analyses); analyses were conducted using SPSS 23.0.

3. Results

Descriptive statistics and bivariate correlations are presented in Table 1. As expected, BSS suicidal ideation was strongly related to BDI

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[1] These findings were generally equivalent when (1) the BSS did not undergo any transformation to correct for non-normality, and (2) univariate outliers on the BSS were recoded to the maximum allowable value (median ± two interquartile ranges = 6), suggesting the replicability of our findings across different data management strategies.

Table 1
Descriptive statistics and bivariate correlations of all study variables.

Variable	BDI-II	BSS	SA	Age	Sex
BDI-II	1				
BSS	.60***	1			
SA	.38***	.62***	1		
Age	.17***	.10**	.18***	1	
Sex	−.16***	−.11**	−.14***	0.02	1
White	0.01	−0.01	−.08*	0.06	−0.04
Black	−0.03	−0.02	0.04	0.03	0.03
Hispanic	−.09*	−0.02	0.01	−.16**	0.06
Asian	.12**	0.06	0.00	−0.01	−0.04
Native	.10**	.09*	.12**	.08*	−0.01
Mean	20.75	3.24	–	27.26	–
SD	12.68	5.96	–	10.67	–
Range	0–57	0–35	–	18–71	–
Skew	0.30	2.44	–	1.66	–
Kurtosis	−0.59	6.09	–	2.11	–

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. SD = Standard deviation; BDI-II = Beck depression inventory – II; BSS = Beck scale for suicide ideation; SA = Suicide attempt. Sex: 1 = Female, 2 = Male. Descriptive statistics are not provided for dichotomous variables, nor are correlations presented between dummy-coded variables, as these categories were mutually exclusive. Correlations between continuous and dichotomous variables are point-biserial correlations, and correlations between two dichotomous variables represent Phi correlations.

depression ($r = 0.60$, $p < .001$) and a lifetime history of suicide attempts ($r = 0.62$, $p < .001$), where BDI depression and a lifetime history of suicide attempts were moderately positively correlated ($r = 0.38$, $p < .001$). Additionally, age ($r = 0.18$, $p < .001$) and identifying as Native American ($r = 0.12$, $p = .001$) were positively associated with the presence of a lifetime suicide attempt with small effect sizes, identifying as White was negatively associated with the presence of a lifetime suicide attempt with a small effect size ($r = -0.08$, $p = .030$), and females were more likely to have attempted suicide in the past ($r = -0.14$, $p < .001$), with a small effect size. Thus, age, gender, and ethnicity were all entered as covariates in the primary models.

In our moderation model (Nagelkerke $R^2 = 0.54$), the interaction between BDI depression and BSS suicidal ideation in association with a lifetime suicide attempt was significant ($B = -0.02$, $SE = 0.01$, $p = .026$, $f^2 = 0.01$, $OR = 0.98$), above and beyond the main effects of BDI depression ($B = 0.01$, $SE = 0.01$, $p = .276$, $f^2 = 0.004$, $OR = 1.02$), BSS suicidal ideation ($B = 1.77$, $SE = 0.17$, $p < .001$, $f^2 = 0.49$, $OR = 5.76$), participant age ($B = 0.04$, $SE = 0.01$, $p < .001$, $f^2 = 0.05$, $OR = 1.04$), participant sex ($B = -0.68$, $SE = 0.26$, $p = .008$, $f^2 = 0.02$, $OR = 0.50$), and identifying as White ($B = -1.26$, $SE = 0.58$, $p = .030$, $f^2 = 0.02$, $OR = 0.28$), Black ($B = -0.39$, $SE = 0.66$, $p = .550$, $f^2 = 0.002$, $OR = 0.68$), Hispanic ($B = -0.40$, $SE = 0.67$, $p = .555$, $f^2 = 0.002$, $OR = 0.68$), or Asian ($B = -1.80$, $SE = 0.96$, $p = .059$, $f^2 = 0.01$, $OR = 0.17$); the Native American ethnicity served as the reference group in dummy coding. The interaction term explained an additional 0.7% of the variance in the model. Consistent with our hypothesis, the form of the interaction specifically indicated that BSS suicidal ideation had a stronger relationship with the presence of a lifetime suicide attempt at low (synonymous with a score of approximately 8.07 in this sample; $B = 2.06$, $SE = 0.25$, $p < .001$), as opposed to high (synonymous with a score of approximately 33.43 in this sample; $B = 1.48$, $SE = 0.16$, $p < .001$), levels of BDI-II depression (see Fig. 1).

Finally, supplemental analyses, utilizing items on the BDI-II (Items 15 and 20) tapping into low energy and fatigue, were conducted to further probe these findings. Although the interaction between these items and suicidal ideation was not statistically significant ($p = .134$) in relation to a lifetime history of suicide attempts, the overall pattern of results was comparable. Namely, the association between suicidal

ideation and a lifetime history of suicide attempts was stronger at higher ($B = 1.86$, $SE = 0.22$, $p < .001$), as opposed to lower ($B = 1.47$, $SE = 0.16$, $p < .001$), energy levels.

4. Discussion

This study evaluated whether a significant interaction emerged between depression symptoms and suicidal ideation in relation to a history of past suicide attempts. Results indicated that the relationship between suicidal ideation and lifetime suicide attempts was strongest in the presence of relatively low depression symptoms—though, unsurprisingly, suicidal ideation was associated with lifetime suicide attempts across all levels of depression, given that suicidal ideation has been robustly linked to suicidal behavior. These findings are consistent with the hypothesis that the low energy associated with depressive episodes may serve as a protective factor against suicide attempts (though replication and extension using a prospective assessment of suicidal behavior is needed before definitive claims are made). Our findings also highlight the complex interplay between depression and suicidal thoughts and behaviors. Namely, whereas depression is a risk factor for suicidal desire, it does not differentiate suicide attempters from suicide ideators (May and Klonsky, 2016). Further, our results are consistent with the ideation-to-action framework (Klonsky and May, 2014; Van Orden et al., 2010) in that the current findings provide support for low energy states as a protective factor against, at minimum, a history of suicide attempts (and conversely, high energy, aroused states as a correlate of lifetime suicide attempts). It is also worth noting that our demographic findings were consistent with the extant literature, in that older, female, and Native American participants were more likely to report a lifetime suicide attempt (although these effects were all small).

Our supplemental analyses, in which we examined the moderating role of specific BDI-II depression items assessing low energy and fatigue (Items 15 and 20) in the relationship between suicidal ideation and a lifetime history of suicide attempts, were partially consistent with our hypotheses. Specifically, the relationship between suicidal ideation and a lifetime history of suicide attempts was descriptively strongest at high, as opposed to low, energy levels; however, the interaction effect was not statistically significant. This suggests that other aspects of depression may play a similar differentiating role in determining who among suicide ideators goes on to engage in suicidal behavior. Agitation and irritability have each been linked to suicidal attempts (Busch et al., 2003; Trivedi et al., 2011); while we originally hypothesized that the energy associated with these states accounted for their associations with suicide attempts, it is possible that other features of agitation and irritability (e.g., mental anguish, disgust with self or others) might play a role in conferring risk for suicide. Another possibility is that anhedonia may increase suicide risk, as several studies have demonstrated a link between anhedonia and suicidal ideation (Ducasse et al., 2018) and attempts (Loas et al., 2018); positive relationships between anhedonia and capability for suicide have also been found (Spitzer et al., 2017). Given that depression is a multifaceted construct, it may be worthwhile to parse apart the unique contributions of each aspect of depression on suicide risk through future research.

Overall, the present study points to this configuration of suicidal ideation and low depression symptoms as a potential marker for suicide risk assessment. Measures of depression and suicidal ideation are routinely integrated into standardized batteries for clinical care and could be utilized as an initial screener for suicide risk. Namely, individuals with relatively lower scores on the BDI-II despite moderate-to-high scores on the BSS may be at particular risk for engaging in suicidal behavior. Such patients might include those with current suicidal thoughts who do not have a diagnosis of a depressive disorder, including those with anorexia nervosa, schizophrenia, or borderline personality disorder (as each of these conditions are associated with
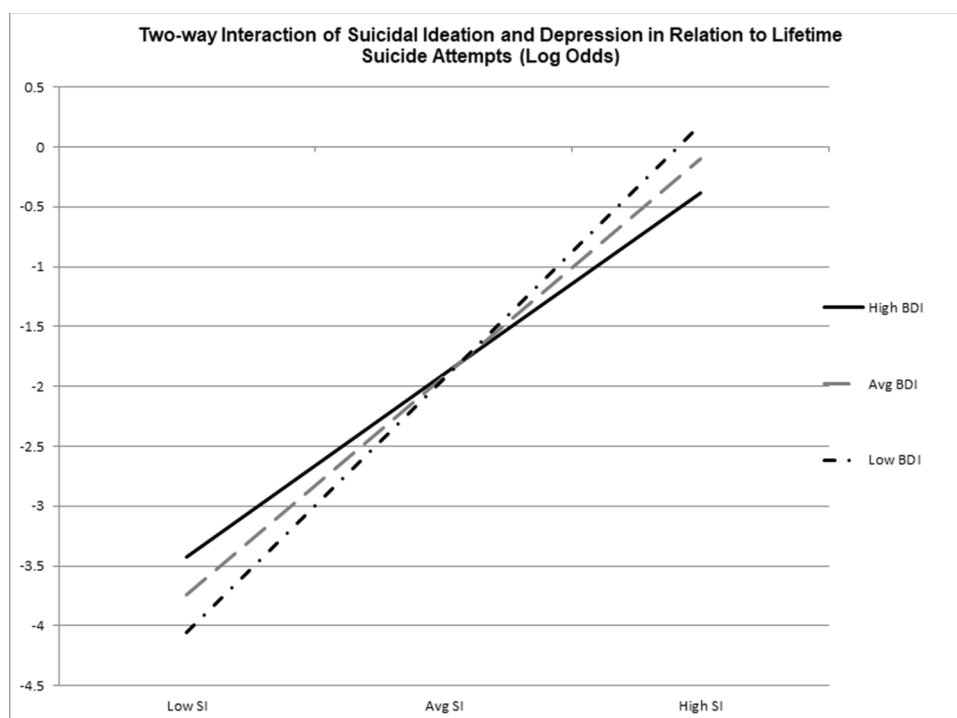
Fig. 1. Two-way interaction of suicidal ideation and depression in relation to lifetime suicide attempts (Log Odds).
Note: SI = Suicidal ideation; BDI = Beck depression inventory – II.

substantially increased risk of death by suicide; see Chesney et al., 2014), or those experiencing manic or mixed episodes. On the other hand, individuals with higher scores on the BDI-II (30+) may be at lower risk given the likelihood of low energy. Of note, we do not intend to convey that these configurations are definitively indicative of an individual's suicide risk, particularly given the retrospective assessment of suicidal behavior in the present study; rather, comprehensive suicide risk assessments (Chu et al., 2015) are still needed. However, examination of BDI-II and BSS (or similar measures) scores may be a time-effective avenue through which to flag individuals for more rigorous assessment and management. Specifically, it may be useful to acknowledge this configuration when considering stratified risk levels (Wortzel et al., 2014), as absent this knowledge, a low depression score might provide false reassurance. Similarly, some evidence suggests that a significant period of suicide risk may emerge when severe depression lessens in intensity (Joiner et al., 2004).

Finally, it is worth highlighting the current study's limitations. First, our outcome measure—lifetime suicide attempts—was assessed using a single item, albeit from a standardized and validated measure (BSS). However, issues have been raised regarding the use of a single item to assess suicidal behaviors, particularly with regard to the accurate classification of suicide attempts (versus aborted, interrupted, or non-attempts; see Hom et al., 2016; Millner et al., 2015). Perhaps more importantly, current depression and suicidal ideation were examined in relation to lifetime suicide attempts. Data regarding the timing of suicide attempts were not collected, so we were unable to examine the recency of suicidal behavior. Further, these findings cannot speak to predictive validity or interpretations of causality, due to the study's cross-sectional design and retrospective assessment of suicide attempts. However, past suicidal behavior remains a potent predictor of future suicidal behavior (Borges et al., 2006; Bostwick et al., 2016; Miranda et al., 2008), supporting the clinical relevance of the use of past attempts in the current study. Lastly, although we controlled for socio-demographic characteristics, we were unable to include all potentially relevant constructs in these analyses. In particular, given that we were unable to identify individuals by the type of depression they were

exhibiting (e.g., atypical versus typical, agitated versus slowed down), it may be worth exploring this interaction among individuals with depression characterized by psychomotor retardation and agitation symptoms, separately, to examine if similar patterns hold. Likewise, given that the measure utilized to assess depression symptoms in this study (BDI-II) is multi-faceted, it is worth following up this study with an examination of different aspects of depression and their subsequent impacts on suicide risk.

Overall, this study provided additional support for the proposition that lethargy may be a protective factor against engagement in suicidal behavior, consistent with theory on shutdown and aroused states (Joiner and Stanley, 2016; Stanley et al., 2018), as well as the literature on mixed versus unipolar depressive states (Akiskal et al., 2005; Balázs et al., 2006; Sani et al., 2011). We look forward to studies building on these findings to better understand the role of energy states, and depression more generally, in suicidal behavior.

Acknowledgements

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