

# Facets of Anger, Childhood Sexual Victimization, and Gender as Predictors of Suicide Attempts by Psychiatric Patients After Hospital Discharge

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Models of suicidal behavior that assess the interplay of multiple risk factors are needed to better identify at-risk individuals during periods of elevated risk, including following psychiatric hospitalization. This study investigated contributions of facets of anger, gender, and sexual victimization to risk for suicide attempts after hospital discharge. Psychiatric patients ( $N = 748$ ; ages 18–40; 44% female) recruited from 3 inpatient facilities were assessed during hospitalization and every 10 weeks during the year following discharge as part of the MacArthur Violence Risk Assessment Study. Multiple logistic regression models with facets of anger (disposition toward physiological arousal, hostile cognitions, and angry behavior) from the Novaco Anger Scale (Novaco, 1994), gender, and childhood sexual victimization history were used to predict suicide attempts in the year following hospital discharge. Facets of anger differentially predicted suicide attempts as a function of gender and sexual victimization history, over and above the variance accounted for by symptoms of depression, anxiety, and recent suicide attempts. In men, greater disposition toward angry behavior predicted an overall greater likelihood of a suicide attempt in the year following hospital discharge, particularly among men with childhood sexual victimization. In women with a history of childhood sexual victimization, physiological arousal predicted suicide attempts. Results indicate that facets of anger are relevant predictors of suicide attempts following hospital discharge for psychiatric patients with a history of childhood sexual victimization. Further, results suggest that incorporating gender and victimization history into models of risk for suicide can help clarify relationships between anger and self-directed violence.

*Keywords:* anger, sexual victimization, gender, suicide attempts

Epidemiological surveys indicate that the prevalence of suicide is increasing in the United States (Crosby et al., 2011) and globally (World Health Organization, 2002, 2008). Approximately 1 million adults in the United States report attempting suicide within the last year (Crosby et al., 2011) and over half a million report visiting hospital emergency departments for suicide attempts and suicidal behavior (Centers for Disease Control, 2008). Psychiatric patients are at particularly elevated risk for suicide deaths and suicide-related behavior (e.g., Black, Winokur, & Nasrallah, 1987), and this risk increases following discharge from inpatient treatment (Bongar, 2002; Goldacre, Seagroatt, & Hawton, 1993). For instance, a national survey found that 24% ( $n = 519$ ) of suicide deaths occurred within 3 months of discharge from a psychiatric hospital (Appleby et al., 1999). Similarly, a prospective study found that 3.3% of discharged inpatients had a suicide death, and over a third engaged in nonsuicidal self-injury or a suicide attempt within 6 months of hospital discharge (Links et al., 2012). These data highlight the need for additional research on factors that increase risk for suicide-related behavior following psychiatric inpatient treatment.

Suicide-related behavior is characterized by a range of thoughts and behaviors that increase the risk of suicide and vary in terms of lethal intent and physical injury (Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007). Examples include self-injury without the intent to kill oneself, thoughts of suicide, suicidal threats, and attempts to inflict lethal self-injury (G. K. Brown, Beck, Steer, & Grisham, 2000; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006; Silverman et al., 2007). Research indicates that both nonsuicidal (without lethal intent) and suicidal (with lethal intent) ideation and behavior are important indicators for assessing risk for suicide (Fawcett et al., 1997).

Anger is potentially important to consider in models of suicide risk, because it is a symptom that cuts across multiple psychiatric diagnoses shown to be associated with elevated risk for suicide attempts, including posttraumatic stress disorder, borderline personality disorder, and antisocial personality disorder (M. Z. Brown, Comtois, & Linehan, 2002; Krysinska & Lester, 2010; Lieb, Zanarini, Schmahl, Linehan, & Bohus, 2004; Verona, Patrick, & Joiner, 2001; Wilcox, Storr, & Breslau, 2009). Thus, it has the potential to serve as a transdiagnostic indicator of risk for suicidal behavior across disorders with overlapping symptomatology (e.g., Nolen-Hoeksema & Watkins, 2011). Despite the potential relevance of anger as a risk factor for suicidal behavior, research to date has been relatively limited and produced mixed findings. On the one hand, there is a relatively large body of research that indicates anger and aggression are positively related to suicide attempts (Daniel, Goldston, Erkanli, Franklin, & Mayfield, 2009; Esposito, Spirito, Boegers, & Donaldson, 2003;

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Giegling et al., 2009; Swahn, Lubell, & Simon, 2004; Swogger, You, Cashman-Brown, & Conner, 2011) and suicidal behavior defined more broadly (e.g., nonsuicidal self-injury and suicide attempts; Gormley & McNiel, 2010; Horesh et al., 1997; Horesh, Gothelf, Ofek, Weizman, & Apter, 1999; Swogger, Walsh, Homafar, Caine, & Conner, 2012).<sup>1</sup> Yet, several studies have not found a reliable relationship between anger and suicidal behavior (Goldston et al., 1999; Horesh, Orbach, Gothelf, Efrati, & Apter, 2003; Kerr et al., 2007; Kingsbury, Hawton, Steinhardt, & James, 1999). Thus, more research is needed to delineate whether and under what circumstances anger confers risk for suicidal behavior. Accordingly, the present study examined whether (a) conceptualizing anger as a multidimensional construct and (b) including theoretically relevant moderators, specifically childhood sexual victimization and gender, into models of risk could further clarify anger relationships with suicide attempts.

Conceptualizing anger as a multidimensional rather than unitary construct may add specificity and clarity to models of anger as a risk factor for suicide-related behavior. Research suggests that anger can be reliably measured as distinct facets that each serve to activate and maintain anger, specifically dispositions toward physiological arousal, angry behavior, and hostile cognitions (Novaco, 1994). As described by Novaco (1994), the arousal facet characterizes the physiological activation and readiness for action component of anger. In contrast, the angry behavior facet describes behavioral manifestations of anger, and the hostile cognitions and attitudes facet indexes thought processes that initiate and maintain anger. Each of these facets may represent distinct anger-related risk factors for suicidal behavior. The physiological arousal facet may be particularly relevant for predicting suicide attempts among individuals with a tendency to experience intense somatic responses to anger, based on research suggesting that suicidal behavior can bring temporary relief from states of heightened arousal (Haines, Williams, Brain, & Wilson, 1995; Nock & Mendes, 2008). Conversely, the angry behavior facet may confer risk for suicide attempts via etiological mechanisms it shares with risk for other-directed violence, such as trait impulsivity, negative emotionality, and serotonin and dopamine dysfunction (Douglas et al., 2008; Seo, Patrick, & Kennealy, 2008; Verona et al., 2001). Additionally, high levels of hostile attributions and attitudes may increase risk for suicide-related behavior through a cognitive vulnerability to repetitive and ruminative thinking similar to that observed in depression. Thus, the anger facets may index heterogeneity in the mechanisms by which anger confers risk for suicide-related behavior, and examining their unique relationships with suicide attempts could provide insight into when a particular component of anger may be most relevant for assessing risk.

One factor that may moderate relationships between facets of anger and suicide-related behavior is trauma history. According to Van Orden, Joiner, and colleagues (Van Orden et al., 2010; Van Orden, Witte, Gordon, Bender, & Joiner, 2008), exposure to traumatic experiences increases risk for suicidal behavior by promoting habituation to fear and physical pain that is necessary for enacting lethal self-injury. Consistent with this theory, a meta-analysis of 37 studies found a mean Cohen's *d* effect size of .44 between sexual abuse history and self-directed violence (broadly defined as recurrent suicidal ideation, plans, attempts, or nonsuicidal self-injury; Paolucci, Genuis, & Violato, 2001). Research also indicates that anger shows moderately strong relationships

with exposure to traumatic events (Briere & Runtz, 1987; Neumann, Houskamp, Pollock, & Briere, 1996), suggesting that it is a potentially important predictor of self-directed violence in individuals with a trauma history. Novaco, Chemtob, and colleagues theorized that anger is activated as part of a "survival mode" of functioning related to the fight-flight-freeze response following exposure to a traumatic event (Chemtob, Novaco, Hamada, Gross, & Smith, 1997; Novaco & Chemtob, 1998). Events experienced as traumatic are theorized to promote anger by activating dispositions toward heightened physiological arousal, interpreting situations as threatening and engaging in angry behavior (Novaco & Chemtob, 1998). Among the anger facets, the physiological arousal facet shows the strongest relationship with symptoms of posttraumatic stress (Novaco & Chemtob, 2002) and is positively associated with retrospective reports of childhood abuse in community samples (Kendra, Bell, & Guimond, 2012).

Sexual victimization history, in particular, has been linked to heightened anger and suicide-related behavior (Briere & Runtz, 1987; Neumann, Houskamp, Pollock, & Briere, 1996; Paolucci et al., 2001). Further, it may be crucial to understanding risk for suicide attempts in psychiatric patients, given their heightened risk for childhood sexual victimization (Bryer, Nelson, Miller, & Krol, 1987). Research also suggests that sexual victimization may be a particularly salient risk factor for suicide attempts by females (Roy & Janal, 2006; Soloff, Lynch, & Kelly, 2002), partly as a consequence of the higher prevalence of sexual victimization reported by women and girls than men and boys (Beitchman et al., 1992; Martin, Bergen, Richardson, Roeger, & Allison, 2004). Strikingly, the prevalence of sexual victimization is estimated to be 1.5 to 3 times greater in female than male samples (Briere & Elliott, 2003; Finkelhor, 1994; Finkelhor, Hotaling, Lewis, & Smith, 1990). It is important to note that sexual abuse is not necessarily a stronger predictor of suicide attempts in women than men (Molnar, Berkman, & Buka, 2001; Paolucci et al., 2001). Rather, it is the higher prevalence of sexual victimization among females that makes it a particularly important context to consider in relation to suicide attempts in women.

Gender differences in the tendency for men and women to manifest anger inwardly or outwardly (e.g., Verona & Curtin, 2006) may also be relevant for understanding variability in anger relationships with suicide attempts. There is preliminary evidence to suggest that the expression of anger relates differentially to suicide attempts in men and women. A 13-year prospective study of 180 adolescents followed into young adulthood found that high levels of trait anger and outward expressions of anger (e.g., angry behavior) predicted suicide attempts above a diagnosis of major depressive disorder selectively in men, whereas there were no direct effects of anger on suicide attempts in women (Daniel et al., 2009). Proactive aggression was also associated with suicide attempts in male but not female patients in substance-dependence treatment (Conner, Swogger, & Houston, 2009). In contrast, trait anger was not associated with suicide attempts in male offenders

<sup>1</sup> Swogger et al. (2012) also investigated self-directed violence (defined as any attempt to hurt oneself with or without suicidal intent) in relation to trait anger in the MacArthur Violence Risk Assessment Study. The present study expands on Swogger et al. by examining how gender and sexual victimization moderate relationships of the NAS anger facets with suicide attempts in the year following hospital discharge.

when entered into a model with depressive symptoms (Sadeh, Javdani, Finy, & Verona, 2011). Hostile attitudes and attributions were, however, positively associated with suicide attempts in female offenders (Sadeh et al., 2011). Overall, these studies suggest that tendencies toward expressing anger behaviorally may be more predictive of suicide attempts in men, whereas tendencies toward internalized manifestations of anger (e.g., hostile cognitions and attitudes) may be more predictive of suicide attempts in women. Though few, these studies indicate that gender is a relevant moderator to consider when examining anger as a risk factor for suicide attempts.

On the basis of the literature reviewed, in our study we sought to clarify anger relationships with suicide risk by examining anger as a multidimensional construct (a disposition toward physiological arousal, hostile cognitions, and angry behavior) as well as examining childhood sexual victimization and gender as theoretically relevant moderating variables. We hypothesized that gender and sexual victimization would moderate associations of the anger facets with suicide attempts by psychiatric patients in the year following hospital discharge.

First, we expected childhood sexual victimization to strengthen relationships of the anger facets with suicide attempts, based on research indicating that a history of childhood sexual abuse increases anger symptoms (Neumann et al., 1996). We expected this moderation to be particularly strong in relation to the physiological arousal facet, given research linking trauma with physiological arousal and physiological arousal with suicidal behavior (Haines et al., 1995; Kendra et al., 2012; Novaco & Chemtob, 2002). In regard to gender differences, we predicted that suicide attempts in male psychiatric patients would be more strongly associated with the tendency to express anger behaviorally (Conner et al., 2009; Daniel et al., 2009), whereas suicide attempts in female psychiatric patients would be more strongly associated with the hostile cognition facet of anger (Sadeh et al., 2011). We did not make predictions about whether gender would moderate relationships of the physiological arousal facet with suicide attempts, given the lack of previous research on this topic. To assess whether facets of anger predicted above the variance already accounted for by well-established predictors of self-directed violence, we included a measure of depression and anxiety symptoms and recent suicide attempts in the 2 months prior to hospitalization as covariates in analyses.

## Method

### Sample and Participant Selection

Participants were drawn from the MacArthur Violence Risk Assessment Study (MVRS), a longitudinal study of psychiatric patients recruited while hospitalized in one of three acute inpatient facilities ( $N = 1,136$ , see Monahan et al., 2001, for a more detailed description of the study methods). Participants were sampled based on age, gender, and ethnicity to ensure a consistent distribution of participants with these characteristics across the three recruitment sites. Individuals who spoke English and received a medical record diagnosis of one or more of the following diagnoses were eligible to participate: schizophrenia, schizoaffective disorder, schizophreniform disorder, dysthymia, mania, major depression, brief reactive psychosis, alcohol abuse, alcohol dependence, substance

abuse, substance dependence, delusional disorder, or personality disorder (i.e., only when an Axis I diagnosis was not present). Chart diagnoses were verified by an interview with a research clinician using the *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., rev.; *DSM-III-R*; American Psychiatric Association, 1987) Checklist or Structured Interview for *DSM-III-R* (SCID) Personality and corresponded with the chart diagnosis in 85.7% of the cases. Discrepancies in diagnosis between the chart and research clinician were resolved by a consultant psychiatrist at each site. The prevalence rates for the diagnoses in the present sample are comparable to nationally representative samples of inpatient discharges (e.g., Banta, Belk, Newton, & Sherzai, 2010). Of the 1,695 eligible participants approached to participate, 71% agreed to participate in the study. Participants completed an initial assessment during the hospital stay and were reassessed every 10 weeks for the year following discharge. All participants were approached to participate in the study within 21 days of hospital admission, and the average amount of time between hospital admission and invitation to participate in the study was 4.5 days. The initial assessment was conducted at any point during the hospital stay, and the median length of hospitalization was 9 days.

This study involved analysis of data collected in the MVRS project, which has been made publically available by the MacArthur Research Network on Mental Health and the Law. Descriptions of how informed consent was obtained and institutional review board approvals for the MVRS are provided elsewhere (Monahan et al., 2001; Steadman et al., 1998). Additional institutional review board approval was not necessary for the present project, as it involved secondary analysis of a publically available, deidentified dataset.

During hospitalization, participants completed the Novaco Anger Scale (Novaco, 1994) questionnaire, and a structured clinical interview was conducted to assess history of childhood sexual abuse and each participant's psychiatric symptoms on the Brief Psychiatric Rating Scale (BPRS; Overall & Gorham, 1962). Engagement in a suicide attempt was reassessed every 10 weeks in the year following discharge from the hospital. The number of participants with missing data at each follow-up assessment was as follows: 10-week assessment = 99 (11%); 20-week assessment = 113 (12%); 30-week assessment = 164 (18%); 40-week assessment = 185 (21%); 50-week assessment = 186 (21%). During the year posthospitalization, 533 (59%) participants completed all of the follow-up assessments, 159 (18%) participants missed one assessment, 81 (9%) participants missed two assessments, 70 (8%) participants missed three assessments, and 54 (6%) participants missed four assessments. To be included in the present study, participants must have (a) completed all of the measures administered during hospitalization, (b) completed at least three follow-up assessments in the year following hospital discharge, and (c) completed either the 40-week or 50-week follow-up assessment. These inclusion criteria resulted in 93.9% of the sample with data at the final 50-week follow-up assessment and 92.6% of the sample with at least four out of five follow-up assessments completed. Participants lost due to incomplete follow-up assessments were more likely to be male, score higher on dispositions toward angry behavior, score lower on symptoms of depression and anxiety, and were less likely to report childhood sexual victimization. Despite these differences, the effect of attrition on the present findings is likely minimal because the variables the groups

differ on are included in the model as predictors and supplemental analyses indicate that results do not change when these individuals are included in analyses versus when they are removed.

The final sample consisted of 748 male (55.6%) and female (44.4%) psychiatric patients ages 18 to 40 ( $M = 30.0$ ;  $SD = 6.23$ ). The majority of participants self-identified as White (69.4%), followed by African-American (28.6%), and Hispanic (2%). Alcohol and substance use disorders were the most common diagnoses,  $n = 557$ , 74.5% (alcohol abuse:  $n = 117$ , 15.6%; alcohol dependence:  $n = 368$ , 49.2%; substance abuse:  $n = 277$ , 37.0%; substance dependence:  $n = 368$ , 49.2%), followed by mood disorders,  $n = 505$ , 67.5% (major depression:  $n = 428$ , 57.2%; dysthymia:  $n = 22$ , 2.9%; bipolar disorder:  $n = 104$ , 13.9%; mania:  $n = 65$ , 8.7%), and psychotic disorders,  $n = 145$ , 19.4% (schizophrenia:  $n = 115$ , 15.4%; schizoaffective disorder:  $n = 44$ , 5.9%; schizophreniform disorder:  $n = 2$ , 0.3%; brief reactive psychosis:  $n = 4$ , 0.5%; delusional disorder:  $n = 4$ , 0.5%).<sup>2</sup> (Total exceeds 100% due to comorbidity.) Approximately 37% of the sample reported engaging in self-injurious behavior in the two months prior to hospital admission, and approximately 20% of participants reported inflicting self-injury with the intent to cause death (i.e., a suicide attempt).

## Assessments and Measures

**Facets of anger.** The Novaco Anger Scale (NAS; Novaco, 1994) is a self-report questionnaire that was used to index facets of anger disposition related to physiological arousal, hostile cognitions, and angry behavior. The NAS shows good reliability and construct validity in psychiatric, forensic, and nonclinical samples (Hornsveld, Muris, & Kraaimaat, 2011; Jones, Thomas-Peter, & Trout, 1999; Mills, Kroner, & Forth, 1998; Novaco, 1994). Research indicates the NAS total and subscale scores show adequate 1-month test-retest reliability (e.g.,  $r_s > .78$ ), concurrent validity with other anger measures (e.g., Aggression Questionnaire, Anger Expression Scale, State-Trait Anger Expression Inventory), and internal consistencies (e.g., alpha coefficients  $> .80$  for the subscales) (Hornsveld et al., 2011; Jones et al., 1999; Mills et al., 1998; Novaco & Chemtob, 2002). Physiological arousal was measured using the 16-item NAS Arousal subscale that assesses physiological activation and readiness for action, including anger intensity, duration, somatic tension, and irritability ( $M = 37.2$ ,  $SD = 6.4$ ; Cronbach's  $\alpha = .89$  for present sample). Disposition toward angry behavior was measured using the 16-item NAS Behavior subscale, which describes behavioral manifestations of anger including impulsive reaction, verbal aggression, physical confrontation, and indirect expression of aggression ( $M = 29.8$ ,  $SD = 6.9$ ; Cronbach's  $\alpha = .89$  for present sample). Hostile cognitions and attitudes were assessed with the 16-item NAS Cognitive subscale, which indexes thought processes that initiate and maintain anger, including attentional focus, suspiciousness, rumination, and hostile attitudes ( $M = 31.7$ ,  $SD = 5.2$ ; Cronbach's  $\alpha = .79$  for present sample). For each item, participants rated how true a statement was of their thoughts, feelings, and behavior on a scale from 1 (*never true*) to 3 (*always true*), and items were summed to create the three subscales. Participants completed the NAS during hospitalization, and the Arousal, Behavior, and Cognitive subscales were entered into analyses as hypothesized predictors of later suicide attempts in the year following hospital discharge.

**Childhood sexual victimization.** During hospitalization, participants were asked "Did anyone ever sexually abuse or assault you?" and participants who endorsed a history of sexual victimization were asked to provide the age at which the sexual abuse or assault first took place. A dichotomous sexual victimization variable was created for analysis based on the presence or absence of sexual abuse or assault before age 18 (1 = history of childhood sexual abuse or assault, 0 = absence of childhood sexual abuse or assault). Approximately 40% of the sample reported a history of childhood sexual victimization ( $n = 318$ ). Participants were then asked to classify the type of sexual victimization that occurred, in categories that correspond to definitions of sexual violence and victimization used by the Centers for Disease Control (2002). The prevalence of sexual victimization reported in the final sample was 42.5%. The most commonly reported form of sexual victimization was forced sexual intercourse (28.3%), followed by inappropriate touching (21.3%), sodomy (19.1%), attempted intercourse (12.0%), and oral sex (10.6%). Approximately 40% of the participants who endorsed a history of experiencing sexual violence reported that abuse happened "frequently" or "too many times to count," 12% reported it happened "sometimes," and another 40% reported it happened "once" or "twice." Childhood sexual victimization was measured during hospitalization and entered into analyses as a hypothesized predictor of later suicide attempts in the year following hospital discharge.

**Depression & anxiety symptoms.** Severity of depression and anxiety was assessed with the Brief Psychiatric Rating Scale (BPRS; Overall & Gorham, 1962), a widely used clinician rating scale of psychiatric symptoms. Clinicians rated participants on the severity of symptoms experienced in the previous week on a scale from 1 (*none reported*) to 7 (*very severe*) at the time of the assessment, which occurred during hospitalization. On the basis of factor analyses of the BPRS (Overall, Hollister, & Pichot, 1967; Shafer, 2005), a Depression and Anxiety symptom subscale was constructed by summing symptoms of depressive mood, guilt feelings, and anxiety ( $M = 10.7$ ,  $SD = 4.6$ ). The Depression and Anxiety BPRS subscale was entered as a covariate in analyses of suicide attempts after hospital discharge, based on research indicating symptoms of depression and anxiety are strong predictors of

<sup>2</sup> Supplemental analyses were conducted with the most prevalent diagnoses in the sample (i.e., major depression, alcohol abuse-dependence, substance abuse-dependence, and schizophrenia) to examine whether psychiatric diagnosis moderated the results. At the bivariate level, NAS Arousal correlated positively with major depressive disorder ( $r = .17$ ,  $p = .001$ ), alcohol abuse-dependence ( $r = .11$ ,  $p = .002$ ), and substance dependence ( $r = .11$ ,  $p = .002$ ), and negatively with schizophrenia ( $r = -.15$ ,  $p = .001$ ). NAS Behavior correlated positively with alcohol abuse-dependence ( $r = .18$ ,  $p = .001$ ) and substance dependence ( $r = .16$ ,  $p = .001$ ) and was unrelated to major depressive disorder and schizophrenia. NAS Cognitive correlated positively with alcohol abuse-dependence ( $r = .17$ ,  $p = .001$ ) and substance dependence ( $r = .13$ ,  $p = .001$ ) and was unrelated to major depressive disorder and schizophrenia. The unique and interactive effects of each diagnosis in the prediction of future suicide attempts were assessed in separate logistic regression analyses. A diagnosis of alcohol abuse or dependence predicted a greater likelihood of future suicide attempts, Wald  $\chi^2 = 4.26$ ,  $p = .039$ ,  $OR = 1.24$ , whereas a diagnosis of schizophrenia predicted a decreased likelihood of future suicide attempts, Wald  $\chi^2 = 12.1$ ,  $p = .001$ ,  $OR = 0.56$ . It is important to note that none of the diagnoses moderated the results reported in this study or produced new findings.

suicide attempts (Goldston, Reboussin, & Daniel, 2006; Kessler, Borges, & Walters, 1999; Sareen et al., 2005).

**Recent suicide attempts (2-month history).** Given that a history of attempting suicide is one of the best predictors of future suicide attempts (Goldston et al., 1999; Joiner et al., 2005), we included a measure of suicide attempts in the 2 months prior to hospital admission as a covariate in analyses that predicted later suicide attempts during the year after hospital discharge. Consistent with the recommendations of Silverman et al., (2007), a suicide attempt was operationalized as a self-inflicted, potentially injurious behavior with a nonfatal outcome for which there is evidence of intent to die, which was assessed via self-report. Recent suicide attempts (2-month history) were assessed by asking each participant if he or she had attempted to hurt himself or herself with the intention of killing himself or herself in the 2 months prior to hospital admission. For purposes of analysis, suicide attempts were coded as a dichotomous variable (1 = recent suicide attempt present, 0 = recent suicide attempt absent). Approximately 20% of the sample reported a recent suicide attempt in the 2 months prior to hospitalization ( $n = 148$ ). The recent suicide attempt (2-month history) variable was entered as a covariate in analyses of suicide attempts after discharge to the community.

**Suicide attempts in the year following hospital discharge.** At each 10-week assessment in the year following hospital discharge, participants were asked if they attempted to hurt themselves in the period since the previous assessment. Participants who reported an attempt to hurt themselves were then asked to specify the degree of harm sought by the act. A suicide attempt was operationalized as engaging in an act of self-injury with the intent to die, based on the nomenclature recommended by a panel of experts in suicidology (Silverman et al., 2007). Given that suicide attempts are low base-rate behaviors, suicide attempts over the course of the year following hospital discharge were aggregated into a single dependent variable that was coded dichotomously (1 = suicide attempt present; 0 = suicide attempt absent). The rates of suicide attempts at each follow-up assessment ranged from 3.7% to 5.3% of the final sample (10 week = 5.3%, 20 week = 4.0%, 30 week = 4.4%, 40 week = 3.6%, 50 week = 3.7%). Overall, approximately 17% of the sample reported engaging in a suicide attempt in the year following hospitalization ( $n = 124$ ).

**Data Analysis**

Bivariate associations were assessed between (a) dichotomous variables with Phi coefficients and (b) a dichotomous and a continuous variable with point-biserial correlations, and (c) continuous variables with Pearson correlation coefficients. Univariate gender differences were assessed via independent samples  $t$  tests or chi-square analysis, depending on the whether the variable assessed was continuous or dichotomous. Hypothesized relationships among the study variables were examined in multiple logistic regression analyses. Gender, childhood sexual victimization, the NAS subscales (Arousal, Behavioral, Cognitive), and their interactions were entered as predictors of whether or not participants attempted suicide during the year following hospital discharge. To examine the influence of the hypothesized predictors above that of previously established predictors of suicide attempts, specifically symptoms of depression and anxiety, and recent suicide attempts (2-month history), these variables were included as covariates in the regression analyses in addition to age. The number of missing follow-up assessments posthospitalization and the period of time assessed posthospitalization were also included as covariates to account for variation in the posthospitalization assessment period across participants, but they were not hypothesized to predict future suicide attempts. Assessment of multicollinearity indicated that predictor intercorrelations ( $< .80$ ; Leahy, 2000) and tolerance levels ( $> .20$ ; Gaur & Gaur, 2006) were within acceptable ranges. Odds ratios were calculated to provide a measure of effect size. Predictors and covariates were z-scored before they were entered into the regression model. The figures were created by plotting the predicted probabilities of attempting suicide for each participant against his or her score on the relevant NAS subscale.

**Results**

**Descriptive Statistics**

Bivariate correlations between the hypothesized covariates, predictors, and suicide attempts in the year following hospital discharge are provided in Table 1 as a reference for subsequent multivariate analyses. The NAS subscales showed moderate to strong positive interrelationships, which indicate they index related but distinguishable

**Table 1**  
*Bivariate Relationships Among Covariates, Predictors, and Suicide Attempts in the Year Following Hospital Discharge*

Variable	1	2	3	4	5	6	7	8	9
1. Age	—								
2. Recent suicide attempts (2-month History)	-.09*	—							
3. BPRS depression & anxiety symptoms during hospitalization	.07	.22*	—						
4. Gender	.01	.08*	.15*	—					
5. Childhood sexual victimization	-.02	.11*	.22*	.35*	—				
6. NAS Arousal	-.11*	.20*	.37*	.11*	.13*	—			
7. NAS Behavior	-.13*	.17*	.16*	.03	.06	.74*	—		
8. NAS Cognitive	-.09*	.13*	.26*	-.03	.05	.77*	.67*	—	
9. Suicide attempt in the year following hospital discharge	-.06	.16*	.07	.05	.13*	.08*	.04	.05	—

*Note.*  $N = 748$ . Recent suicide attempt: Absent = 0, Present = 1. Gender: Men = 0, Women = 1. Childhood sexual victimization: Absent = 0, Present = 1. Suicide attempt in the year following hospital discharge: Absent = 0, Present = 1. BPRS = Brief Psychiatric Rating Scale (Overall & Gorham, 1962). NAS = Novaco Anger Scale (Novaco, 1994).

\*  $p < .05$ .

facets of anger. Among the anger facets, the tendency to experience physiological arousal and activation (NAS Arousal) correlated most strongly with the occurrence of suicide attempts in the year following hospital discharge and childhood sexual victimization. Recent suicide attempts (2-month history) and childhood sexual victimization also showed the expected positive relationships with the likelihood of suicide attempts in the year following hospital discharge.

Table 2 includes descriptive statistics for the hypothesized covariates, predictors, and suicide attempts in the year following hospital discharge in the total sample and for women and men separately. Approximately 17% of the sample reported one or more suicide attempts in the year following discharge from the hospital. Proportionately more women reported suicide attempts in the 2 months prior to hospitalization than men,  $\chi^2(1) = 5.17, p = .027$ , but no gender differences emerged in the risk of suicide attempts during the year follow-up period. Clinicians rated women as having more severe symptoms of depression and anxiety on the BPRS,  $t(746) = -4.10, p < .001$ , and women reported higher levels of physiological arousal on the NAS than men,  $t(746) = -2.94, p = .003$ . Women did not differ from men on the hostile cognitions or angry behavior NAS facets. As predicted, the genders differed by childhood sexual victimization history, with a substantially larger proportion of women than men reporting sexual abuse or assault as children (62.3%) than men (26.7%),  $\chi^2(1) = 96.1, p < .001$ .

### Multiple Logistic Regressions

Results of regressing suicide attempts in the year following hospital discharge on gender, childhood sexual victimization, and the NAS subscales are presented in Table 3. A history of suicide attempts in the 2 months before hospital admission, Wald  $\chi^2 = 14.13, p < .001$ , odds ratio (*OR*) = 1.40, predicted the risk of attempting suicide after hospital discharge, whereas BPRS Depression and Anxiety Symptoms and age did not. Childhood sexual victimization also positively predicted attempting suicide in the year following hospital discharge, Wald  $\chi^2 = 7.84, p = .005, OR = 1.36$ . In the multivariate model, gender and the NAS subscales did not directly predict risk of attempting suicide above the variance accounted for by recent suicide attempts (2-month history), age, and symptoms of depression and anxiety during hospitalization.

Gender and childhood sexual victimization moderated the relationships of the NAS subscales with risk of attempting suicide

during the year follow-up period. First, a two-way Gender  $\times$  NAS Behavior interaction emerged, Wald  $\chi^2 = 7.92, p = .005, OR = 0.61$ , that reflected a cross-over effect. Specifically, a disposition to engage in angry behavior positively predicted suicide attempts in men and negatively in women. These relationships were further qualified by a Gender  $\times$  Childhood Sexual Victimization  $\times$  NAS Behavior interaction, Wald  $\chi^2 = 6.87, p = .009, OR = .63$ , which is depicted in Figure 1. Follow-up analyses conducted within each gender as a function of childhood sexual victimization revealed that NAS Behavior significantly predicted suicide attempts in the year posthospital discharge for men, Wald  $\chi^2 = 5.50, p = .019, OR = 1.76$ , but not women ( $p > .15$ ). In men with childhood sexual victimization, a tendency to act aggressively when angry positively predicted suicide attempts, Wald  $\chi^2 = 6.98, p = .008, OR = 3.26$ , whereas it did not in men without a history of sexual abuse or assault ( $p > .84$ ).

The regression analysis also produced a Gender  $\times$  Childhood Sexual Victimization  $\times$  NAS Arousal interaction, Wald  $\chi^2 = 4.03, p = .045, OR = 1.53$ . To disentangle the interaction, follow-up analyses were conducted within each gender. These analyses revealed a significant Childhood Sexual Victimization  $\times$  NAS Arousal interaction for women, Wald  $\chi^2 = 4.29, p = .038, OR = 1.95$ , but not men ( $p > .46$ ). As illustrated in Figure 2, physiological arousal positively predicted suicide attempts in women with childhood sexual victimization, Wald  $\chi^2 = 4.01, p = .045, OR = 2.03$ , but did not in women without childhood sexual victimization ( $p > .34$ ).

In summary, the NAS facets differentially predicted suicide attempts in the year following hospital discharge as a function of gender and childhood sexual victimization above the variance accounted for by symptoms of depression and anxiety and recent suicide attempts. A disposition toward angry behavior predicted a greater likelihood of suicide attempts in men, particularly men with a history of childhood sexual victimization. In contrast, the arousal facet of anger was particularly important for predicting suicide attempts in women with a history of childhood sexual abuse or assault.

### Discussion

This study investigated whether facets of anger predict suicide attempts in the year following patients' discharge from psychiatric hospitalization. As hypothesized, facets of anger predicted suicide

Table 2  
Descriptive Statistics for the Final Sample and by Gender

Variable	Women	Men	Final sample	Statistical difference test
Age ( <i>M/SD</i> )	30.0 (6.1)	30.0 (6.3)	30.0 (6.2)	$t(746) = -0.13$
Recent Suicide Attempts (2-Month History) ( <i>Frequency/%</i> )	78 (23.5)	70 (16.8)	148 (19.8)	$\chi^2(1) = 5.17^*$
BPRS Depression & Anxiety Symptoms During Hospitalization ( <i>M/SD</i> )	11.5 (4.6)	10.1 (4.5)	10.7 (4.6)	$t(746) = -4.10^*$
Childhood Sexual Victimization Present ( <i>Frequency/%</i> )	207 (62.3)	111 (26.7)	318 (42.5)	$\chi^2(1) = 96.1^*$
NAS Arousal ( <i>M/SD</i> )	33.5 (6.4)	32.1 (6.4)	32.7 (6.4)	$t(746) = -2.94^*$
NAS Behavior ( <i>M/SD</i> )	30.0 (6.9)	29.6 (6.9)	29.8 (6.9)	$t(746) = -0.93$
NAS Cognitive ( <i>M/SD</i> )	31.5 (5.1)	31.9 (5.3)	31.7 (5.2)	$t(746) = 0.87$
Occurrence of Suicide Attempts in the Year Following Hospital Discharge ( <i>Frequency/%</i> )	62 (18.7)	62 (14.9)	124 (16.6)	$\chi^2(1) = 1.90$

Note.  $N = 748$ ; Women:  $n = 332$ ; Men:  $n = 416$ ; Gender: Men = 0; Women = 1; BPRS = Brief Psychiatric Rating Scale (Overall & Gorham, 1962). NAS = Novaco Anger Scale (Novaco, 1994).

\*  $p < .05$ .

Table 3

Logistic Regression Models of Gender, Childhood Sexual Victimization, and Anger Facets Predicting Suicide Attempts in the Year Following Hospital Discharge

Variable	Suicide attempts				
	<i>B</i>	<i>SE</i>	Wald $\chi^2$	<i>OR</i>	<i>p</i>
Period assessed posthospitalization	-0.03	0.12	0.07	0.97	.80
No. of missing assessments posthospitalization	-0.27	0.13	4.52	0.76	.034*
Age	-0.16	0.10	2.41	0.85	.12
Recent suicide attempts (2-month history)	0.34	0.09	14.13	1.40	.001*
BPRS depression & anxiety symptoms during hospitalization	0.11	0.11	1.10	1.12	.30
Gender	-0.03	0.10	0.06	0.97	.80
Childhood sexual victimization	0.30	0.10	7.84	1.35	.005*
NAS Arousal	0.19	0.19	0.38	1.13	.54
NAS Behavior	-0.07	0.16	0.19	0.94	.66
NAS Cognitive	0.00	0.17	0.00	1.00	.99
NAS Arousal × Gender	0.18	0.21	0.76	1.20	.38
NAS Behavior × Gender	-0.49	0.18	7.92	0.61	.005*
NAS Cognitive × Gender	0.14	0.18	0.54	1.14	.46
Gender × Childhood Sexual Victimization	0.07	0.12	0.38	1.07	.54
NAS Arousal × Childhood Sexual Victimization	0.12	0.21	0.33	1.13	.56
NAS Behavior × Childhood Sexual Victimization	0.18	0.17	1.11	1.20	.29
NAS Cognitive × Childhood Sexual Victimization	-0.17	0.18	0.85	0.85	.36
NAS Arousal × Gender × Childhood Sexual Victimization	0.42	0.21	4.03	1.52	.045*
NAS Behavior × Gender × Childhood Sexual Victimization	-0.46	0.18	6.87	0.63	.009*
NAS Cognitive × Gender × Childhood Sexual Victimization	-0.06	0.18	0.10	0.95	.76

Note. *N* = 748. Recent Suicide Attempts: Absent = 0, Present = 1. Gender: Men = 0, Women = 1. Childhood sexual victimization: Absent = 0, Present = 1. Suicide attempt in the year following hospital discharge: Absent = 0, Present = 1. BPRS = Brief Psychiatric Rating Scale (Overall & Gorham, 1962); NAS = Novaco Anger Scale (Novaco, 1994); OR = odds ratio.

\* *p* < .05.

attempts above the influence of other well-established risk factors, including symptoms of depression and anxiety, and a recent history of suicide attempts, when entered into a model that accounted for the moderating effects of gender and sexual victimization history. Physiological arousal predicted suicide attempts in women who experienced childhood sexual victimization. In contrast, a disposition toward angry behavior pre-

dicted suicide attempts in men, particularly those with childhood sexual victimization. In combination, the results suggest that facets of anger have distinct predictive relationships with risk for suicide attempts in the year following hospital discharge. Further, the results illustrate the importance of incorporating gender and sexual victimization into models of risk for self-directed violence.

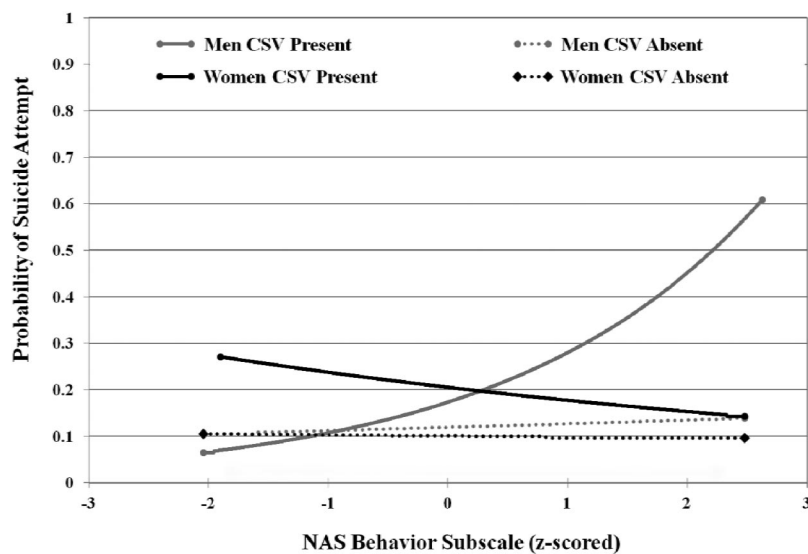


Figure 1. NAS Behavior Predicting the Probability of Suicide Attempts in the Year Following Hospital Discharge. CSV = Childhood Sexual Victimization.

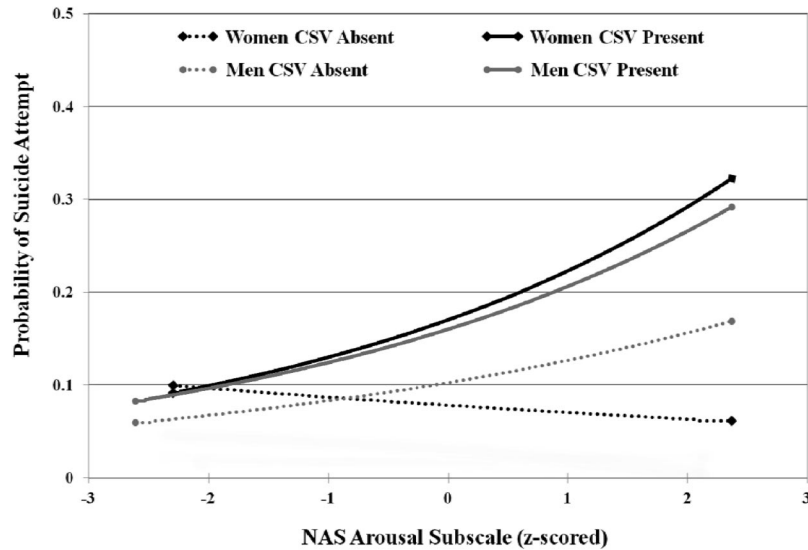


Figure 2. NAS Arousal Predicting the Probability of Suicide Attempts in the Year Following Hospital Discharge. CSV = Childhood Sexual Victimization.

The association of a disposition toward physiological arousal with increased risk for suicide attempts in the context of sexual victimization extends the growing literature that indicates heightened physiological arousal to stress is a risk factor for suicide and nonsuicidal self-injury (Nock, 2009; Nock & Mendes, 2008). Researchers have theorized that one function of engaging in suicidal behavior is to regulate aversive arousal and negative affect (M. Z. Brown et al., 2002; Nock & Mendes, 2008). However, few studies have directly tested the hypothesis that a disposition toward physiological arousal predicts future suicide-related behavior. Recent work has found that individuals with a history of nonsuicidal self-injury demonstrate increased skin conductance during a distressing task (Nock & Mendes, 2008), and arousal decreases in self-injurers when they imagine engaging in suicidal behavior (Haines et al., 1995). The present results extend these studies by showing that patients with a history of sexual victimization had a greater likelihood of suicide attempts following hospital discharge when they reported increased anger-related arousal, an effect that was particularly strong for women.

In contrast to the results for women, the findings for men indicate that a disposition toward angry behavior predicts risk for suicide attempts following hospital discharge. This finding replicates previous research showing that angry behavior predicts suicide attempts in young adult men but not women (Daniel et al., 2009) and proactive aggression predicts suicide attempts in male but not female patients in substance-dependence treatment (Conner et al., 2009). A disposition toward angry behavior may be more predictive of suicide attempts in men than women as a function of their tendency to have lower levels of behavioral constraint, a personality trait positively associated with angry behavior and suicide attempts (Douglas et al., 2008; Roberts, Caspi, & Moffitt, 2001; Verona et al., 2001).

We did not find that hostile cognitions are a stronger predictor of suicide attempts in women than men, which we expected based on previous work examining these relationships in an externalizing

sample of adults (Sadeh et al., 2011). This failure to replicate may reflect differences in the sample composition (i.e., individuals involved in the criminal justice system vs. nonforensic psychiatric patients), though more research is needed to clarify relationships between gender, hostility, and risk for suicidal behavior. Although the present findings extend the growing literature on gender differences in risk factors for self-directed violence, more research is needed to better understand the mechanisms underlying the relationship between anger facets and risk for suicide attempts in men and women.

One contribution of this study that has implications for clinical practice is that it provides preliminary evidence that men and women with a history of sexual victimization may benefit from different treatment interventions. First, the risk conferred by physiological arousal for future suicide attempts in women supports the clinical relevance of teaching at-risk individuals ways to tolerate intense distress and aversive arousal, which is typically elevated among individuals with a history of trauma exposure (Kendra et al., 2012; Novaco & Chemtob, 2002). Thus, the present results support the potential value of the distress tolerance skills taught in dialectical behavior therapy and relaxation-based interventions for reducing risk for suicide attempts, particularly for women who report high levels of physiological arousal. Second, the finding that a disposition toward angry behavior is a predictor of suicide attempts in men with childhood sexual victimization suggests that anger management may reduce risk of suicide attempts in men with a history of sexual abuse. Indeed, meta-analyses conducted on the effectiveness of anger management interventions (e.g., cognitive restructuring, relaxation, skills training) indicate that they are effective at reducing anger and decreasing aggression (Beck & Fernandez, 1998; DiGiuseppe & Tafrate, 2003), though the potential of these interventions to reduce risk for suicide attempts has largely been neglected in the literature. Taken together, our findings suggest that teaching distress tolerance and relaxation skills may help reduce risk for suicide attempts in female psychiatric



patients, whereas anger management techniques may help mitigate risk of suicide attempts in male psychiatric patients with a history of sexual victimization.

As with any investigation, this study has potential limitations. First, risk factors for suicide deaths were not studied, which may limit the generalizability of these results to nonfatal suicide attempts. Nonetheless, research indicates that nonfatal suicide attempts are among the strongest predictors of eventual suicide death (Borges et al., 2006), suggesting that the present results may still be relevant to understanding risk for suicide death. Second, our use of a retrospective self-report assessment of sexual victimization experiences is susceptible to recall and social-desirability bias, which may have increased measurement error and decreased our ability to detect certain relationships between sexual victimization and suicide attempts. Research examining the limitations associated with using retrospective measures of adverse events in childhood suggests that this methodological approach has measurement bias, but it can provide relevant information as long as the events assessed are adequately operationalized, do not rely on detailed accounts, and are serious enough to be recalled (Hardt & Rutter, 2004). Measurement of sexual victimization in this study meets these requirements, suggesting it is a useful measure despite the bias inherent in use of a retrospective measure of childhood adversity. Third, the longitudinal nature of this study may have impacted the likelihood that patients would attempt suicide, as there is some evidence that follow-up contacts with patients can influence the risk of suicide-related behavior (Kim et al., 2010; Motto & Bostom, 2001). Also, there is a possibility that attrition affected the findings, given that not all participants completed the follow-up assessments. Fourth, our measure of suicide attempts was based on self-report of the participants and data were not available to assess the reliability of this variable.

We also did not include psychiatric diagnosis as a moderating variable in this study and cannot speak to how diagnostic status may have affected our findings. It may be fruitful to explore whether the anger facets function differentially across psychiatric disorders in future research. For instance, anger may function differently in internalizing (e.g., mood and anxiety disorders) versus externalizing (e.g., substance use and antisocial) disorders in that the former may confer risk for an individual to direct anger inward, whereas the latter may increase the likelihood that an individual will direct anger toward others. However, research suggests that externalizing disorders are associated with risk for suicide attempts when comorbidity with internalizing disorders is accounted for (Verona, Sachs-Ericsson, & Joiner, 2004), which is not consistent with this model. Serotonin dysfunction and poor self-regulation are mechanisms by which anger may increase risk for suicide attempts in psychiatric patients across diagnoses (Douglas et al., 2008; Seo et al., 2008), as empirical evidence converges to suggest that low serotonin functioning and impaired executive functions are associated with both depression and impulsive aggression (Carver, Johnson, & Joormann, 2008). On a related note, it is possible that facets of anger could indirectly index factors that are not specific to anger, but encompass different risk processes than those typically captured by a unitary anger variable, such as trauma reexperiencing or other psychiatric diagnoses. Thus, the interpretation of the findings for the anger facets may not generalize to studies that have examined a more general anger variable. Further research is needed to explicate the external

correlates of these facets in relation to anger-related psychiatric diagnoses and risk for suicide attempts.

This study has several strengths, including the use of a prospective design to evaluate risk factors for future suicide attempts, recruitment of a large and clinically relevant sample of psychiatric patients at elevated risk for suicide (Qin, Agerbo, & Mortensen, 2003), and examination of an integrative model of risk for suicide attempts. It extends the literature on risk for self-directed violence by examining anger as a multidimensional construct and adds to the burgeoning body of research that indicates gender and childhood victimization experiences are important moderators to consider when assessing risk for suicide attempts.

In summary, the results of our study support the conclusion that facets of anger and childhood sexual victimization increase the risk of suicide attempts by psychiatric patients after discharge to the community, and that assessment of these issues adds information over and above other well-established risk factors for suicidal behavior. The results suggest that dispositions toward physiological arousal and angry behavior differentially affect risk for attempted suicide in female versus male patients, respectively. Furthermore, the findings indicate that relationships between facets of anger and suicide attempts are strengthened in the context of childhood sexual victimization.

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