

BRIEF REPORT

Psychological Processes and Repeat Suicidal Behavior: A Four-Year Prospective Study

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Objective: Although suicidal behavior is a major public health concern, understanding of individually sensitive suicide risk mechanisms is limited. In this study, the authors investigated, for the first time, the utility of defeat and entrapment in predicting repeat suicidal behavior in a sample of suicide attempters. **Method:** Seventy patients hospitalized after a suicide attempt completed a range of clinical and psychological measures (depression, hopelessness, suicidal ideation, defeat, and entrapment) while in hospital. Four years later, a nationally linked database was used to determine who had been hospitalized again after a suicide attempt. **Results:** Over 4 years, 24.6% of linked participants were readmitted to hospital after a suicidal attempt. In univariate logistic regression analyses, defeat and entrapment as well as depression, hopelessness, past suicide attempts, and suicidal ideation all predicted suicidal behavior over this interval. However, in the multivariate analysis, entrapment and past frequency of suicide attempts were the only significant predictors of suicidal behavior. **Conclusions:** This longitudinal study supports the utility of a new theoretical model in the prediction of suicidal behavior. Individually sensitive suicide risk processes like entrapment could usefully be targeted in treatment interventions to reduce the risk of repeat suicidal behavior in those who have been previously hospitalized after a suicide attempt.

Keywords: suicidal, longitudinal, cognition, defeat, entrapment

Suicide and self-injurious behavior represent global public health concerns. Previous suicidal behavior is one of the most robust predictors of future suicide and, consequently, it is often the focus of research efforts to better understand the etiology of suicide (Suominen et al., 2004). Although it is generally accepted that distal suicide risk mechanisms may arise from a complex interaction of genetic and environmental factors (Mann, Water-naux, Haas, & Malone, 1999), there is increased recognition that researchers need to move beyond the classic psychiatric diagnostic

categories if they are to further understand the etiology of suicide, because the diagnostic categories are not sufficiently sensitive to differentiate the vast majority of people with mental health disorders who do not take their own lives from those who do (Bostwick & Pankratz, 2000; van Heeringen, 2001).

More basic science research into the identification of individually sensitive suicide risk mechanisms (Baumeister, 1990; Joiner, 2005; Nock & Banaji, 2007; Nock et al., 2010; O'Connor, Fraser, Whyte, MacHale, & Masterton, 2008, 2009; Rudd, Joiner, &

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Rajad, 1996; Van Orden, Witte, Gordon, Bender, & Joiner, 2008; Van Orden et al., 2010; Williams, Barnhofer, Crane, & Beck, 2005; Williams, Van Der Does, Barnhofer, Crane, & Segal, 2008) is vital to inform the development of evidence-informed treatment interventions in this area. One attempt to take account of this literature in a comprehensive way, to specify in detail the development of suicide risk, has been a three-phase psychological model of suicidal behavior, the integrated motivational–volitional model (IMV; O'Connor, 2011).¹

This model of suicidal behavior (O'Connor, 2011) draws from Williams (1997) and Baumeister (1990) and assumes that both environmentally and biologically mediated risk variables shift individuals through a final common pathway involving a high sensitivity to cues in the environment signaling defeat and a sense of entrapment. It is unique in that it conceptualizes suicide attempts as health behaviors (Ajzen, 1991) with motivational (i.e., factors associated with the development of suicidal thoughts) and volitional (i.e., factors that govern whether suicidal thoughts will be acted on) determinants. It also endeavors to incorporate the key constructs from existing predominant models of suicidal behavior into a process model to inform the development of psychological interventions that reduce the risk of suicide. In the present context, drawing from social rank theory (e.g., Price, Sloman, Gardner, Gilbert, & Rhode, 1994), defeat is characterized by a failed struggle, when an individual has been defeated by a triggering event or circumstances. Entrapment results when one's attempt to escape from high stress or defeating circumstances (which can be internal or external) is blocked (*arrested flight*; Gilbert & Allan, 1998; O'Connor, 2003; Pollock & Williams, 2001; Williams, 1997).

Although defeat and entrapment are not new constructs in the psychopathology literature (Baumeister, 1990; Gilbert & Allan, 1998), the findings from a number of independent research groups suggest that they have special relevance in the etiology of suicide (O'Connor, 2011; Rasmussen et al., 2010; Taylor, Gooding, Wood, & Tarrier, 2011; Taylor, Gooding, Wood, Johnson, & Tarrier, 2011; Williams, 1997). In particular, we posit that it is this motivation to escape from the defeating circumstances that drives the search for solutions to end the unbearable psychological pain (Shneidman, 1996) that often characterizes the suicidal mind. Accordingly, as entrapment increases and no solutions are found, the likelihood of suicide being considered an escape strategy increases (O'Connor, 2011; Taylor, Gooding, Wood, & Tarrier, 2011).

Present Study

In this study, therefore, we aimed to conduct a robust test of the central tenet of the model. Specifically, we aimed to investigate whether, as posited in the IMV model, defeat and entrapment would predict suicide attempts prospectively and that entrapment would be the strongest predictor of repeat suicidal behavior. We have focused on those who have attempted suicide previously because they comprise a high-risk group for suicide. Indeed, a history of repeat suicide attempts is one of the strongest predictors of whether someone dies by suicide (Hawton & van Heeringen, 2009; Owens, Horrocks, & House, 2002). Specifically, we hypothesized that defeat and entrapment would be significant univariate predictors of future suicide attempts (Hypothesis 1). Crucially, though, we also hypothesized (Hypothesis 2) that entrapment

would add incrementally to the prediction of suicide attempts, beyond the explanations offered by established predictors of suicidal behavior (e.g., depression, suicide ideation, hopelessness, past suicide attempts).

Method

Participants and Procedure

Seventy patients who were seen by the liaison psychiatry service the morning after presenting at a Scottish hospital following a suicide attempt were recruited to the study. The sample was drawn from a larger sample of 136 intentional self-harm patients who were admitted to the hospital. Eighteen participants were excluded because they had been discharged or transferred to another hospital before they could be invited to participate, six were unfit for interview, 33 reported no suicidal intent, and nine declined to participate. The vast majority of patients presented after an overdose (93%; International Classification of Diseases [ICD] Codes ×60–X69), with episodes of self-cutting ($n = 3$; ICD Codes ×78) and mixed presentations of self-cutting and overdose ($n = 4$; ICD Codes ×60–X69, ×78) accounting for the remainder of cases. There were 41 females and 29 males with an overall mean age of 35.6 years ($SD = 13.24$, range: 16–69 years). The men ($M = 33.66$ years, $SD = 11.34$) and women ($M = 37.07$ years, $SD = 14.40$) did not differ significantly in age, $t(68) = 1.07$, ns . We did not record ethnicity; however, the overwhelming majority of participants were White.

Baseline data were collected in hospital, usually within 24 hr of admission. The Information Services Division of the National Health Service Scotland maintains a national database of hospital records and mortality data. This nationally linked database is a powerful resource as it allowed us to determine whether a patient was readmitted to hospital in Scotland with intentional self-harm at any time since their index episode.² We asked the Information Services Division to extract hospital admissions for intentional self-harm (ICD Codes ×60–X84) in the period between the index suicide attempt and 48 months later for each patient. For this data set, the Information Services Division successfully linked 87% of the sample (61/70). We also reviewed the electronic medical records of those patients who were hospitalized again after intentional self-harm during the follow-up period to determine whether the repeat self-harm episode was a suicide attempt.

Baseline Measures

Depression. The seven-item depression scale from the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith,

¹ The IMV model is similar to Joiner's interpersonal–psychological theory (Joiner, 2005; Van Orden et al., 2010), in that both models endeavor to discriminate between those who think about suicide (but do not act on these thoughts, i.e., ideators) and those who act on their thoughts (i.e., suicide attempters). Both models also aim to provide a detailed map of the pathway to suicidal ideation and suicidal behavior, with belongingness and burdensomeness being highlighted in the interpersonal–psychological theory versus defeat and entrapment in the IMV model, in the final common pathway to suicide risk.

² *Intentional self-harm* is the terminology used in the ICD and refers to acts of suicidal and nonsuicidal self-harm.

1983) was used to assess depression. The HADS is a well-established, widely used, reliable, and valid measure of affect (Bjelland, Dahl, Haug, & Neckelmann, 2002; Mykletun, Stordal, & Dahl, 2001) that assesses depression (and anxiety) in psychiatric as well as primary care and general populations. Cronbach's alpha for the present sample was .80.

Suicidal ideation. Suicidal ideation was assessed using the Suicidal Ideation subscale of the Suicide Probability Scale (SPS; Cull & Gill, 1988). The scale is reliable and valid (Cull & Gill, 1988). The SPS measures an individual's self-reported attitudes that are related to suicide risk, and the scale has been shown to predict suicide attempts prospectively (Larzelere, Smith, Batenhorst, & Kelly, 1996). Internal consistency for the present study was very good (Cronbach's $\alpha = .86$).

Hopelessness. Hopelessness was measured using the 20-item Beck Hopelessness Scale (BHS; Beck, Weissman, Lester, & Trexler, 1974). This reliable and valid measure has been shown to predict eventual suicide (Beck, Steer, Kovacs, & Garrison, 1985; Beck et al., 1974). In the present study, internal consistency was very good (Kuder-Richardson formula 20 = .92).

Defeat. Feelings of defeat were assessed via the Defeat Scale (Gilbert & Allan, 1998). This is a 16-item self-report measure of perceived failed struggle and loss of rank (e.g., "I feel defeated by life"). The Defeat Scale has good psychometric properties (Gilbert & Allan, 1998; Gilbert, Allan, Brough, Melley, & Miles, 2002). It has good test-retest reliability and has been shown to predict suicidality over 12 months independent of baseline levels of depression (Taylor, Gooding, Wood, Johnson, & Tarrier, 2011). Cronbach's alpha for the present sample was very good ($\alpha = .93$).

Entrapment. Entrapment represents the sense of being unable to escape feelings of defeat and rejection and is measured by the Entrapment Scale (Gilbert & Allan, 1998). This 16-item self-report measure taps internal entrapment (perceptions of entrapment by one's own thoughts and feelings) and external entrapment (perceptions of entrapment by external situations). The Entrapment Scale has good psychometric properties (Gilbert & Allan, 1998; Gilbert et al., 2002). It has good test-retest reliability (Taylor, Gooding, Wood, Johnson, & Tarrier, 2011), and it has been shown to distinguish between clinical patients with and without suicide attempt histories (Rasmussen et al., 2010). Cronbach's alpha for the present study was .91.

Outcome Measure

Readmission to hospital with a suicide attempt. An episode of self-harm was recorded if a patient was admitted to any hospital

in Scotland with self-harm in the 48 months after their index episode (ICD Codes $\times 60-X84$ (intentional self-harm)). When a patient was readmitted to a hospital with self-harm during the study period, we reviewed their medical records to ascertain whether this episode was a suicide attempt. On admission to the ward, members of the psychiatric team routinely assess suicidal intent. Two trained coders independently rated the medical records and agreed on all 15 positive cases. Coders of repeat suicidal behavior were unaware of all of the baseline measures.

Statistical analyses. We conducted a series of univariate logistic regression analyses for each predictor of a future suicide attempt. Although we are interested specifically in the entrapment and defeat logistic regression analyses, we present the findings for other established predictors of suicidal behavior (i.e., depression, hopelessness, suicide ideation, past suicide attempts). To test the second hypothesis, we conducted a hierarchical multivariate logistic regression including all significant univariate predictors. All analyses were conducted in SPSS 20 and Stata 11.

Results

Linked Sample

There were 35 women and 26 men with an overall mean age of 35.6 years ($SD = 13.16$, range: 16–69 years) in the linked sample. At baseline, 41.4% of these participants ($n = 29$) reported no previous suicide attempts, 25.7% of participants ($n = 18$) reported one previous attempt, 10.0% ($n = 7$) reported two previous attempts, and 22.9% ($n = 16$) reported three or more previous episodes.

Repeat Suicide Attempt During Follow-Up

Between Time 1 and Time 2 (48 months after the index episode), 32.8% ($n = 20$) of the linked participants were readmitted to hospital, presenting with intentional self-harm. One participant died by suicide in this time. Of the 20 participants who self-harmed between Time 1 and Time 2, 75% ($n = 15$) presented with a suicide attempt at follow-up. There was insufficient information to determine suicidal intent for three of the patients and 10% ($n = 2$) did not report suicide intent at follow-up admissions. Consequently, in the subsequent analyses, these five participants were coded as having made no suicide attempt between baseline and follow-up. In short, 15 participants engaged in a repeat suicide attempt between Time 1 and Time 2. As anticipated, all continuous study measures were intercorrelated (see Table 1).

Table 1
Correlations, Means, and Standard Deviations for All of the Study Variables for All Participants

Variable	Depression	Suicidal ideation	Hopelessness	Defeat	Entrapment
Depression	—				
Suicidal Ideation	.553***	—			
Hopelessness	.642***	.465***	—		
Defeat	.551***	.430***	.732***	—	
Entrapment	.602***	.598***	.645***	.738***	—
<i>M</i>	12.23	19.46	13.43	44.00	43.36
<i>SD</i>	5.53	6.10	5.64	14.01	13.84

*** $p < .001$.

Individual and Multivariate Predictors of Suicide Attempts Between Time 1 and Time 2

None of the demographic variables emerged as significant univariate predictors of future suicidal behavior (see Table 2). However, all of the other variables (i.e., defeat and entrapment as well as frequency of previous suicide attempts, suicidal ideation, depression, and hopelessness) individually predicted suicidal behavior between Time 1 and Time 2 (see Table 2).

To test the prediction that entrapment adds incrementally over depression, we specified suicide ideation, suicide attempt history, and hopelessness in a hierarchical logistic regression, with entrapment and defeat entered at Step 2. Given that there are significant correlations between the predictors raising concerns about multicollinearity, a series of multicollinearity diagnostics were conducted. First, an examination of the correlations derived from the fitted model variance–covariance matrix shows none were greater than .5 (regardless of sign, the mean correlation was .15, the median was .14, with a range of .00 to .33), indicating no collinearity problems. Next, variance inflation factors (VIFs) were examined. These indicate the extent to which the standard errors are inflated because of collinearity. Various rules of thumb for VIFs exist, with some suggesting that VIFs greater than 10 (Hair, Anderson, Tatham, & Black, 1995) and others suggesting VIFs greater than 4 (Menard, 1995) indicate multicollinearity problems. For these analyses, VIFs ranged from 1.16 to 2.93 ($M = 2.26$) with the square roots of the VIF all less than 2 ($M = 1.48$, range: 1.08–1.73), indicating that, on average, the standard errors are only inflated 1.48 times because of multicollinearity (Stewart, 1987). Finally, if multicollinearity is a major problem, then odds ratios will be extremely large. This was not the case in these analyses. Therefore, on the basis of the above analyses, there are no problems with multicollinearity.

The results of the hierarchical logistic regression are reported in Table 3 and show that entrapment adds incremental predictive validity over depression, hopelessness, suicide ideation, and the frequency of previous suicide attempts. In the final model, both entrapment and the frequency of previous suicide attempts predict the occurrence of a future suicide attempt.³ To aid interpretation, Table 3 also reports standardized coefficients for logistic models (see King, 2007; Long, 1997; Long & Freese, 2006; Menard, 2011). The standardized coefficients allow us to examine the relative magnitude of the effects. Given the variety of potential standardized coefficients for logistic regression (King, 2007; Menard, 2011), Winship and Mare (1984) recommended using fully standardized coefficients, and we report fully standardized coefficients as defined by Long and Freese (2006). For the two significant effects, these show that a one standard deviation increase in entrapment results in just over a half a standard deviation increase (.59) in log odds of attempting suicide and a one standard deviation increase in the number of previous attempts results in an increase of one fifth (.20) in log odds of attempting suicide. We also examined if the effect of entrapment in the final model was significantly different from the number of previous attempts. The results showed that although it was stronger, this effect only approached significance, $\chi^2(1)$, $p = .09$. However, given the nonlinearity of the logistic model, another way to assess the importance of a predictor is in terms of the discrete change in the predicted probabilities (Long & Freese, 2006). If the predicted

probabilities show a large change across the predictor, then it is likely to be an important predictor. For the predictor variables in this model, the largest change was for entrapment, with a predicted probability change of .63 from the minimum value to the maximum of the scale. The next largest was for the number of suicide attempts (.14); the rest ranged from $-.02$ to .07. This shows entrapment as an important predictor. Examining the effect for entrapment in terms of standard deviation changes from the mean (holding all other variables at their mean) revealed that a single standard deviation increase in entrapment results in a .08 increased probability of attempting suicide.

Discussion

This was the first study to investigate the predictive utility of defeat and entrapment among suicide attempters. The findings clearly showed that both defeat and entrapment were significant univariate predictors of suicidal behavior 4 years after an index suicide attempt, alongside depression, hopelessness, suicidal ideation, and previous suicide attempts. It is important to note, though, that consistent with the IMV model (O'Connor, 2011), entrapment was a unique predictor of suicidal behavior when considered together with the other univariate predictors. As frequency of past suicide attempts was the only other significant predictor in the multivariate analysis, entrapment was the only potentially modifiable risk factor for repeat suicidal behavior in this study. The predictive utility of entrapment is consistent with a central tenet of the IMV model of suicidal behavior (O'Connor, 2011), which states that entrapment is a unique predictor of suicidal behavior. According to Gilbert and Allan (1998), it is the thwarted motivation to escape that distinguishes entrapment from hopelessness. Indeed, we posit that as entrapment beliefs become stronger, the motivation to escape increases, and if no solution to the state of entrapment is found, beliefs about suicide become more likely, with suicide being viewed as the only solution to escape the painful feelings of entrapment.

³ We also used receiver operating characteristic curve analysis to identify a cutoff score for each predictor that maximized that predictor's sensitivity and specificity with respect to predicting a future suicide attempt. The cutoff scores and areas under the curve (AUC) for each predictor were, (a) for entrapment, 51+, AUC = .83; (b) for defeat, 52+, AUC = .83; (c) for hopelessness, 17+, AUC = .82; (d) for depression, 15+, AUC = .01; (e) for ideation, 20+, AUC = .69; and (f) for frequency of previous attempts, 2+, AUC = .79. The hierarchical logistic regression reported in Table 3 was repeated using the predictor score's case and noncase at these cutoffs. Entrapment and defeat added significantly over the other four variables (Step $\chi^2 = 8.3$, $p = .016$; Model $\chi^2 = 36.2$, $p < .001$). In the final model, both entrapment ($B = 2.3$, $\beta_{\text{stdxy}} = .33$, $p = .035$) and the frequency of previous suicide attempts ($B = 2.3$, $\beta_{\text{stdxy}} = .32$, $p = .031$) were the only significant predictors. Thus, the results were identical to those in Table 3. There were no multicollinearity problems, with a mean VIF of 1.79 (range: 1.56–2.16), and no correlations derived from the fitted model variance–covariance matrix were greater than .5. Although these results replicate the main findings on the basis of continuous scores using binary cutoff scores, we have to caution strongly that these cutoff scores should not, at present, be used for clinical diagnostic purposes, because of the small sample size and number of repeat suicide attempts. These analyses were conducted to show the potential clinical applications of including entrapment as a key predictor of repeat suicide attempts; however, much more work is needed to show that these scales are indeed taxonic and that the cutoffs vary meaningfully with external criteria (see Ferguson, 2009; Ferguson et al., 2009).

Table 2
Univariate Logistic Regression Analyses Investigating Associations Between Baseline Predictors and Hospital-Treated Suicide Attempts or Suicide Between Time 1 (T1) and Time 2 (T2)

Variable	N (%)	M	SD	% attempted suicide at T2	B	OR	95% CI	p
Gender								
Male	26 (42.6)			26.9				
Female	35 (57.4)			22.9		0.80	0.25–2.60	.716
Marital status								
Married/partner	24 (39.3)			12.5				
Single/other	37 (60.7)			32.4		3.36	0.84–13.52	.088
Age								
No suicide attempt (T1–T2)		35.39	14.03					
Suicide attempt (T1–T2)		36.33	10.45		0.006			.808
Previous suicide attempt								
No suicide attempt (T1–T2)		0.83	1.02					
Suicide attempt (T1–T2)		2.47	1.51		0.97			.0001
Suicidal ideation								
No suicide attempt (T1–T2)		18.46	6.16					
Suicide attempt (T1–T2)		22.67	5.78		0.12			.030
Depression								
No suicide attempt (T1–T2)		10.78	5.64					
Suicide attempt (T1–T2)		16.73	3.04		0.26			.002
Hopelessness								
No suicide attempt (T1–T2)		11.98	5.86			0.32		.006
Suicide attempt (T1–T2)		17.73	2.79					
Defeat								
No suicide attempt (T1–T2)		40.57	14.33					
Suicide attempt (T1–T2)		54.53	4.88		0.14			.003
Entrapment								
No suicide attempt (T1–T2)		39.98	14.16					
Suicide attempt (T1–T2)		53.73	4.80		0.22			.004

Note. Bold indicates statistical significance at the conventional $p < .05$ level.

Clinically, these data suggest that it may be useful to incorporate entrapment, together with established predictors, into the psychosocial risk assessment of repeat suicide attempts in patients who have previously been hospitalized after a suicide attempt. Our findings highlight that the former, in particular, may play a unique role within the suicidal process. It may represent part of the final common pathway to suicide. However, little is known about the development of entrapment. Future research, therefore, is required

to specify the factors that lead to entrapment as well as the mechanisms accounting for the strong relationship between entrapment and suicidal behavior. Theoretically, the present findings also suggest that the IMV model is a useful new framework that warrants further empirical and clinical investigation. Although there has been a recent suggestion that defeat and entrapment are not distinct constructs (Taylor, Wood, Gooding, Johnson, & Tarrrier, 2009), this study reinforces the utility of operationalizing the constructs separately.

Although these findings are promising and the sample size was adequate, the results do require replication and extension. It is also worth noting that this study was set up to investigate the repetition of medically serious suicide attempts: It will have missed low lethality attempts that did not require hospitalization. It also did not record suicide attempts that may have been captured at outpatient clinics, primary care settings, or other nonclinical settings. Researchers conducting future studies should also investigate whether the findings are generalizable to people with baseline attempts that did not result in hospitalization severe enough to result in initial hospitalization. Also, given that the majority of the sample had attempted suicide at least once prior to entry into the study, it would be useful to determine the predictive validity of entrapment in a homogeneous sample of first-time suicide attempters. As entrapment may underpin different types of self-injurious behavior (Nock, 2010; Williams, 1997), future research ought to investigate whether it differentially predicts suicidal versus non-suicidal self-injury. Finally, large-scale studies are required to

Table 3
Hierarchical Multivariate Logistic Regression Analyses Investigating Associations Between Predictors and Hospital-Treated Suicide Attempts or Suicide Between Time 1 and Time 2

Variable	Step 1		Step 2	
	B	β_{stdxy}	B	β_{stdxy}
Previous suicide attempt	0.77*	.34*	0.79*	.20*
Suicidal ideation	-0.02	-.04	-0.06	-.07
Depression	0.19	.34	0.16	.17
Hopelessness	0.20	.37	0.15	.16
Defeat			0.03	.08
Entrapment			0.23*	.59*
Cox & Snell R^2	.38		.45	
Step χ^2	28.4***		7.66*	
Model χ^2			36.5***	

Note. β_{stdxy} = fully standardized coefficient with respect to X and Y (using Long and Freese's *listcoef* command in Stata).

* $p < .05$. *** $p < .001$.

determine whether entrapment on its own is predictive of suicide beyond established risk factors.

Conclusions

This study extends the understanding of individually sensitive mechanisms of suicide risk. The IMV model of suicidal behavior may provide a useful theoretical framework on which clinical formulations and treatment interventions could be based. Entrapment in particular should be included in clinical assessment and considered for inclusion in treatment trials as an index of clinical change. It should also be thought of as potentially part of the final common pathway to serious suicidal behavior.

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