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Brooding and reflection: Rumination predicts suicidal ideation at 1-year follow-up in a community sample

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Abstract

The cognitive processes underlying suicidal thinking and behavior are not well understood. The present study examined brooding and reflection, two dimensions of rumination, as predictors of suicidal ideation among a community sample of 1134 adults. Participants completed self-report measures of rumination and depression, and a semi-structured clinical interview that included an assessment of suicidal ideation, at baseline and 1-year follow-up. Brooding was more strongly related to degree of ideation at baseline than was reflection. However, both brooding and reflection predicted whether an individual thought about suicide at 1-year follow-up, even after adjusting for baseline suicidal ideation. Symptoms of depression mediated the relationship between brooding and ideation but not that between reflection and ideation. Implications for the nature of thought processes that result in suicidal thinking are discussed.

Keywords: Rumination; Suicidal ideation; Longitudinal

Introduction

Cognitive risk factors for depression have been well researched (Alloy et al., 2006; Girgus & Nolen-Hoeksema, 2006; Hankin, Fraley, & Abela, 2005; Ingram, Miranda, & Segal, 1998). However, cognitive risk factors for suicidal ideation and behavior have received less attention, although some research has emerged in the past decade (see Ellis, 2006). Given that depression has been found to predict suicidal ideation, attempts, and eventual completed suicide (Brown, Beck, Steer, & Grisham, 2000; Fergusson, Woodward, & Horwood, 2000; Lewinsohn, Rohde, & Seeley, 1994), recent work has focused on cognitive risk factors for depression that may also increase vulnerability to suicidality. For example, a negative cognitive style—such as the tendency to make internal, stable, and global attributions for negative outcomes—prospectively predicted increased risk of suicidal ideation and attempts (Abramson et al., 1998). Other cognitive risk factors found to be associated with suicidal ideation and behavior include hopelessness, perfectionism, and negative automatic thoughts (Beck, Brown, & Steer, 1989; Beevers & Miller, 2004; Brown et al., 2000; Gibb et al., 2001;

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Nock & Kazdin, 2002). More recently, rumination—a repetitive focus on the causes, meanings, and consequences of one's depressed mood (Nolen-Hoeksema, 1991)—has received attention as a potential longitudinal predictor of suicidal thoughts (Eshun, 2000; Smith, Alloy, & Abramson, 2006).

In a recent prospective study, Smith et al. (2006) found that rumination, as measured by the Ruminative Responses Scale (RRS) of the Response Styles Questionnaire (RSQ; Nolen-Hoeksema & Morrow, 1991), predicted the presence and duration of suicidal ideation during a 2.5-year follow-up period among a sample of 127 college undergraduates. Furthermore, the relationship between rumination and ideation was at least partially mediated by hopelessness, a construct that has also been found to predict eventual suicide (Beck et al., 1989; Brown et al., 2000; Kerfoot, Dyer, Harrington, Woodham, & Harrington, 1996).

Factor analyses of the RRS have attempted to better specify the aspects of rumination that predict symptoms of depression. These studies have revealed two separate aspects of rumination (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). One, labeled brooding, involves the tendency to dwell on the negative consequences of one's depression. The other, labeled reflective pondering, involves attempts to understand the reasons for one's depressed mood. Treynor et al. (2003) found that brooding predicted increases in depression, while reflective pondering predicted decreases in depression over 1 year. Another study, however, found that while the tendency to dwell on the negative consequences of one's depression and active cognitive appraisal of the reasons for one's mood were both significantly and positively associated with symptoms of depression and anxiety, dwelling was more strongly related to these symptoms (Fresco, Frankel, Mennin, Turk, & Heimberg, 2002).

Rumination, particularly brooding, may predict suicidal ideation for several reasons. If ideation is a form of repetitive thinking that is linguistic (see Segerstrom, Stanton, Alden, & Shortridge, 2003), like rumination, a tendency to ruminate in the form of brooding on one's negative mood might increase vulnerability to having thoughts about suicide. In addition, past research suggests that rumination is characterized by an inflexible and perseverative cognitive style (Davis & Nolen-Hoeksema, 2000; Watkins & Brown, 2002) that can interfere with effective problem solving (Lyubomirsky & Nolen-Hoeksema, 1995; Watkins & Baracaia, 2002) and mood regulation, deficits that are known to be associated with suicidality (e.g., Howat & Davidson, 2002; Williams, Barnhofer, Crane, & Beck, 2005; Zlotnick, Donaldson, Spirito, & Pearlstein, 1997). A cognitive process that impacts emotion regulation and problem-solving ability may thus increase vulnerability to suicidal thinking. Indeed, a recent study of adolescent girls found that rumination predicted the risk of other escapist behaviors that involve self-regulatory deficits—specifically, bulimic symptoms and substance abuse—(Nolen-Hoeksema, Stice, Wade, & Bohon, 2007). Thus, rumination might also increase the risk of thoughts of suicide involving a desire to escape from present circumstances. Finally, rumination might predict suicidal ideation simply because rumination is correlated with depression, and depression predicts suicidal ideation.

The present study sought to examine whether brooding and reflection, two aspects of ruminative thinking that are differentially related to symptoms of depression, would be differentially related to suicidal ideation, i.e., the degree to which individuals had passive or active thoughts about suicide. Furthermore, we sought to test the hypothesis that brooding and reflection would differentially predict whether an individual thought about suicide 1 year later, even after adjusting for severity of depression symptoms. Specifically, we expected that brooding would more strongly predict the odds of suicidal ideation at 1-year follow-up than would reflection.

Method

Participants

A community sample of 1324 adults between the ages of 24 and 82 years from the San Francisco Bay Area of California were interviewed between 1994 and 1996, as part of a study to examine gender differences in depression, and 1134 of these individuals (607 female, 527 male) between the ages of 25 and 82 ($M = 47.8$, $SD = 15.1$) were interviewed 1 year later (see Nolen-Hoeksema, Larson, & Grayson, 1999; Nolen-Hoeksema, 2000, for details on the original sample and on differences between those who did and did not participate in the interview 1 year later). Individuals were recruited through random-digit dialing. Participants interviewed at both time points were primarily European American (72%), with a smaller percentage of Hispanic (9%),

African American (7%), Asian/Pacific Islander (6%), or of other ethnicities (6%). Level of education in the sample ranged from 5% with some high school or less, 14% with a high school degree, 27% with some college education, 26% with a college degree, 8% with some graduate or professional education, and 21% with a graduate or professional degree.

Measures

Rumination

The RRS of the RSQ (Nolen-Hoeksema & Morrow, 1991) includes 22 items that assess the extent to which individuals repeatedly focus on the causes, meanings, and consequences of their negative mood. A factor analysis of the RRS has identified two separate subscales that are differentially related to symptoms of depression. The first, reflection, consists of five questions that assess the degree to which individuals engage in cognitive problem solving to improve their mood (e.g., *Analyze recent events to try to understand why you are depressed*), and the second, brooding, consists of five items that assess the degree to which individuals passively focus on the reasons for their distress (e.g., *think 'What am I doing to deserve this*?') (Treynor et al., 2003). These two scales showed adequate internal consistency in this study ($\alpha_{\text{brood}} = .77$; $\alpha_{\text{reflection}} = .71$).

Beck depression inventory (BDI; Beck & Beck, 1972)

Symptoms of depression were assessed using the 13-item version of the BDI. Individuals rate each symptom on a scale ranging from 0 to 3. The suicide item on the BDI was excluded from the total score for the BDI, to remove overlap between the dependent and independent variables. Thus, scores on the BDI could range from 0 to 36. In the present sample, adjusted BDI scores ranged from 0 to 27 at baseline and from 0 to 23 at follow-up. The BDI showed good internal consistency in the present sample, both at baseline ($\alpha = .81$) and at follow-up ($\alpha = .83$).

Suicidal ideation

Suicidal ideation was assessed via responses to questions about suicidal ideation on the Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 1997) and to the suicidal ideation item of the BDI. The SCID was administered primarily to assess for a diagnosis of major depressive disorder. Participants who endorsed either sadness or anhedonia in the previous month answered subsequent questions about symptoms of depression. Two of these questions assessed suicidal ideation within the previous month—i.e., passive suicidal ideation (*Were things so bad that you were thinking a lot about death or that you would be better off dead*?) and active suicidal ideation (*Were you thinking of hurting yourself*?). Participants who endorsed any of these questions were classified as positive for suicidal ideation. For participants who endorsed suicidal ideation, the SCID also inquired about whether individuals had engaged in self-harm (*Did you do anything to hurt yourself*?). The BDI inquired about suicidal ideation via one question that assessed for passive or active ideation in the previous week on a Likert-type scale that ranged from 0 (*I don't have any thoughts about killing myself*) to 3 (*I would kill myself if I had the chance*). Individuals who endorsed any thoughts of suicide (i.e., ratings of 1–3) were classified as positive for suicidal ideation. Prior research indicates that the suicidal ideation item on the BDI has adequate concurrent validity, as assessed by its correlation with other measures of current suicidal ideation, such as the clinician-administered Scale for Suicidal Ideation ($r = .56$; Beck, Brown, & Steer, 1997) and the self-report Beck Scale for Suicidal Ideation ($r = .69$; Beck, Steer, & Ranieri, 1988), among outpatient samples. For data analytical purposes, individuals who endorsed either the passive or active suicidal ideation questions on the SCID or who endorsed any thoughts of suicide on the BDI received a code of "1" for suicidal ideation in the previous month, and those who did not endorse any suicidal ideation on the SCID or BDI received a code of "0."

Procedure

Informed consent was obtained verbally and in writing from individuals at the beginning of the study. All measures (including self-report) were administered to participants via an interview. Participants were interviewed in their home by a trained interviewer at the beginning of the study and also 1 year later. The

interviewer read the instructions for each measure to participants and provided them with a card containing the possible responses for each item of the measure, so that individuals could choose from among the possible responses. The measures and procedure used in this study were approved by the Institutional Review Board of Stanford University.

Results

Endorsement of suicidal ideation in the sample

Approximately 13% ($n = 143$) of the sample endorsed suicidal ideation at baseline—either on the SCID or on the BDI— and .4% ($n = 4$) endorsed having engaged in self-harm behavior in the previous month on the SCID. At follow-up, 11% ($n = 129$) of the sample endorsed ideation, and .6% ($n = 7$) reported having engaged in self-harm in the previous month. Overlap in endorsement of suicidal ideation at baseline and follow-up was moderate ($\kappa = .44$). There were no significant age, gender, or ethnic differences in endorsement of suicidal ideation. However, individuals with less than a college education were more likely to endorse suicidal ideation at baseline (18%) than were individuals with at least some college education (11%); $\chi^2(1) = 6.14$, $p < .05$.

Relationship among rumination scales and suicidal ideation

Given that prior research indicates that brooding is more strongly associated with symptoms of depression than is reflection (Treynor et al., 2003), and that depression is strongly associated with suicidality (Brown et al., 2000; Fergusson et al., 2000; Lewinsohn et al., 1994), it was hypothesized that brooding would be more strongly associated with suicidal ideation than would reflection. This hypothesis was supported by correlational analyses. While both brooding and reflection were significantly correlated with suicidal ideation at baseline, the correlation between brooding and ideation was stronger, $r(1131) = .26$, $p < .01$, than was the correlation between reflection and ideation, $r(1131) = .09$, $p < .01$, $Z_{\text{diff}} = 5.21$, $p < .01$. Similarly, brooding was more strongly correlated with baseline BDI score, $r(1130) = .43$, $p < .01$, and with follow-up BDI score, $r(1130) = .37$, $p < .01$, than was reflection, $r_1(1130) = .12$, $p < .01$, $r_2(1130) = .08$, $p < .05$, $Z_{\text{diff1}} = 9.81$, $p < .01$, $Z_{\text{diff2}} = 9.00$, $p < .01$.

Brooding and reflection as predictors of suicidal ideation at 1-year follow-up

Brooding and reflection were examined as predictors of whether individuals reported suicidal ideation at 1-year follow-up via a hierarchical logistic regression, with suicidal ideation coded as a binary outcome (i.e., endorsement of any suicidal ideation on the SCID or BDI). Demographic variables (i.e., age, gender, ethnicity, education) were entered in the first block of the analysis, followed by time 1 suicidal ideation. Brooding and reflection were entered in the next block of the analysis, followed by BDI score. Adjusting for demographic variables and baseline suicidal ideation, both brooding (OR = 2.24; 95% CI = 1.56–3.22, $p < .01$) and reflection (OR = 1.54; 95% CI = 1.08–2.20, $p < .05$) were found to significantly predict suicidal ideation at 1-year follow-up. In addition, brooding and reflection remained statistically significant predictors of ideation after adjusting for symptoms of depression (which also predicted the odds of ideation at follow-up), although the odds ratio for brooding was somewhat lower after adjusting for BDI score (OR = 1.80) (see Table 1). The strongest predictor of suicidal ideation at follow-up was a history of ideation at baseline, with participants having over 7 times higher odds of endorsing suicidal ideation in the previous month at follow-up if they had done so a year earlier.

Given that adjusting for depression significantly decreased the relationship between brooding and suicidal ideation, the indirect effect of brooding on ideation through depression (i.e., mediation) was tested using bootstrapping (see Preacher & Hayes, 2004), with a *Sobel's t* statistic computed to test for the significance of the indirect effect (Baron & Kenny, 1986; MacKinnon & Dwyer, 1993), adjusting for other covariates in the model. Findings suggested that symptoms of depression partially mediated the relationship between brooding and suicidal ideation (*Sobel's* $t = 3.09$, $p < .05$), but not that between reflection and ideation ($p = \text{ns}$).

Table 1
Logistic regression predicting time 2 suicidal ideation from brooding and reflection, adjusting for demographic variables, baseline suicidal ideation, and time 1 BDI

Predictors	OR	95% CI OR
Block 1		
Age	1.01	(1.00, 1.03)
Gender	.78	(.51, 1.20)
Non-White ethnicity	.75	(.46, 1.23)
Education level	.95	(.81, 1.10)
Block 2		
Time 1 Suicidality	7.79**	(4.82, 12.59)
Block 3		
Brooding	1.80**	(1.22, 2.66)
Reflective pondering	1.56*	(1.09, 2.24)
Time 1 BDI	1.09**	(1.04, 1.16)

Coefficients reflect values in the final model. OR = odds ratio.
**$p < .01$; *$p < .05$.

Table 2
Logistic regression predicting time 2 suicidal ideation from brooding and reflection, adjusting for demographic variables, baseline suicidal ideation, time 1 BDI, and time 2 BDI

Predictors	OR	95% CI OR
Block 1		
Age	1.01	(.99, 1.03)
Gender	.70	(.44, 1.12)
Non-White ethnicity	.76	(.44, 1.29)
Education level	.97	(.82, 1.14)
Block 2		
Time 1 Suicidality	9.55**	(5.67, 16.10)
Block 3		
Brooding	1.31	(.85, 2.03)
Reflective pondering	1.66*	(1.12, 2.47)
Time 1 BDI	.98	(.92, 1.04)
Block 4		
Time 2 BDI	1.29**	(1.21, 1.37)

Coefficients reflect values in the final model. OR = odds ratio.
**$p < .01$; *$p < .05$.

To examine whether the effect of brooding and reflection on suicidal ideation might be the result of their impact on later symptoms of depression, a logistic regression analysis that adjusted for symptoms of depression at 1-year follow-up, in addition to the time 1 variables, was conducted. After adjusting for time 2 BDI score, brooding was no longer a statistically significant predictor of time 2 suicidal ideation (O.R. = 1.31; 95% CI = .85–2.03), while reflection remained a significant predictor of ideation at follow-up (O.R. = 1.66; 95% CI = 1.12–2.47) (see Table 2). Thus, the effect of brooding on suicidal ideation appeared to be mediated by its impact on future symptoms of depression, while the effect of reflection on ideation was not a result of its relationship to depression at time 2.

Discussion

The cognitive processes that increase vulnerability to suicidal thinking and behavior are not well understood, although research has begun to acknowledge the role of cognition in suicide (Ellis, 2006). The present research suggests that both brooding and reflection predicted suicidal ideation prospectively, after

adjusting for symptoms of depression at baseline. These results are consistent with a prior finding that brooding predicted increases in depression (Treynor et al., 2003). However, unlike prior research, reflection significantly predicted suicidal ideation at follow-up.

Recent cognitive models of suicide suggest that repeatedly thinking about suicide might increase cognitive vulnerability to suicidal behavior by increasing the accessibility of suicide-related thoughts, lowering the threshold necessary to trigger a suicidal episode, and habituating the individual to the experience of self-injury (Beck, 1996; Joiner, 2005). The present findings suggest that other forms of repetitive thinking, in the form of dwelling on one's negative mood or even engaging in cognitive appraisal processes to understand and change one's mood, are associated with increases in suicidal ideation. Brooding may be associated with increases in thoughts of suicide because it involves attention to painful symptoms of depression and the negative consequences of depression (e.g., family members or co-workers rejecting an individual because of the depression). Such thoughts, in turn, may lead individuals to consider suicide as a way of escaping these painful symptoms and consequences. That is, depression may partially mediate the relationship between brooding and suicidal ideation.

Reflection, on the other hand, though not as strongly associated with concurrent suicidal ideation, was found to prospectively predict suicidal ideation, and this relationship did not change after adjusting for severity of depression. Reflective rumination may thus contribute to ideation in the long term through a different mechanism. For example, the relation between reflection and suicidal ideation may be moderated by other variables—such as problem solving or coping. Attempts to understand the reasons for one's depressed mood may result in suicidal ideation when individuals are not successful in generating solutions during their problem-solving attempts, or when their attempts at reflection turn into brooding. The present findings suggest that reflective rumination may not be as adaptive as has previously been suggested (Treynor et al., 2003). For example, prior evidence suggests that reflection may only be adaptive in the absence of negative cognitive biases (Joormann, Dkane, & Gotlib, 2006). Alternatively, Watkins and colleagues (Moberly & Watkins, 2006; Watkins, 2004; Watkins & Moulds, 2005) have suggested and provided evidence that rumination involving abstract, evaluative self-focus—versus a more concrete, process-oriented self-focus—is maladaptive, in terms of recovery from a negative mood following a failure (Watkins, 2004) and generation of less effective solutions to problems (Watkins & Moulds, 2005). Furthermore, individuals high in trait rumination who practice considering emotional scenarios in an abstract, verbal–linguistic mode are more vulnerable to experiencing lowered positive affect following an upsetting experience (Moberly & Watkins, 2006). Perhaps reflective rumination that is verbal–linguistic in nature increases vulnerability to suicidal thoughts by impairing mood regulation and problem solving. Future research should examine such variables that might account for the relationship between reflection and ideation.

Some limitations of the present study should be noted. Suicidal ideation was only assessed within the previous month, thus limiting the ability of researchers to capture suicidality that may have occurred within the remainder of the follow-up period. That is, the present study may underestimate the degree of suicidal ideation that occurred in the sample. Secondly, the measures used were categorical, limiting the ability of the study to provide information about suicidal ideation as a dimensional construct. Furthermore, only suicidal ideation—and not suicide attempts—was examined as an outcome. Future research should include measures of both ideation and attempts, as brooding and reflection may differentially predict both, and because not all individuals who think about suicide will necessarily engage in suicidal behavior. However, it should be noted that suicidal ideation has been found to be a risk factor for completed suicide in prior research (Brown et al., 2000). Moreover, the relationship between the different forms of rumination and suicidal ideation might have been better elucidated by inclusion of other measures known to be associated with suicidal ideation. For example, past research indicates that the relationship between rumination and suicidal ideation is partially mediated by hopelessness (Smith et al., 2006). Finally, while the sample included in this study was diverse in terms of age and gender, participants were primarily of European American ethnic origin, which may limit the generalizability of the findings (although it should be noted that participants were representative of the San Francisco Bay Area).

Conclusion

Prevention and intervention programs for suicidal ideation and behavior will benefit from more knowledge of their cognitive risk factors. The results of this study suggest that targeting ruminative thinking in these

programs may be useful. Future research should examine the mechanisms through which brooding and reflection result in thoughts about suicide.

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