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The relationship of outwardly-directed aggression to suicidal ideation and suicide attempts across two high-risk samples

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Abstract

Objective—While research has established some relationships between risk factors and specific suicide-related outcomes, in large part the extent to which suicidal ideation and attempts have different risk profiles is unclear. Using two theories of suicidal behavior to guide our hypotheses, we studied the relationship of outwardly-directed aggression to suicidal ideation and attempts in two high-risk samples.

Method—Participants in study one were 271 criminal offenders in a pretrial diversion program. Participants in study two were 892 psychiatric inpatients who participated in the MacArthur Violence Risk Assessment Study.

Results—In both studies, after controlling for relevant covariates, outwardly-directed aggression was associated with suicide attempts, but not ideation. Among psychiatric patients, further analyses revealed that outwardly-directed aggression was associated with planned, but not unplanned, suicide attempts.

Conclusions—That aggression is related to suicide attempts and not ideation is consistent with hypotheses based on both Joiner's (2005) interpersonal theory of suicidal behavior and theories based on a diathesis toward behavioral dysregulation (e.g., Mann, 2009). That aggression was associated with planned suicide attempts is consistent with Joiner's theory. Competing explanations for the results include a potential role of proactive aggression in suicide attempts, particularly planned attempts.

Keywords

aggression; suicide; suicide attempts; suicidal ideation; interpersonal theory

Approximately 5.6 – 14.3% of the United States population considers suicide at some point during their life (i.e., suicidal ideation) and a lower proportion—between 1.9 and 8.7%—attempt suicide (Nock et al., 2008). The prevalence of suicidal ideation is higher in forensic (Ilgen, Burnette, Conner, Czyz, Murray, & Chermak, 2010; Morgan & Hawton, 2004) and clinical populations (Beck, Brown, & Steer, 1979; Radomsky, Haas, Mann, & Sweeney, 1999). However, in most high-risk samples, a minority of individuals with suicidal ideation

go on to make suicide attempts. For this reason, it is important to identify factors that contribute differentially to suicidal ideation and attempts. In the present study we examined outwardly-directed aggression and its relationship to suicidal ideation and attempts.

Research has established some relationships between risk factors and specific suicide-related outcomes. Depression, one of the strongest risk factors for suicide deaths, has been shown to predict suicidal ideation in numerous studies (e.g., Nock, Hwang, Sampson, & Kessler, 2009; Wilcox, Arria, Caldeira, Vincent, Pinchevsky, & O'Grady, 2012). However, in an analysis of the National Comorbidity Survey Replication that considered planning and attempts among those with suicide ideation, depression was not shown to predict the transition to suicide plans or attempts. In contrast, disorders that are characterized by anxiety/agitation (post-traumatic stress disorder) or low impulse control (substance abuse disorders, conduct disorder) were shown to predict suicide planning and attempts among those with suicide ideation (Nock, Hwang, Sampson, & Kessler, 2009). Similarly, Keilp et al. (2006) found that aggression distinguished between suicide attempters and non-attempters among individuals with major depressive disorder. Overall, the extent to which different types of suicidal ideation and behavior have different risk profiles is unclear (Conner et al., 2007; Kessler, Borges, & Walters, 1999). Further, the specific behavioral and/or psychological mechanisms whereby specific disorders may contribute to the transition from ideation to attempt is not known. Elucidating these relationships has implications for prevention; if risk factors differ across outcomes -- including suicidal ideation, planning, and attempts -- it would suggest the need for targeted strategies to prevent and treat these outcomes. Alternatively, if different outcomes share a common risk profile, then a singular prevention and treatment strategy may be of greater value (Conner et al., 2007; Kessler et al., 1999).

We hypothesize that outwardly directed aggression is a key behavioral mechanism that contributes to differentiating ideation only from attempts. First, outwardly-directed aggression is one symptom of impulse control disorders, which predict suicide planning and attempts among those with suicide ideation (Nock et al., 2009). Further, outwardly directed aggression has been specifically linked with suicide attempts (Angst & Clayton, 1986; Conner, Swogger, & Houston, 2009; Swogger, You, Cashman-Brown, & Conner, 2011). Empirical findings linking aggression to suicidal behavior have been summarized and integrated into models of suicidal behavior. Mann and colleagues (2003) proposed an influential diathesis-stress model of suicidal behavior. The model proposes that a biologically-based diathesis—which involves the serotonergic system at the biological level and manifests as impulsive and aggressive traits at the biological level—predisposes individuals to act on suicidal thoughts (the latter are produced by psychosocial stressors). In this model, impulsivity and aggression are considered together as indicators of “behavioral dysregulation,” which is the observable sign of the underlying biologically-based diathesis for suicidal behavior. Further, the model proposes that the mechanism whereby the diathesis—manifested as either aggression or impulsivity—confers risk is by increasing impulsive (unplanned) behaviors: “Behavioral dysregulation is thought to characterize suicidal behavior, with traits of impulsivity and aggression being particularly salient because impulsiveness favors acting on emotions including anger and suicidal ideation.” (Mann et al., 2009; p. 557). Thus, both suicidal behavior and aggression are proposed to result from

the presence of impulsivity. Similar models that stress the role of impulsivity or impulsive aggression with regard to suicidal behavior have been proposed by others (e.g., Conner, Duberstein, Conwell, & Caine, 2003; Plutchik, Van Praag, & Conte, 1989). These models also feature the idea that individuals who demonstrate impulsive aggressive behaviors will be more likely to act on suicidal thoughts because they are prone to rapidly transition from suicidal thoughts to action. Consistent with this idea, analysis of a large sample of adults with alcohol dependence showed that a measure of aggressive behavior that took place while drinking predicted the transition from suicidal ideation to unplanned (but not planned) suicide attempts (Conner et al., 2007).

Another model, Joiner's interpersonal theory of suicidal behavior (Joiner, 2005; Van Orden, Witte, Cukrowicz, Braithwaite, Selby, & Joiner, 2010), also proposes a key role for aggression in the transition from suicidal ideation to attempts. However, this theory proposes a different mechanism whereby aggression confers risk for suicidal behavior. The theory distinguishes between desire for suicide and capability to engage in suicidal behavior, and argues that, in order for suicidal ideation to result in suicide attempts, individuals must possess the capability to engage in life-threatening behaviors. This capability manifests as reduced fear of death and self-injury as well as increased physical pain tolerance. Further, the theory posits that individuals are not born with the capability to die by suicide, as humans are biologically prepared to be frightened of cues that signal threats to survival. The theory asserts that capability for suicide is acquired over time through two mechanisms, 1) exposure to painful and provocative (i.e., frightening) experiences and 2) habituation and activation of emotional opponent processes to these painful and provocative experiences. In essence, habituation and activation of opponent processes in the face of painful and frightening stimuli cause fearful stimuli to become less frightening and painful stimuli to become less painful. The theory posits an *indirect* role for aggression and impulsivity, such that aggressive and impulsive behaviors both increase the likelihood that individuals will be exposed to painful and provocative experiences. Witnessing others' pain and injury can lead to vicarious habituation, which, in turn, increases capability for suicide (Joiner, Van Orden, Witte, & Rudd, 2009). Thus, exposure to outwardly-directed aggression, particularly as the perpetrator, may also lead to habituation to fear and pain that places one at greater risk for the transition from suicidal ideation to suicide attempts (Bryan, Cukrowicz, West, & Morrow, 2010). Combat exposure provides an extreme example of interpersonal aggression that leads to pain and fear but can be attenuated with repetition (Selby et al., 2010). Supporting the link between combat exposure and suicide attempts, Bryan, Morrow, Anestis, and Joiner (2010) found that active duty members of the United States Air Force displayed higher levels of acquired capability than individuals from a non-military clinical comparison sample. It is possible, however, that interpersonal aggression outside of military contexts -- for example, that occurring in urban "combat zones" -- results in similar exposure to pain and fear that leads to the acquired capability for suicidal behavior.

The aforementioned models of the association between aggression and suicidal behavior posit that aggression plays a role in suicide risk by increasing the likelihood that suicidal ideation will result in suicide attempts (i.e., the transition from ideation to attempts) rather than risk for developing suicidal thoughts. The first aim of the present studies was to

examine the relationship between outwardly-directed aggression and both suicidal ideation and attempts. We hypothesized that greater outwardly-directed aggression would be associated with increased risk of attempting suicide, but not associated with increased risk for the presence of suicidal ideation.

A difference between the interpersonal model of suicidal behavior proposed by Joiner and colleagues versus that offered by Mann et al., 2003 (and similar models described by Conner et al., 2003 and Plutchik et al., 1989) is that the interpersonal model proposes that interpersonal aggression is associated with increased risk for suicide attempts because the experience of interpersonal aggression facilitates acquired capability. The other models consider both aggression and impulsivity to be forms of behavioral dysregulation that causes individuals to be unable to suppress acting on thoughts, for example in the face of perceived provocation. With regard to trait impulsivity, a provocative study by Witte et al., (2008) indicated that impulsive people actually engage in greater prior planning for suicide attempts and are more likely to make medically serious suicide attempts. These results are consistent with an indirect role for impulsivity, potentially via acquired capability, in increasing risk for suicidal behavior. That is, impulsive individuals are more likely to be exposed to painful experiences than less impulsive individuals (Witte et al., 2008). However, to our knowledge, a similar finding of a role of aggressive behavior in more planned suicidal behavior in particular has not been shown previously. Thus, the second aim of the present studies is to examine the competing hypotheses derived from Mann's theory and others versus the interpersonal theory: namely, whether outwardly-directed aggression will be associated with impulsive (i.e., unplanned) or more planful attempts.

The Present Studies

We report the results of two studies of samples from high-risk populations: criminal offenders and psychiatric inpatients. We note that the first study includes a re-analysis of Swogger et al. (2011), which reported a relationship between aggression and suicide attempts, but did not examine suicidal ideation. Our aims are 1) to examine outwardly-directed aggression and its relationship to suicide attempts and 2) to examine whether outwardly-directed aggression will be associated differentially with planned and unplanned attempts. With regard to our first aim we hypothesized that aggression will be related to suicide attempts and unrelated to suicidal ideation in both samples. Our second aim was exploratory and we made no hypotheses. In all analyses across both samples we assessed relevant covariates for inclusion in the adjusted regression models. Based on prior research on suicidal behavior, these covariates included sex, race, age, education level or verbal IQ, and symptoms of depression and substance use disorders (Andersson, Allebeck, Gustafsson, & Gunnell, 2008; Brown, Beck, Steer, & Grisham, 2000; Swogger, Conner, Meldrum, & Caine, 2009).

Study 1

Swogger et al. (2011) found a relationship between lifetime aggression and suicide attempts. In the present re-analysis we expected that, after we rigorously controlled for relevant covariates, lifetime aggression would continue to explain variance in suicide attempts. We hypothesized that aggression would not be related to suicidal ideation.

Method

Participants: Participants were 204 male and 67 female ($n = 271$) criminal offenders, ages 18-62 ($M = 33.6$; $SD = 11.0$), participating in an urban pretrial supervision program in the Northeastern United States subsequent to receiving criminal charges. The sample was 55.4% African American ($n = 150$), 28.8 % White ($n = 78$), 15.9 % Other ($n = 43$). Mean education level (i.e., highest grade completed) was 11.5 ($SD = 1.9$). The mean number of lifetime violent charges (including robbery, assault, murder, weapons charges, kidnapping, arson, criminal damage to property, and sex crimes; Walsh et al., 2004) was 2.1 ($SD = 3.4$).

Procedures: Following a brief announcement about the study, individuals who stepped forward to participate and provided consent completed a number of self-report measures. All forms were checked for missing data and errors prior to ending the session. Participants were compensated for their time with a gift card. Among those who heard the announcement, 73.8% participated.

Measures

Depression and Substance Use Disorders: The Psychiatric Diagnostic Screening Questionnaire (PDSQ; Zimmerman, 2000; Zimmerman & Mattia, 2001) is a self-report diagnostic screening measure consisting of 125 items that are answered yes or no. We measured current symptoms of depression, alcohol use disorder, and drug use disorder using PDSQ subscales. The PDSQ has been extensively tested with psychiatric outpatients and there is considerable evidence for the validity of the scales that we used (Zimmerman & Chelminski, 2006; Zimmerman & Mattia, 2001; Zimmerman & Sheeran, 2003). Because behavioral disorders can be conceptualized as representing extremes of continuous dimensions (Plomin, Owen, & McGuffin, 1994), we created a continuous variable for each disorder by summing the total items endorsed, following Lesser et al.'s (2005) approach. The mean score for the 21-item depression scale was 6.10 ($SD = 4.62$). For the six-item drug and alcohol use disorder scale, the means were 1.46 ($SD = 2.10$) and 2.87 ($SD = 2.50$), respectively. Internal consistency for the PDSQ subscales was excellent ($\alpha = .86-.91$).

Suicidal Ideation and Attempts: Participants were asked to respond yes or no to the questions: 1) "have you ever seriously thought about committing suicide, and 2) "have you ever tried to kill yourself or attempted suicide?" These items are modifications of questions from the National Comorbidity Survey (Kessler et al., 1999) and show good test-retest reliability (Conner et al., 2007). In the current sample, 51 (18.8%) participants reported a history of suicidal ideation and 40 (14.8%) reported a lifetime suicide attempt.

Outwardly-Directed Aggression: Frequency of aggressive behavior since age 13 was assessed using the 5-item (e.g., "physical fights with other people", "deliberately struck or broke objects in anger") aggression subscale of the Life History of Aggression Questionnaire (LHAQ), a reliable and valid measure of overt verbal and physical outwardly-directed aggression that yields a continuous score (Coccaro et al., 1997). The LHAQ uses 0-5 scales to assess the frequency of different types of aggression from "none" to "more events than can be counted." In the present sample, internal consistency for the aggression subscale was excellent ($\alpha = .87$; mean score = 11.47, $SD = 6.78$).

Data analysis: The criterion variables were binary: lifetime suicidal ideation versus none and lifetime suicide attempt versus none. We first examined the relationship of each predictor to suicidal ideation or attempt in bivariate logistic regressions. We retained variables showing $p < .20$ (Hosmer & Lemeshow, 2000) with criterion variable to be entered simultaneously into multivariate models. Primary analyses were two separate multivariate logistic regression models; one for suicidal ideation and one for suicide attempts.

Results and Discussion—There were no bivariate outliers and the continuous variables exhibited no substantial deviations from normality. The highest correlation among predictors/covariates was $r = .32$, indicating an absence of pronounced multicollinearity.

Race, gender, age, and education level (i.e., highest grade completed) were unrelated to suicidal ideation ($ps > .20$) and were not retained in the multivariate logistic regression model. As shown in Table 1, lifetime aggression, symptoms of alcohol and drug use disorder, and symptoms of depression (excluding those related to suicidal ideation) were each related to suicidal ideation in bivariate tests. In the multivariate model (Table 1), only symptoms of depression remained associated with suicidal ideation.

Race and education level were not associated with suicide attempt in bivariate analyses, while female gender and age were positively associated with suicide attempts, and were thus retained for the multivariate model. In bivariate tests, lifetime aggression, symptoms of alcohol and drug use disorder, and symptoms of depression were associated with suicide attempt. In the multivariate model (Table 1), lifetime aggression and depression remained associated with suicide attempts after adjusting for all other variables.

Consistent with our first hypothesis, when adjusting for several established risk factors for suicidal ideation including symptoms of depression and substance use disorders, lifetime aggression was not significantly associated with lifetime history of suicidal ideation, but remained a significant predictor of lifetime history of suicide attempts. These results suggest that the association between aggression and suicidal behavior may be specific to engaging in suicidal behavior, rather than the development of suicidal ideation.

Study 2

We had ascertained that, among criminal offenders, outwardly-directed aggression was related to suicide attempts - but not ideation - in multivariate models. However, in Study 1 we did not have the data to examine planned versus unplanned attempts as outcomes. In study 2, we aimed to examine the relationship of aggression to suicidal ideation in a large sample of psychiatric patients and then rigorously examine the relationship of aggression and suicide attempts, limiting the sample to individuals with suicidal ideation. We again expected that aggression would be unrelated to suicidal ideation, but would be related to suicide attempts among individuals with ideation. We were particularly interested in whether aggression would be more highly related to planned suicide attempts (consistent with the interpersonal model) or unplanned suicide attempts (consistent with the models proposed by Mann et al., and others).

Participants—Participants were 1136 civil psychiatric patients between the ages of 18-40 ($M = 30.3$, $SD = 6.1$) who were recruited from one of three acute inpatient hospitals as part of the MacArthur Violence Risk Assessment Study (see Silver, Mulvey, & Monahan, 1999, for a detailed description of this study). Additional inclusion criteria included, (a) civil admission, (b) English speaking, and (c) a diagnosis, based on medical records, of schizophrenia, schizophreniform disorder, schizoaffective disorder, dysthymia, depression, mania, brief reactive psychosis, delusional disorder, alcohol or other drug abuse or dependence, or a personality disorder. Researchers approached eligible patients to request informed consent an average of 4.5 days after hospital admission. Otherwise eligible patients were excluded if they had been hospitalized for 20 or more days prior to being approached (Skeem & Mulvey, 2001). Of those approached, 71% agreed to participate.

For the present study, we have incorporated data from the baseline interview, conducted in the hospital. Participants are the 514 male and 378 female ($n = 892$) patients, ages 18-40 ($M = 29.9$, $SD = 6.2$) who have scores on the measures described below. The ethnic distribution is 630 (70.6%) White, 262 (29.4%) Black.¹ Three hundred and sixty-eight patients (41.3%) had Axis I psychiatric diagnoses without substance use disorder, 375 (42.0%) had both substance use disorder and Axis I diagnoses, and 132 (14.8%) had a substance use disorder diagnosis only. Two-hundred and fifty-nine individuals (29.0%) were diagnosed with a psychotic disorder and 247 (27.7%) were diagnosed with a personality disorder.

Measures

Suicidal Ideation, Planning, and Attempt: Three questions were used to assess history of suicidal ideation and attempts, as well as the level of planning and intent to die associated with the attempts. Participants were asked whether they had thought of hurting themselves in the past two months. Those who answered affirmatively were asked whether they had attempted to hurt themselves during the past two months. Individuals who answered yes to the second question were asked about the degree of harm that they sought to inflict. Six-hundred and nineteen (69.4%) indicated recent suicidal ideation. Of those, 329 (53.2%) reported a suicide attempt. Of individuals with a suicide attempt, 189 (57.4%) reported at least some planning prior to the attempt and 140 (42.6%) reported “none”; 172 (52.3%) reported intent to die.

Outwardly-Directed Aggression: Perpetration of aggression was assessed at baseline during interviews with participants and collateral informants. Aggression was defined as battery resulting in physical injury (ranging from bruises to death), sexual assault, and threats with weapons in hand. This data was coded for the presence versus absence of violence during the two months prior to assessment, with 142 (15.9%) individuals reporting violence and 750 (84.0%) reporting none.

Substance Use Diagnosis: Based upon administration of a DSM-III-R checklist at baseline, the presence versus absence of a current substance use disorder diagnosis was determined. Five-hundred and seven participants (56.8%) met criteria for a substance use disorder.

¹Latino participants ($n=18$) were excluded from analysis to avoid drawing conclusions from an insufficient sample.

Depression and Anxiety: Depression and anxiety scores were derived from the depression and anxiety subscale ($M = 13.1$, $SD = 5.4$) of the Brief Psychiatric Rating Scale (BPRS; Overall & Gorham, 1962), a valid measure of psychopathology in psychiatric patients (Shafer, 2005).

Verbal Intelligence: Verbal IQ was estimated based on the raw vocabulary subscores ($M = 35.0$, $SD = 16.3$) of the Wechsler Adult Intelligence Scale - Revised (Wechsler, 1981).

Statistical Analyses—As in Study 1, we first examined each variable using a bivariate logistic regression and then retained variables showing a $p < .20$ (Hosmer & Lemeshow, 2000) relationship with suicidal ideation and entered them simultaneously into a multivariate model. Next, in analyses limited to individuals with suicidal ideation, we examined the bivariate relationships of each variable to suicide attempt. We retained variables showing a $p < .20$ relationship with suicide attempts and entered them simultaneously into a multivariate logistic regression model. We then conducted a sensitivity analysis in which we repeated the suicide attempt model including only individuals who reported intent to die in the suicide attempt group. Finally, we examined the relationship of interpersonal aggression to planned and unplanned suicide attempts by repeating the regressions twice more with different criteria: a) planned suicide attempts versus none and b) unplanned suicide attempts versus none.

Results

There were no bivariate outliers and the continuous variables exhibited no substantial deviations from normality. The highest correlation among predictors/covariates was $r = .42$, indicating an absence of pronounced multicollinearity.

As shown in Table 2, White race, female gender, depression/anxiety, verbal IQ, and interpersonal aggression were significantly associated with suicidal ideation in bivariate tests. In bivariate analyses, age was negatively associated with suicidal ideation. Each of these variables was retained as a covariate in the multivariate logistic regression model. Substance use disorder was not related to suicidal ideation ($p > .20$) and was thus not retained in the multivariate logistic regression model. In the multivariate model (Table 3), depression and White race were associated with suicidal ideation and age displayed a negative relationship. Outwardly-directed aggression was not associated with suicidal ideation.

The analysis predicting suicide attempts was limited to individuals who reported suicidal ideation. Among these patients, race, substance use disorder, and anxiety/depression were not associated with suicide attempt. Age was significantly negatively related to suicide attempt and verbal IQ exhibited a negative relationship with suicide attempts at $p < .20$; both were included in the multivariate model along with female gender, which was marginally ($p = .06$) associated with suicide attempt. In a bivariate test, aggression was associated with membership in the suicide attempt group. In the multivariate model (Table 3), aggression remained associated with suicide attempts after adjusting for all other variables.²

Sensitivity Analysis—We re-ran the above multivariate analysis, excluding individuals in the suicide attempt group who indicated that they did not intend to die ($n = 60$). The

pattern of significant results remained unchanged, including the significant association between aggression and suicide attempt (1.39, 1.10-1.74, $p < .01$), adjusting for gender, age, and verbal IQ.

Planned versus Unplanned Attempts—We re-ran the multivariate analysis twice more, including significant covariates, using planned suicide attempts versus none and unplanned suicide attempts versus none as the respective outcome variables. Whereas outwardly-directed aggression was associated with planned suicide attempts (1.43, 1.12-1.82, $p < .01$), it was not associated with unplanned attempts (1.22, .92-1.63.) Finally, we conducted a binary logistic regression using planned versus unplanned attempts as the criterion variable. This analysis, which included substance use disorder and depression/anxiety as covariates, also indicated a relationship between aggression and planned attempts (1.32, 1.00-1.77, $p = .05$).

Results from Study 2 indicate that we replicated our finding from Study 1 regarding the specificity of the association between aggression and suicidal behavior (rather than ideation), and tested the robustness of the effect by using, a more limited time frame (i.e., 2 months versus lifetime), and a more rigorous design (i.e., likelihood of attempt among a sample of ideators). Further, our results do not appear to be due to the association between aggression and non-suicidal self-harm behaviors, as our findings remained unchanged with excluding those in the attempt subgroup without intention to die. Finally, we examined the association between outwardly-directed aggression and the degree of planning reported for suicide attempts. These results indicated that aggression was associated with planned, but not unplanned, attempts.

General Discussion

We examined the relationship of aggression to suicidal thinking (i.e., ideation) and suicidal actions (i.e., non-fatal attempt) among two high-risk samples: criminal offenders and psychiatric inpatients. Across both samples, results supported the hypothesis that the association between outwardly-directed aggression and suicidal behavior is likely driven by the effect of aggression on increasing risk for suicidal actions, rather than the development of suicidal thinking (i.e., ideation or suicidal desire). When we accounted for known risk factors for the development of suicidal thinking, including one of the most robust predictors—depressive symptoms—more frequent acts of aggression were associated with increased likelihood of reporting histories of suicide attempts, but not suicidal ideation, both over the lifetime in Study 1 and the past two weeks in Study 2.

Research Implications—The design of our studies enabled us to test theory-driven hypotheses about potential mechanism whereby aggression is associated with suicidal behavior. Our results indicating the specificity of aggression to risk for suicide attempts (versus ideation) supports our first hypothesis, derived from each of the models of suicidal behavior discussed above (Joiner, 2005; Mann et al., 2003). That our results indicate that

²Because of the high rate of severe mental illness in our sample, we conducted supplemental analyses in which we re-ran all analyses in Study 2, adding overall psychiatric symptom levels as a covariate using the Brief Psychiatric Rating Scale (BPRS; Overall & Gorham, 1962). The pattern of significant results was identical to those reported, supporting the reliability of initial findings.

aggression was only associated with planned (but not unplanned) attempts is compatible with the interpersonal theory of suicide (Joiner, 2005), which posits an indirect role for aggression whereby engaging in aggressive behaviors facilitates acquired capability for suicide, enabling individuals to overcome the fear and pain involved in suicidal behavior and thereby engage in planned suicide attempts. Given that greater planning for a suicide attempt is reliably associated with greater medical severity of suicide attempts (Brown, Henriques, Sosdjan, & Beck, 2004; Nakagawa et al., 2009), aggressive behavior may therefore be a marker of risk for more serious suicide attempts. These results of an association of aggression with planned (but not unplanned) suicide attempt is inconsistent with the theoretical ideas put forth by Mann et al., (2003), and the related ideas put forth by others (Conner et al., 2003; Plutchik et al., 1989) that posit the role of (impulsive) aggression in unplanned suicidal behavior.

Our results showing a role of aggression in planned suicide attempts are provocative and seem compatible with a prior study linking a measure of impulsivity with planned suicide attempts (Witte et al., 2008), and both reports seem in line with the interpersonal theory's predictions regarding acquired capability. Rather than suggesting, as does Mann's model, that aggressive individuals impulsively attempt suicide, our findings are consistent with the idea that aggressive individuals are exposed to painful or provocative experiences and that this exposure, not impulsivity itself, puts them at higher risk for suicide (Witte et al., 2008). At this early stage of research, it is important to entertain other potential explanations. For example, Conner et al. (2009) found an association with proactive, outwardly-directed aggression, a planful form of aggression, and suicide attempts among substance dependent individuals, suggesting the possibility that tendencies toward proactive aggression may play a role in the transition from suicidal ideation to behavior, and hypothetically planned suicidal behavior in particular. The authors speculated that trait characteristics associated with proactive aggression including lower anxiety and sentimentality in the face of self-harm are potential mechanisms for a link with suicidal behavior. As well, not all studies examining the association between aggression and suicidal behavior find that greater histories of aggression are associated with greater planning as shown here (Conner et al., 2007; Nakagawa, et al., 2009), underscoring the importance of further study.

Strengths of our studies include that our results were consistent across different measurements of aggression and psychopathology, differing time intervals, and type of population. Further, results were consistent when excluding individuals with no intent to die (Study 2) and were specific to planned attempts, indicating that aggression is most likely associated with serious and planful suicidal behavior, rather than impulsive self-harm behaviors. Also, our subjects were members of high risk populations – criminal offenders and psychiatric inpatients.

Limitations—The primary limitations of the study related to measurement, including lack of assessments of acquired capability or impulsive aggression. In Study 2 it is possible that some individuals with thoughts of self-harm, but not suicide, were included in the suicidal ideation group because the intended severity of harm was not assessed for ideation. Study 2 also incorporated a measure of suicidal ideation/behavior that used a two-month retrospective time frame, potentially missing individuals who had engaged in such behavior

in the relatively recent past. Study 2 also used a measure of aggression that was limited in scope (i.e., using the most severe acts of aggression) and duration, which may limit generalizability. We note also that our use of “planned” versus “unplanned” suicide attempts as an outcome may not have captured nuance in suicidal behavior that may be captured with more sophisticated measures. Other limitations included our cross-sectional research design, use of a composite measure of anxiety and depression (Study 2), a dichotomized outcome variable for suicidal ideation and attempts, and unclear generalizability to suicide deaths. For these reasons, our findings should be considered preliminary until independently replicated.

Clinical and Policy Implications—Results across two independent samples indicate the potential clinical utility of brief assessments of histories of aggression in determining the degree of risk for suicide attempts among high-risk individuals. Outwardly-directed aggression may be a marker of elevated acquired capability for suicide, a key construct in the Interpersonal Theory of Suicide. In a risk assessment framework based on this theory, Joiner et al. (2009), indicate that acquired capability is a marker for long-standing elevated risk. They also recommend that when individuals elevated in acquired capability present with any other risk factors for suicide, including suicidal thoughts, depression, or social isolation, their risk is markedly elevated, even more so than for individuals without acquired capability. The rationale is that individuals with acquired capability are more likely to act on suicidal thoughts once developed. This rationale is consistent with our finding that aggression is a potential marker of acquired capability for suicide and thereby most informative regarding risk for engaging in suicidal actions once suicidal thoughts have developed, rather than in the formation of a desire for suicide. Further study of the potential role of proactive aggression in suicide attempts including planned attempts is also needed.

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Logistic regression models for Study 1: Associations between predictors and suicidal ideation (versus non-ideation reference group), and suicide attempt (versus non-attempt reference group) among criminal offenders ($n = 271$).

Table 1

Independent Variable	Suicidal Ideation		Suicide Attempt	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Female	1.29 (1.60, 2.76)	-	3.04** (1.51, 6.11)	2.22* (1.02, 4.85)
Age	1.01 (.98, 1.04)	-	1.03 (1.00, 1.06)	1.03 (.99, 1.07)
Caucasian	1.13 (.42, 3.04)	-	1.35 (.48, 3.81)	-
African American	.66 (.25, 1.71)	-	.95 (.36, 2.54)	-
Other Race	1.00	-	1.00	-
Education	1.00 (.84, 1.20)	-	.92 (.77, 1.10)	-
Alcohol Disorder	1.26** (1.08, 1.46)	1.06 (.87, 1.07)	1.19* (1.02, 1.37)	1.04 (.88, 1.23)
Drug use disorder	1.24** (1.07, 1.44)	1.05 (.87, 1.27)	1.23** (1.07, 1.42)	1.06 (.90, 1.24)
Depression	1.50** (1.33, 1.69)	1.48** (1.31, 1.68)	1.18** (1.10, 1.27)	1.12** (1.03, 1.22)
Lifetime Aggression	1.08** (1.02, 1.13)	1.05 (.98, 1.12)	1.08** (1.03, 1.14)	1.08* (1.02, 1.14)

Note. Alcohol Disorder, drug use disorder, and depression = number of symptoms for each disorder.

* $p < .05$.
** $p < .01$.

Table 2

Logistic regression model for Study 2: Associations between predictors and suicidal ideation among psychiatric patients ($n = 892$).

Independent Variable	Suicidal Ideation	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Female	1.44 ^{**} (1.07, 1.93)	1.03 (.73, 1.45)
Age	.97 [*] (.95, 1.00)	.96 ^{**} (.94, .99)
Verbal IQ	1.01 [*] (1.00, 1.02)	1.00 (.98, 1.01)
Caucasian	1.84 ^{**} (1.36, 2.49)	1.83 ^{**} (1.25, 2.70)
African American	1.00	1.00
Substance Disorder	1.06 (.80, 1.42)	1.19 (.84, 1.69)
Depression/Anxiety	1.26 ^{**} (1.21, 1.31)	1.27 ^{**} (1.22, 1.32)
Aggression	1.22 (.99, 1.50)	1.19 (.94, 1.51)

Note.

*
p<.05.

**
p<.01.

Table 3

Logistic regression model for Study 2: Association between predictors and suicide attempt among psychiatric patients with suicidal ideation ($n = 619$).

Independent Variable	Suicidal Attempt	
	Unadjusted OR (95%CI)	Adjusted OR (95%CI)
Female	1.36 (.99, 1.87)	1.41* (1.02, 1.95)
Age	.96** (.93, .98)	.96** (.93, .99)
Verbal IQ	.99 (.98, 1.00)	1.00 (.99, 1.01)
Caucasian	1.29 (.90, 1.85)	-
African American	1.00	-
Substance disorder	.82 (.60, 1.13)	-
Depression/Anxiety	1.02 (.98, 1.05)	-
Aggression	1.34** (1.08, 1.67)	1.34* (1.07, 1.67)

Note.

*
p<.05.

**
p<.01.