A Test of the Unique and Interactive Roles of Anger Experience and Expression in Suicidality

Findings From a Population-Based Study

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Abstract: This study examined the unique and interactive roles of anger experience and expression in suicidality (suicidal ideation, plans, and attempts) in a large, nationally representative sample. Participants included 5692 adults from the National Comorbidity Survey–Replication, a nationally representative survey. Anger experience was assessed through a continuous measure, whereas anger expression problems were determined by the presence of an intermittent explosive disorder diagnosis. Tests of unique associations revealed that for the overall sample, anger experience and expression each predicted a unique variance in all outcomes of suicidality. Among the individuals reporting lifetime suicidal ideation, anger experience and expression were uniquely related to suicide attempts. Analyses also revealed anger experience and expression to interact in the prediction of suicidal ideation, suggesting that these have independent and additive effects on risk for suicide. The findings suggest that both anger experience and expression contribute to suicidality and the progression from suicidal ideation to plans and attempts.

Key Words: Anger, intermittent explosive disorder, suicide

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Worldwide, approximately one person dies by suicide every 40 seconds, and one million people die of suicide each year (World Health Organization [WHO], 2011). In the last 45 years, global rates of suicide have increased by 60% and continue to rise (WHO, 2011). Given these numbers, identification of the risk factors of suicide is extremely important. Having a mental disorder is perhaps the most well-known risk factor (Harris and Barraclough, 1997; Moœcicki, 2001), but other characteristics that defy diagnostic classification may also confer risk.

Anger experience and expression are two temperamental factors that have been considered in studies of suicide risk among adolescents. Research on adolescents has found that the experience of anger frequently precedes a suicide attempt (Withers and Kaplan, 1987), whereas anger expression is predictive of the seriousness and the lethality of the attempt (Gispert et al., 1985). Adolescents with repeated suicide attempts have been found to have more difficulty with modulating their expression of anger than those who attempted once (Gispert et al., 1987). Another study of suicidal adolescents found that more than half indicated that they were angry with someone at the time of their suicide attempt (Hawton et al., 1982). An epidemiological study of young adults found that individuals with high levels of overt aggression reported the most suicidal thoughts (Goldberg, 1981).

Researchers have also found different relationships between modes of anger expression and suicide attempts. For example, Lehnert et al. (1994) found that, compared with their peers, adolescents who had attempted suicide were more likely to report elevated levels of internalized and externalized anger. Internalized anger was related to depression and hopelessness, but externalized anger was not. This is an interesting finding because it indicates that screening adolescents for depression and hopelessness (well-established risk factors of suicide) would fail to capture those who are likely to externalize their anger and are at risk for suicide. Indeed, some research has found that, for girls, low levels of anger experience and expression actually increase the risk for suicide in the presence of depression; for boys, in contrast, high levels of anger experience and expression were associated with suicide attempt, independently of depression diagnosis (Daniel et al., 2009).

Despite the established relationship between anger and suicide risk in adolescents, little research has been conducted to investigate this relationship in adult populations. In one study, a history of aggressive behavior was found to be associated with a greater risk for suicide among men with depression (Dumais et al., 2005). A qualitative study of inpatient individuals who died by suicide reported that many of these patients expressed notable levels of anger toward others before their death and that this anger was as obvious as any of their symptoms of depression (Morgan and Priest, 1984).

To summarize, previous research suggests relationships between anger experience and expression and suicidal ideation and behavior. However, many of the studies conducted have suffered from a number of limitations, including the use of nonrepresentative samples (*e.g.*, treatment seekers). Much of this research has been conducted with adolescents, so it is less clear whether the relationship exists in adults. In addition, many of these studies have relied on relatively small samples and did not take demographics and comorbidity into account. Research has also not typically considered the unique roles of anger experience and expression in the increasing risk for suicidality. For example, it is possible that the impulsivity that characterizes expressive anger may account for the link between anger experience and suicidality. Further, the role of anger in the increasing risk for suicide plans and attempts among those with suicidal ideation has not been examined extensively. Such analyses have been conducted in recent suicide-related studies to identify those who are likely to progress from suicidal ideation to plans and attempts. For example, Nock et al. (2010) found the presence of intermittent explosive disorder (IED) to predict suicide plans and attempts among those reporting ideation, although depression was not predictive of plans and attempts among those with ideation. Such findings suggest that problematic anger may lead individuals who are contemplating suicide to act on these thoughts. Lastly, the potential interactive roles of anger experience and expression in increasing the risk for suicide have not been fully explored. It is possible that anger experience is predictive of suicide risk only among those high in anger expression and vice versa.

The current study sought to test the relationship between anger experience and expression and suicidality (suicidal ideation, plans, and attempts) in a large, nationally representative sample of adults. Anger expression problems were conceptualized as the presence of IED diagnosis for the current study. We evaluated the unique roles of anger experience and expression in the prediction of suicidality and

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assessed whether these anger variables predicted suicide plans and attempts among those with ideation. Further, we examined whether anger experience and expression would interact in their prediction of suicidality.

METHODS

Sample

The National Comorbidity Survey–Replication (NCS-R) is composed of a representative sample of English-speaking adults from the contiguous United States. Participants were interviewed in person at their place of residence between February 2001 and April 2003. A detailed description of the methodology, weighting, and sampling procedures used in the NCS-R has been provided by Kessler et al. (2004).

The interview was administered in two parts. All respondents completed part I ($N = 9282$), which contained a section covering each of the core mental health disorders. Part II included sections on disorders of secondary importance as well as risk factors, consequences, services, and other correlates of mental health disorders. To reduce respondent burden, part II was completed only by those who met criteria for a lifetime core diagnosis and by a probability subsample of those who did not meet the criteria. The current investigation was based on data from both parts I and II from which we obtained a subsample of individuals ($n = 5692$) who reported on psychiatric history. Of the sample, 53% were women, with a mean age of 44.99 (SD = 17.9). For the racial and ethnic representation of the study participants, 72.8% were white, 12.4% were African-American, 11.1% were Hispanic, and 3.8% were from other ethnicities.

Procedure

On the basis of the 2000 US Census, a stratified, multistage probability sample was created. The respondents received a letter describing the survey and their potential participation several days before in-person contact was made. The interviews were conducted by professional interviewers who had obtained extensive training and were closely supervised by the Institute for Social Research. The administration of the interview was completed face-to-face with the assistance of a laptop computer. The interviewers obtained verbal informed consent from each respondent. The consent procedures were approved by the Human Subject Research Committees at Harvard Medical School and the University of Michigan. The respondents received $50 as a token of appreciation for completing the interview. The overall response rate was 70.9%. Part I was weighted to adjust for discrepancies between the sample and the US Census in terms of geographic and sociodemographic variables. Additional weighting of part II was conducted to adjust for differential probability of selection from part I (Kessler et al., 2004).

Measures

Demographic

The interview included an extensive demographic section that assessed sex, age, ethnicity, marital status, and current household income. Sex (0 = male, 1 = female), ethnicity (0 = nonwhite, 1 = white), and marital status (0 = not married, 1 = married) were used as dichotomous variables in statistical analyses. Age and household income were continuous variables used in the analyses.

Suicidal Ideation and Behavior

Lifetime suicidal behaviors (ideation, plans, and attempts) were assessed using the Suicidality Module of the Composite International Diagnostic Interview (CIDI; Kessler and Ustun, 2004). Lifetime suicidal ideation, plan for suicide, and suicide attempt were used as dichotomous variables in the statistical analyses (0 = not present, 1 = present).

Anger Experience

To measure the extent to which the respondents experienced anger, a scale was created by summing five NCS-R items assessing anger experience in the past 30 days. Sample items include "How often did you feel mad or angry?" and "How often did you have an urge to hit, push, or hurt someone?" The participants rated their answers on a 5-point Likert-type scale ranging from 0 (none of the time) to 4 (all of the time). Reliability analyses indicated strong internal consistency between these five items ($\alpha = 0.76$). This scale has been used in previous studies of anger experience (Hawkins and Cougle, 2011).

Intermittent Explosive Disorder

IED diagnosis was used to determine the presence of anger expression problems in this investigation. Lifetime IED was assessed using the World Mental Health Survey Initiative version of the WHO CIDI reference. This is a structured diagnostic interview from which *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*), axis I (American Psychiatric Association [APA], 2000) diagnoses are derived. The CIDI has been found to have good validity and reliability for anxiety, mood, and substance use disorders, but it has not yet been validated for impulse control disorders (First et al., 2002).

The CIDI operationalizes the *DSM-IV* criteria for IED as including at least one of three types of anger attacks: a) lost control and broke or smashed something worth more than a few dollars, b) lost control and tried to hit or hurt someone, and c) lost control and threatened to hit or hurt someone. Three or more of these attacks occurring within 1 year were required to meet the criteria for lifetime IED. Twelve-month prevalence required three lifetime attacks and at least one attack in the past year. These attacks had to be interpreted by the respondent as occurring without good reason, reacting with more anger than others would have, or occurring in a situation in which others would not have had an anger attack. Finally, these attacks could not be better accounted for by another mental disorder, as the result of the physiological effects of substance use, or a general medical condition.

Major Depressive Disorder

To covary for a lifetime diagnosis of major depressive disorder (MDD), one dichotomous variable (0 = no MDD, 1 = lifetime MDD) was used in the analyses.

Anxiety Disorder

To covary for presence of a lifetime anxiety disorder, one dichotomous variable (0 = no anxiety disorder, 1 = any anxiety disorder) was created and used in the analyses.

Borderline Personality Disorder

To covary for symptoms of borderline personality disorder (BPD), a continuous variable was created. Seven dichotomous items from the International Personality Disorder Examination (Loranger et al., 1994) were used. The *DSM-IV* criteria for BPD consists of nine items; however, to prevent criterion contamination in the current study, the symptoms of "inappropriate, intense anger or difficulty controlling anger (*e.g.*, frequent displays of temper, constant anger, recurrent physical fights)" and "recurrent suicidal behavior, gestures, or threats or self-mutilating behavior" were excluded (APA, 2000). The remaining seven items were summed to create a measure of BPD symptoms.

TABLE 1. Descriptive Statistics for the Total Sample

		Anger Experience	Lifetime IED Diagnosis
	n	Mean (SD)	*n*
Total sample	5692	2.18 (2.2)	447
Lifetime			
Suicide ideation	887	3.45 (3.1)	166
Suicide plan	309	3.91 (3.4)	76
Suicide attempt	286	4.34 (3.7)	72

Data Analytic Approach

All analyses were conducted using the Statistical Analysis Software version 9.1 and used the appropriate NCS-R statistical weights to ensure that the sample was representative of the general US population. The data analyses consisted of a series of logistic regression analyses to examine the relationships between the two anger variables (anger experience and IED diagnosis) and dichotomous dependent variables (*i.e.*, suicidal ideation, plan for suicide, and suicide attempt). All analyses controlled for sex, age, ethnicity, marital status, income, symptoms of BPD (not including anger or suicidality), lifetime presence of an anxiety disorder, and lifetime diagnosis of major depression.

RESULTS

Associations Between Anger Experience and IED and Suicidality

A series of logistic regression analyses were conducted to examine the relationships between anger experience, lifetime IED diagnosis, and suicidal behavior. Lifetime suicidal ideation, plans for suicide, and suicide attempts were the dependent variables. Each measure of anger (anger experience and IED diagnosis) was entered in a separate regression analysis to predict each dependent variable. Descriptive statistics for the whole sample are presented in Table 1, and results for the overall sample are presented in Table 2.

Anger experience predicted the presence of lifetime suicidal ideation, suicide plans, and suicide attempts. Lifetime IED diagnosis also predicted the presence of lifetime suicidal ideation, suicide plans, and suicide attempts.

Associations Between Anger and Suicidality Among Those With Suicidal Ideation

We also examined the relationship between anger and suicidal plans and attempts among those reporting lifetime ideation. Anger experience was found to predict the presence of a lifetime suicide attempt among this group. Lifetime IED diagnosis predicted both a plan and an attempt among this group. The results for the lifetime suicidal ideation sample are in Table 2.

Tests of the Unique Roles of Anger Experience and IED in Suicidality

A series of logistic regressions were conducted to examine the unique relationships between anger experience and IED on suicidal ideation and behavior. Lifetime suicidal ideation, plans for suicide, and presence of a suicide attempt were the dependent variables. Anger experience and IED diagnosis were entered together in a series of regression analyses to predict each variable among the overall sample. Logistic regressions were then repeated to look at the unique relationships between anger experience and IED on suicidal ideation and behavior among the participants who endorsed lifetime suicidal ideation. The results for the overall and lifetime suicidal ideation sample are in Table 3.

Among the overall sample, when anger experience and lifetime IED were both entered as predictors of lifetime suicidal ideation, suicide plan, and suicide attempt, these were both significant unique predictors.

Among the participants with lifetime suicidal ideation, lifetime IED diagnosis and anger experience were both uniquely related to lifetime suicide attempt but not lifetime suicide plan.

Tests of Interaction

We examined whether IED would interact with anger experience in the prediction of lifetime suicidal ideation and behavior. For these analyses, we first centered anger experience and lifetime IED diagnoses before calculating their interaction. We entered the centered variables of anger experience and IED diagnosis as well as the interaction between the two in regressions.

Significant interactions were found between anger experience and IED in the prediction of lifetime suicidal ideation ($\beta = -0.07$, $p < 0.001$) in the full sample. Follow-up tests of simple slopes revealed that IED was predictive of suicidal ideation at both high and low levels of anger experience and vice versa. Thus, these findings

TABLE 2. Associations Between Anger Experience and IED Diagnosis and Suicidality Among the Overall Sample and the Participants With Lifetime Suicidal Ideation

	Anger Experience	Lifetime IED Diagnosis
	AOR[a] (95% CI)	AOR[a] (95% CI)
Full sample		
Lifetime		
Suicide ideation	1.09 (1.06–1.13)***	1.62 (1.25–2.10)***
Suicide plan	1.07 (1.02–1.11)**	1.71 (1.29–2.28)***
Suicide attempt	1.09 (1.06–1.13)***	1.68 (1.27–2.23)***
With lifetime ideation		
Lifetime		
Suicide plan	1.02 (0.97–1.06)	1.40 (1.02–1.91)*
Suicide attempt	1.05 (1.01–1.09)*	1.45 (1.10–1.93)**

[a]Adjusted odds ratios (AORs) represent associations between anger experience and IED diagnosis and suicidality, adjusting for age, sex, ethnicity, marital status, income, symptoms of BPD, lifetime presence of an anxiety disorder, and lifetime diagnosis of major depression.

*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

TABLE 3. Unique Associations Between Anger Experience, IED, and Suicidality

Full Sample	AOR[a] (95% CI)	With Lifetime Ideation	AOR[a] (95% CI)
Lifetime suicidal ideation		Lifetime suicide plan	
Lifetime IED	1.49 (1.15–1.93)*	Lifetime IED	1.39 (1.01–1.89)
Anger experience	1.08 (1.05–1.12)**	Anger experience	1.01 (0.97–1.06)
Lifetime suicide plan		Lifetime suicide attempt	
Lifetime IED	1.63 (1.23–2.15)**	Lifetime IED	1.41 (1.06–1.89)*
Anger experience	1.05 (1.01–1.10)*	Anger experience	1.04 (1.01–1.08)*
Lifetime suicide attempt			
Lifetime IED	1.56 (1.18–2.05)*		
Anger experience	1.08 (1.05–1.11)**		

[a]Adjusted odds ratios (AORs) represent associations between anger experience and IED diagnosis and suicidal behaviors, adjusting for age, sex, ethnicity, marital status, income, symptoms of BPD, lifetime presence of an anxiety disorder, and lifetime diagnosis of major depression.
*$p < 0.05$.
**$p < 0.001$.

implicate additive effects between anger experience and IED in the prediction of lifetime suicidal ideation. That is, the significant interactions revealed that those with elevations in anger experience and with IED were at greatest risk for suicidal ideation.

DISCUSSION

Our findings suggest that problems of anger experience and expression are significantly related to lifetime suicidality (suicidal ideation, plans, and attempts). All analyses testing the associations between greater anger experience or IED and suicidality in the overall sample revealed significant associations. Furthermore, when both anger experience and IED were entered simultaneously into a regression model, lifetime IED diagnosis and anger experience were uniquely associated with suicidality. In addition, we found anger experience and lifetime IED diagnosis to significantly interact in the prediction of each feature of lifetime suicidal ideation. This suggests that problems of anger experience and expression have independent and additive effects in increasing the risk for suicidal ideation.

Among the individuals who had experienced suicidal ideation during the course of their lifetime, IED diagnosis, but not anger experience, predicted a subsequent suicide plan. However, both IED diagnosis and anger experience predicted a suicide attempt. In addition, when considering the unique roles of anger experience and expression variables in predicting suicidality, anger experience and lifetime IED were found to predict unique variance in suicide attempt but not suicide plans. These findings suggest that both anger experience and expression contribute to the progression from suicidal ideation to attempts. This has important implications for suicide assessment among those reporting current ideation.

The current study possessed a number of methodological strengths that add to existing research on this topic. First, the use of a large, nationally representative sample was an important feature. We also used sound assessments of two aspects of anger—experience and expression—and evaluated their unique and interactive roles in the prediction of suicidality. We also covaried for important demographic and psychological variables in each analysis. The current investigation possesses certain strengths over extant research on this topic, which is limited by the use of small samples lacking in generalizability and univariate analytic approaches. In addition, much of the past research on this topic focused on adolescent populations. This is one of the first studies to investigate the relationship between anger and suicidality in an adult population.

This study also has some limitations that necessitate additional research on this topic. First, the NCS-R consists of interview data and, in some instances, relied on lifetime histories of disorders. The anger experience scale assessed symptoms during the past month. This limitation makes it difficult to draw conclusions about the temporal relationships between these measures of anger and lifetime suicidality. Secondly, data from the NCS-R are cross-sectional and do not allow us to test causal relationships between suicidality and anger. Some of the analyses were limited by low power; thus, certain nonsignificant findings should be interpreted with caution. Lastly, IED represents a more severe form of anger expression; thus, we were not able to consider more minor forms of aggression in our analyses. However, the fact that the diagnostic criteria for this disorder are so behaviorally specific (*i.e.*, damaging property or hurting or threatening to hurt others) should support its consideration in suicide risk assessment.

Although there is currently no "anger disorder" in the *DSM-IV*, anger is a symptom of a number of psychological disorders (*i.e.*, MDD, posttraumatic stress disorder, bipolar disorder, IED, and various personality disorders; APA, 2000), and the current study indicates that anger may be an important indication of suicidal risk. Anger experience and expression are not typically assessed during suicide risk evaluations. However, the evaluation of core processes such as anger and agitation could assist in increasing the efficiency of suicide risk assessment.

High levels of anger experience and expression could represent an important process occurring across disorders that places individuals at a higher risk for suicide. Perhaps, heightened anger experience may lead individuals to consider extreme actions, such as suicidal behavior, as an effort to escape significant feelings of distress. In addition, explosive acts of anger, such as those present in individuals with IED, may reflect tendencies for individuals to act more impulsively when they are upset, and perhaps, such tendencies increase the risk for suicide. Furthermore, engaging in violent acts may increase one's risk for suicide by leading him/her to habituate to pain and, thus, reduce his/her fear of self-inflicted pain. Joiner's (2005) interpersonal-psychological theory of suicidal behavior proposes that such habituation to painful experiences is necessary for the emergence of suicidal behavior. Both heightened anger experience and IED symptoms could also serve to isolate individuals and contribute to lower social support, a well-established risk factor of suicidality (Van Orden et al., 2010). Assessing anger experience and expression may add important information to inform both assessment and treatment of suicidal patients. Future research in this area should attempt to test potential causal relationships between anger and suicidality, perhaps by examining changes in suicidal ideation when problematic anger is treated and vice versa.

CONCLUSIONS

The current study found that anger was significantly related to suicidality in a large, nationally representative sample of adults. Tests

of unique associations revealed that for both the overall sample and among the individuals reporting lifetime suicidal ideation, anger experience and expression each predicted unique variance in most outcomes of suicidality. The analyses also revealed anger experience and expression to interact in the prediction of suicidal ideation, suggesting that these have independent and additive effects on risk for suicide. The findings suggest that both anger experience and expression contribute to suicidality and the progression from suicidal ideation to plans and attempts.

DISCLOSURES

The authors declare no conflict of interest.

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