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Distinguishing suicide ideation from suicide attempts: Further test of the Integrated Motivational-Volitional Model of Suicidal Behaviour

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ABSTRACT

Suicidal behaviour poses a significant public health concern. Research into the factors that distinguish between the emergence of suicide ideation and the enactment of a suicide attempt is crucial. This study tests central tenets of the Integrated Motivational-Volitional Model of suicidal behaviour (IMV, O'Connor and Kirtley, 2018) which posits that volitional phase factors govern the transition from thinking to attempting suicide. 299 adults completed a face-to-face interview and were allocated to groups based on their suicidal history: Suicide attempt group (N = 100), suicide ideation group (N = 105), and a control group (N = 94). Measures were taken at baseline, at 1-month and 6-months follow-up. As predicted, the attempt group differed from the ideation group on all volitional phase factors. Those who had attempted suicide reported higher capability for suicide, were more likely to have a family member or friend who had self-injured or attempted suicide, and were more impulsive. In keeping with the IMV model, the ideation and attempt groups had similar scores on the motivational factors. Defeat and entrapment were significant predictors of ideation at baseline, and mediation analyses indicated that defeat had an indirect effect on ideation through entrapment at baseline and at 1-month follow-up. The results support the IMV model and suggest that entrapment should be routinely included in suicide risk assessments. Further research to test predictors of the transition from suicide ideation to suicide attempts is crucial to inform future intervention development and health care delivery.

1. Introduction

Suicide accounts for over 800,000 deaths every year, this number is predicted to rise to over 1 million deaths per year by 2030 (*WHO*, 2017). This makes suicide one of the leading causes of death. Despite an increase in prevention efforts, the number of suicides continues to rise in many countries (Naghavi, 2019).

The Integrated Motivational-Volitional Model (IMV; O'Connor, 2011; O'Connor and Kirtley, 2018) of suicidal behaviour provides a theoretical basis for examining the factors associated with the development of suicide ideation and the transition from ideation to suicidal behaviour (i.e., suicide attempts). It integrates predominant factors from existing psychosocial models including Williams' arrested flight model (Williams and Williams, 2001), the diathesis-stress hypothesis (Schotte and Clum, 1987), and the theory of planned behaviour (Ajzen, 1991). The model conceptualises suicide as a behaviour that results from a complex interplay of factors; and provides a detailed map of the pathway from ideation to behaviour, through defeat and entrapment (O'Connor et al., 2013). The IMV model proposes that the central predictor of a suicide attempt is an individual's intention to engage in suicidal behaviour. Feelings of defeat/humiliation trigger feelings of entrapment, which in turn predicts intention (i.e., ideation) as a solution to life circumstances. Throughout this process, there are stage-specific moderators that facilitate or prevent progress to the next stage, with motivational moderators (e.g. thwarted belongingness, burdensomeness, and goals) predicting ideation, and volitional moderators (e.g., exposure to suicidal behaviour and impulsivity) governing enactment (Fig. 1).

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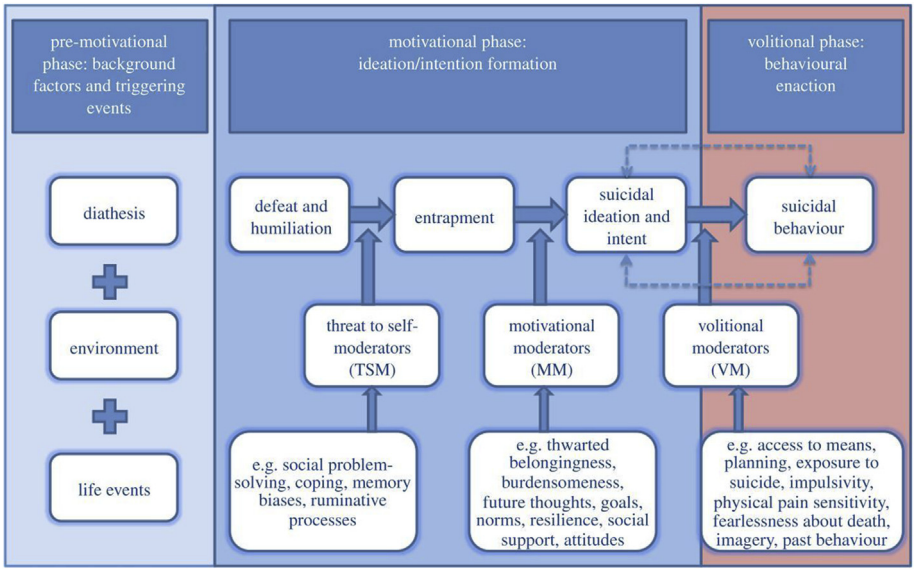

Fig. 1. The integrated motivational-volitional model of suicide behaviour (O'Connor and Kirtley, 2018).

Previous research has highlighted the utility of identifying the factors which facilitate the transition from ideation to attempts (Dhingra, Boduszek, & O'Connor, 2015; Klonsky & May 2014). The majority of individuals who experience ideation, do not go on to make suicide attempts (Kessler et al., 1999). However, it is vital to understand which factors may predict which individuals *will* go on to make an attempt. Well established predictors of suicidal behaviour (e.g., mental disorders, depression and hopelessness) are limited in the specificity of their predictive utility (Nock et al., 2010; Nock et al., 2009; O'Connor et al., 2013).

The IMV model suggests that the factors underpinning suicide ideation may differ from those that underpin the development of thoughts of suicidal enactment. Recent studies by Dhingra et al. (2015) and Wetherall et al. (2018a,b) support the model; in a student and young adult sample respectively. They found that those in the ideation group and those in the attempt group did not differ on the motivational moderators, but they did differ on the volitional moderators. The current study builds upon these findings by extending them in two important areas. Firstly, by including a more diverse sample of participants not restricted to the student population or recruited via a single organisation. Secondly, the current study tested whether the factors within the IMV model had predictive utility over 1- and 6-month follow-up periods. The inclusion of a predictive dimension helps to identify whether the model could be useful for assessing and predicting future ideation in individuals. In summary, the first phase of the current study tested the following hypotheses:

H1. Those in the ideation and attempt groups would differ significantly from those in the control group on the motivational (and pre-motivational) phase variables, i.e., burdensomeness, thwarted belongingness, defeat, entrapment, hopelessness, resilience, social perfectionism, social support and perceived stress.

H2. Those in the ideation and attempt groups would differ from the controls on the volitional phase variables, i.e., exposure to suicide behaviour by friends/family, acquired capability for suicide, and impulsivity. Those in the ideation group would also differ from those in the attempt group on these measures.

The second phase of the study included only the ideation and attempt groups. This phase aimed to investigate the extent to which the core components of the IMV model predict ideation (across three time points: baseline, 1-month post-baseline and 6 months post-baseline) by testing the following hypothesis:

H3. Consistent with the IMV model, the relationship between defeat and suicidal ideation would be mediated by entrapment.

2. Material and methods

2.1. Recruitment, group assignment and procedure

Participants were recruited across two separate studies to examine the relationship between stress, cortisol and suicide risk (O'Connor et al., 2017; O'Connor et al., under review). Recruitment adverts targeted adults (18yrs+) willing to participate in a study about "stressors and wellbeing" and were placed on local online advertising website Gumtree, part-time employment website VivaStreet, and Doing Good Leeds website. Adverts were also shared via the University of Leeds website and staff magazine the Laboratory for Stress and Health Research (STARLab) social media pages (Twitter and Facebook), the Leeds Forum website and disseminated via charity organisations (Volition Leeds, Leeds Mind and Papyrus UK). Individuals who responded to the advertisements were screened via telephone to assess their eligibility to participate and to ensure each group was well represented. Individuals were required to be over 18 years of age, fluent in English, able to visit the University campus and be free from recreational drug use within the past month. Exclusion criteria included the use of steroid-based medication, hormonal or endocrinological disorders or pregnancy within the last 6 months. Suicide ideation and attempts were assessed using the Beck Scale for Suicidal Ideation (BSSI; Beck et al., 1988) and the Self-Injurious Thoughts and Behaviours Interview (SITBI; Nock et al., 2007). Participants were categorized to the attempt group if they reported a previous attempt to take their own life (at any stage in their life), or to the ideation group if they had not previously attempted suicide but reported having thoughts of suicide within the last 12 months. We selected lifetime suicide attempts for pragmatic reasons as in the past we have struggled to recruit suffice numbers of participants in a timely manner when we have recruited recruitment to a suicide attempt in the past 12 months. A suicide attempt was defined as the individual inflicting - or attempting to inflict - harm upon themselves, with the intention to take their own life. Participants with no history of attempts or ideation were categorized to the control group. Individuals who reported self-harm without intent to take their own life were classified to the control group (if they reported no ideation within the last 12 months) or the ideation group (if ideation within the last 12 months was reported).

Participants provided informed consent and were advised of their right to withdraw from the study, and assured that their participation was anonymous and confidential. Participants in study 1 and 2 received £20 and £30 respectively for their participation in the initial lab visit which included a detailed face-to-face interview around their previous history of suicide ideation and/or attempt(s) and completing a range of psychological scales (detailed further in section 2.3). Two follow-up telephone interviews were conducted per participant (at 1 month and 6 months post-lab visit); participants received an additional £10 Amazon gift voucher for each follow-up interview. Payment/gift vouchers were to compensate for participants' time and travel. All participants were risk assessed based upon a number of known risk factors including gender, ethnicity, age, psychiatric diagnoses, history of suicidal behaviour, impulsiveness, hopelessness, and recent disruptive events (DeLeo et al., 2002). The risk assessment also took into account whether any safety plan was in place. Any participants scoring as at imminent suicide risk were referred immediately to the relevant professional health services (i.e., hospital emergency department, clinician, support worker). All participants were debriefed and provided with information on local mental health services. The research protocols were reviewed and approved by the institutional ethics panels of the participating universities (University of Leeds, University of Glasgow and University of Stirling) and the U.S Department of Defense. Data were anonymized and securely stored on encrypted devices and within locked cabinets. All data are stored and handled in accordance with GDPR.

2.2. Measures

2.2.1. Pre-motivational and motivational variables

2.2.1.1. Defeat and entrapment. The Defeat Scale and the Entrapment Scales (Gilbert and Allan, 1998) were used to measure the respective factors. Each scale consists of 16 items, with higher scores indicating greater feelings of defeat/entrapment. The defeat scale measures individuals' perceptions of failed struggle and losing rank. Items are answered using a 5-point scale ranging from 0 ("never") to 4 ("always") and answered according to how the participant has felt over the last 7 days. Internal reliability was excellent (α = .97).

The Entrapment Scale measures motivation to escape. The scale measures internal and external entrapment, as well as providing an overall total entrapment score. Items are rated on a five-point scale from 0 ("Not at all like me") to 4 ("Extremely like me"). Cronbach's α was .95.

2.2.1.2. Perceived burdensomeness and thwarted belongingness. Perceived burdensomeness (feeling like a burden on others) and thwarted belongingness (feeling disconnected from other people) were measured using the 12-item version of the Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2010). Items are rated on a Likert-type scale ranging from 1 ("not at all true of me") to 7 ("very true for me"), with higher scores reflecting higher levels of thwarted belongingness (measured by 7 items) and burdensomeness (measured by 5 items). Internal reliability was good for both the burdensomeness items (α = .93) and the thwarted belongingness items (α = .88).

2.2.1.3. Resilience. The Brief Resilience Scale (Smith et al., 2008) was used to measure the ability to bounce back or recover from stress. This is a 10-item measure with each item answered on a scale of 0 (not true at all) to 4 (true nearly all of the time), and summed to give an overall score. Cronbach's α was .89.

2.2.1.4. Social perfectionism. The Social Perfectionism Scale (Hewitt and Flett, 1991) is a 15-item measure. Each item is scored from 1 (disagree) to 7 (agree). Some items are reverse scored, then all items are summed to provide an overall measure of social perfectionism (α = .89).

2.2.1.5. Enriched social support. Enriched social support was measured using the ENRICHD Social Support Instrument (ESSI; Blumenthal2000). The ESSI is a 7-item measure for assessing social support. All items are scored from 1 (none of the time) to 5 (all of the time), and then summed to produce an overall score (α = .87).

2.2.1.6. Perceived stress. Perceived stress was measured using the Perceived Stress Scale (PSS; Cohen et al., 1983). The PSS is a 4-item measure which asks participants about their stress over the past month. Items are scored on a scale of 0 (never) to 4 (very often). Two items are reverse scored before all items are summed. Cronbach's α was .85.

2.2.2. Volitional moderator (VM) variables

2.2.2.1. Capability for suicide. The Acquired Capability for Suicide Scale (ACSS; Van Orden, Witte, Gordon, Bender and Joiner, 2008) was originally developed as a 20-item self-report measure to assess both Fearlessness About Death (FAD) and Pain Insensitivity. In the current study, a 5-item measure was used to measure capability for suicide. The items chosen were: 1. "Things that scare most people do not scare me", 2. "I can tolerate a lot more pain than most people", 3. "People describe me as fearless", 4. "The pain involved in dying frightens me", and 5. "I am not at all afraid to die". Items are rated on a 5-point scale from 0 ("Not at all like me") to 4 ("Very much like me"). Some items are reverse scored, then all items are summed to provide an overall score with higher scores indicating greater capability for suicide. However, internal consistency in the current sample was low, α = .51. Reliability and principal component analysis revealed that items 3 and 4 were not a good fit, therefore these two items were excluded. The final scale is comprised of 3 items (Items 1–3).

2.2.2.2. Exposure to self-destructive behaviours and death. Respondents were asked 7 questions about their experiences with family and/or close friends engaging in self-harm or suicidal behaviours, e.g., "Has anyone among your family attempted suicide?". The overall score consists of the total number of scenarios the participant reported experiencing.

2.2.2.3. Impulsivity. The Barrett Impulsiveness Scale (BIS) was used to measure impulsivity. The scale consists of 30 items measured on a 4-point scale from "Rarely/Never" to "Almost Always/Always". High scores equate to higher levels of impulsivity (α = .86).

2.2.3. Mood and suicidal ideation

2.2.3.1. Hopelessness. The Beck Hopelessness Scale (BHS; Beck, 1998) was used to measure hopelessness. This is a 20-item measure designed to capture three major aspects of hopelessness: feelings about the future, loss of motivation, and expectations. It measures the extent of the respondent's negative attitudes, or pessimism, about the future. Each item is answered as true or false. Following reversal of some items, all of the items are summed, in the direction of hopelessness, to give an overall score (α = .91).

2.2.3.2. Depression. Depression was measured using the Beck Depression Inventory (BDI-II; Beck et al., 1996). The BDI-II consists of 21 items scored on a scale of 0–3, with higher scores indicating more severe symptoms of depression. The items measure symptoms over the last fortnight (α = .94).

2.2.3.3. Suicidal ideation. Current suicidal ideation was measured using the Beck Scale for Suicidal Ideation (BSSI; Beck et al., 1988) at baseline, 1 month follow-up and 6 month follow-up. The BSSI is a widely used measure consisting of 21 items scored on a scale of 0–2, which asks participants to reflect on how they have been feeling over the past week. Past suicidal ideation was measured using item 5 of the SITBI (Nock et al., 2007): "During how many separate times have you had thoughts of killing yourself in the past year?".

2.3. Statistical analysis

2.3.1. Missing data

Missing data was tested for randomness using Little's Missing Completely At Random (MCAR) test. The results were non-significant indicating that the data was missing completely at random, therefore suitable for imputation. The analyses were run with and without imputed data (using single, expectation maximization imputation). The use of imputed data did not substantively affect the results; therefore, the non-imputed findings are reported.

2.3.2. Phase 1

A series of one-way ANOVAs were conducted to compare the three groups (ideation vs. attempt vs. controls) on all the continuous measures. To control for the number of comparisons we employed the Bonferroni correction method.

2.3.3. Phase 2

Hierarchical linear regression was used to test the utility of the core components of the IMV model (i.e., defeat and entrapment) to predict suicidal ideation at baseline and over time. Only participants from the ideation (N = 105) and attempt (N = 100) groups were included in this analysis. Assuming a medium effect size requires an N of 91 participants to achieve a power of .80 with and α of .05. Given the sample size, it was not possible to investigate the predictive utility of the other variables or interactions. The analyses controlled for age, gender and previous ideation over the past year. At step 1, age, gender and previous ideation were included to identify if the control variables had any effect on ideation. Step 2 introduced defeat and step 3 added entrapment (in accordance with the IMV model that suggests that defeat leads to feelings of entrapment). Three regressions were run predicting ideation at baseline, 1-month, and 6-months.

Mediation analysis was conducted to test whether entrapment mediates the relationship between defeat and suicidal ideation (as predicted by the IMV model). Again, the analyses controlled for age, gender and previous ideation over the past year. Mediation was tested using PROCESS macro for SPSS (Hayes, 2013). Assuming a medium effect for both the α and β (Wetherall et al., 2018b) then an N of 71 is needed to achieve a .80 power (Fritz and MacKinnon, 2007).

3. Results

3.1. Sample

299 participants were recruited across the two studies (study 1 = 145 participants and study 2 = 154 participants). The combined sample includes 194 (64.9%) females, 104 (34.8%) males and 1 participant who did not identify as male or female. Participants were 18–63 years of age (M = 27.35 years, SD = 9.32 years). Less than half (43.5%) identified their main employment status as being a student. 29.8% identified as being in full- or part-time employment, 13.7% identified as unemployed/homemaker and the remainder identified as "other" (6.4%) or not working due to disability/incapacity (4%), extended leave (1.7%) or retirement (0.7%).

3.2. Descriptive statistics

Means (M) and standard deviations (SD), for all continuous variables are shown in Table 1.

Due to the diverse population of participants, between group comparisons were conducted to test for differences between the employment groups (employed, unemployed, student). The results are shown in Table 2. There were significant differences between the groups, particularly in relation to the unemployed group whose members scored higher than the other groups on hopelessness, defeat, entrapment, perceived burdensomeness, thwarted belongingness, impulsivity, depression and current ideation. This group also measured lower on resilience and enriched social support, compared to the employed and student groups. The only differences between the student and employed groups were a higher score for entrapment and exposure to self-destructive behaviours for the student group.

3.3. Phase 1: Testing for differences between the groups on motivational and volitional phase variables

The results of the ANOVAs indicated that both suicide groups (ideation and attempt) differed significantly from the control group on hopelessness, entrapment, defeat, burdensomeness, thwarted belongingness, resilience, social perfectionism and enriched social support (i.e., the pre-motivational and motivational phase variables) in the expected directions (Table 3). In addition, both suicide groups differed significantly from controls on impulsivity (volitional phase variable). The attempt group also significantly differed from controls on exposure to suicide (volitional phase variable).

Those in the attempt group significantly differed from those in the ideation group on all 3 of the volitional phase variables (capability for suicide, exposure to suicide and impulsivity) but there was no significant difference between the ideation group and attempt group for any of the pre-motivational or motivational phase variables (as well as the other variables) consistent with the predictions of the IMV model.

Compared to the ideation group, the attempt group reported higher capability for suicide, were more likely to have a family member or close friend who had self-injured or attempted suicide, and were more impulsive.

3.4. Phase 2: Testing whether entrapment mediates defeat and ideation

3.4.1. Hierarchical linear regression

Prior to running the regression, correlational analysis was used to investigate the strength of the relationships between the continuous variables (Table 4). The results of the regression are presented in Table 5. Due to the significant differences previously shown in Table 2, employment group (employed vs unemployed/student) was controlled for during the analyses. The results suggest that employment group is not a significant predictor of ideation. At baseline both defeat and entrapment are significant predictors of ideation. Entrapment is also significant at the 1-month follow-up. Defeat remains significant at both follow-ups prior to the inclusion of entrapment.

3.4.2. Mediation analysis

The relationship between defeat and entrapment was investigated further with mediation analysis using PROCESS macro for SPSS, model 4 (Hayes, 2013). The results are shown in Table 6. Entrapment significantly mediates the relationship between defeat and ideation (as shown by the indirect effects). This effect is significant at baseline and 1-month follow-up but not at 6 months.

4. Discussion

Overall, the results offer support for the IMV model of suicidal behaviour. In the phase one analyses, the first and second hypotheses were supported. Firstly, those in the ideation group and the attempt group differed significantly from controls on the motivational variables, but no differences were found between the ideation and attempt groups on these measures. Secondly, those in the attempt group differed from the control and ideation groups on the volitional phase variables. Compared to the ideation group, those who acted upon their thoughts of suicide (i.e., attempt group) reported higher capability for suicide, were more likely to have a family member or close friend who had self-injured or attempted suicide, and were more impulsive. This supports the IMV model that specifies that it is the volitional phrase rather than the motivational phase which distinguishes ideation from enaction, and

Table 1
Descriptive statistics for continuous variables.

	Control Group			Ideation Group		Attempt Group			Total		
	N	M	SD	M	SD	N	M	*SD*	N	*M*	*SD*
Hopelessness	91	4.03	3.23	9.89	5.15	94	10.20	5.88	284	8.12	5.64
Defeat	92	12.10	8.49	31.95	14.93	99	33.11	15.30	296	26.17	16.38
Entrapment	93	7.96	8.79	29.92	15.27	99	31.85	16.20	297	23.69	17.51
Perceived Burdensomeness	94	10.94	4.00	22.92	10.73	100	24.87	11.27	299	19.80	11.15
Thwarted Belongingness	94	11.59	5.54	19.69	7.39	99	20.06	7.87	297	17.25	8.01
Resilience	94	2.83	0.71	1.99	0.69	100	2.13	0.86	299	2.30	0.82
Social Perfectionism	94	51.50	14.64	61.44	17.23	94	63.87	17.65	292	59.02	17.35
Enriched Social Support	93	24.62	4.61	19.47	5.62	99	18.76	6.06	297	20.85	6.04
Perceived Stress	94	8.36	1.38	8.56	1.62	99	8.85	1.70	298	8.59	1.58
Capability for Suicide	94	5.35	2.79	4.95	2.87	99	6.09	2.87	298	5.46	2.87
Exposure to self-destructive behaviours and death	94	1.44	1.31	1.96	1.49	99	2.64	1.74	298	2.02	1.59
Impulsivity	89	31.63	9.93	38.33	12.86	88	43.16	12.73	273	37.70	12.78
Depression	91	8.14	7.01	21.63	11.09	95	24.98	13.68	288	18.47	13.09
Ideation (BSSI)†				4.60	6.49	100	7.09	8.03	205	5.82	7.37
Previous ideation (past year)†				21.79	62.84	93	39.82	92.61	196	30.34	78.70

Note: † Ideation and attempt group only.

Table 2
Testing the effects of employment group on study variables.

	F	Group Comparison		
		U & E	U & S	S & E
Age	40.905*	NS	.225	.000
Depression	19.248*	.102	.173	NS
Hopelessness	13.141*	.000	.124	NS
Ext. Entrapment (M)	22.364*	.074	.189	.042
Int. Entrapment (M)	13.962*	.079	.126	NS
Defeat (M)	29.389*	.136	.239	NS
Burdensomeness (M)	10.716*	.061	.101	NS
Thwarted Belongingness (M)	15.773*	.086	.142	NS
Resilience (M)	5.641*	.732	.036	NS
Social Perfectionism (M)	.600	–	–	–
Enriched Social Support (M)	17.426*	.082	.161	NS
Perceived Stress (PSS) (M)	.243	–	–	–
Capability for Suicide (V)	1.792	–	–	–
Exposure to suicide (V)	7.303*	NS	.052	.049
Impulsivity (V)	8.529*	.058	.083	NS

Note: Bonferroni adjustment applied for post-hoc tests (p = .003). E = Employed group, U = Unemployed group, S = Student group M = Motivational/pre-motivational moderators, V = Volitional moderator.

Table 3
Testing the effects of suicide group on study variables.

	F	Group Comparison		
		C & I	C & A	I & A
Age	5.273*	NS	.052	NS
Depression	61.029*	.342	.374	NS
Hopelessness	46.529*	.315	.297	NS
Ext. Entrapment (M)	67.943*	.358	.406	NS
Int. Entrapment (M)	84.304*	.422	.449	NS
Defeat (M)	73.705*	.394	.417	NS
Burdensomeness (M)	62.403*	.346	.401	NS
Thwarted Belongingness (M)	44.637*	.277	.280	NS
Resilience (M)	36.575*	.270	.177	NS
Social Perfectionism (M)	14.796*	.088	.128	NS
Enriched Social Support (M)	32.593*	.200	.229	NS
Perceived Stress (PSS) (M)	2.335	–	–	–
Capability for Suicide (V)	4.195*	NS	NS	.038
Exposure to suicide (V)	15.099*	NS	.133	.042
Impulsivity (V)	20.831*	.078	.205	.035

Note: Bonferroni adjustment applied for post-hoc tests (p = .003).
C = Control group, I = Ideation group, A = Attempt group. M = Motivational/pre-motivational moderators, V = Volitional moderator.

replicates findings by Dhingra et al. (2015) and Wetherall et al. (2018a). It is important, therefore, that health care professionals are aware of the factors associated with suicide enactment as distinct from those that predict ideation; and that those conducting psychosocial assessments take this into account.

The second phase of the study involved only the ideation and attempt groups. The results from this phase provide partial support for the predictive utility of the IMV model. Defeat and entrapment were both significant predictors of ideation at baseline, and entrapment a significant predictor at 1-month follow-up. Defeat was significant across all three time points at the second step of the regression, however failed to reach significance once entrapment was introduced into the model. This is likely be explained by entrapment mediating the effect of defeat on ideation – which is consistent with the IMV model that predicts that defeat may lead to feelings of entrapment in some individuals. This was further supported by the mediation analyses which shows a significant indirect effect of defeat on ideation (via entrapment) at baseline and 1-month follow-up. Entrapment may have failed to reach significance at the final time point (6-month follow-up) due to a lack of statistical power and because events in people's lives may have changed in the intervening 6 months to make them feel less trapped.

These findings, alongside other recent studies (Dhingra et al., 2015; O'Connor et al., 2013; Wetherall et al., 2018a) provide support for the IMV model. Risk assessments should include the volitional moderators: capability for suicide, exposure to suicide behaviour (by others), and impulsivity as indicators of vulnerability to ideation and/or attempts. Single item risk assessments have been identified as potentially leading to the misclassification of suicide risk, leading to a call for more detailed risk assessments (Hom et al., 2016). Identifying the key measures to include in such assessments is key. That said, suicide risk assessment remains a controversial area (Bolton et al., 2015) and the authors acknowledge that effective risk assessment is likely to involve a collaborative approach between clinician and patient rather than a reliance solely upon scale measures. Indeed a recent clinical study concluded that scales do not predict repeat suicidal behaviour (Steeg et al., 2018). It is also vital that research continues to explore measures of assessment that are independent of patient reported information – as some patients may misreport when asked about behaviours linked to suicide ideation and/or enactment (Busch et al., 2003).

As suggested by Dhingra et al. (2016), further consideration should be given to interventions aimed at reducing the desire for suicide despite increased capability and exposure to suicidal behaviour by others. Interventions aimed at reducing perceptions of entrapment and defeat should be prioritized as they are likely to be key in reducing future ideation. Crucially though, these findings also highlight the importance

Table 4
Zero-order Pearson's product moment correlations between main study variables.

	Hopelessness	Defeat	Entrapment	Burdensomeness	Belongingness	Resilience	Social Perfectionism	Social Support	Perceived Stress	Capability for Suicide	Exposure to death	Impulsivity	Depression	Ideation†	Prev. ideation†
Hopelessness	–														
Defeat	.85**	–													
Entrapment	.79**	.86**	–												
Burdensomeness	.75**	.82**	.78**	–											
Belongingness	.65**	.68**	.67**	.60**	–										
Resilience	-.66**	-.64**	-.56**	-.56**	-.51**	–									
Social Perfectionism	.40**	.44**	.49**	.49**	.50**	-.33**	–								
Social Support	-.48**	-.51**	-.50**	-.40**	-.74**	.34**	-.36**	–							
Perceived Stress	.04	.07	.19**	.09	-.00	-.02	.15**	.01	–						
Capability for Suicide	− 16*	-.03	-.02	-.07	-.06	.42**	.05	-.05	-.04	–					
Exposure to death	.12*	.19**	.21**	.21	.09	-.07	.18**	-.08	.18**	.07*	–				
Impulsivity	.46**	.50**	.48**	.50**	.33**	-.34**	.22**	-.27**	.04	.12	.16**	–			
Depression	.77**	.81**	.80**	.79**	.59**	-.60**	.47**	-.39**	.16**	-.06	.24**	.50**	–		
Ideation (BSSI)	.54**	.48**	.49**	.44**	.37**	-.30**	.21**	-.20**	-.03	-.03	.16*	.21**	.50**	–	
Prev. ideation	.30**	.21**	.26**	.12	.25**	-.13	.10	-.20**	-.16*	.09	.04	.05	.13	.47**	–

Note: ***p < .001 **p < .01 * p < .05. † Ideation and previous ideation only measured for ideation and attempt groups.

of focusing on volitional phase factors in clinical care. If someone is presenting to healthcare professionals in a suicidal crisis, working to keep the environment safe and monitoring other volitional factors like fearlessness about death should be prioritized.

The current study adds to the existing literature supporting the IMV model and addresses recommendations to replicate these findings beyond student populations (Dhingra et al., 2015). Although the student population is an important group to study due to relatively high levels of suicidal behaviour within this group (Russell et al., 2019), it is also necessary to extend studies to a wider population to increase the generalizability of results - as the student population is not representative of the general population. Therefore, the current study aimed to recruit from a wider population by utilizing a wide range of sources. Less than half of the current sample identified their current employment status as being a student. Another strength of the current study is the use of longitudinal data over a 6-month period. This addresses the limitations of a cross-sectional study (as identified by Dhingra et al., 2015) and helps to rule out reverse causation.

Limitations of the current investigation include a relatively modest sample size of the ideation group and attempt group. Although it is worth noting that this is not an easy population to recruit for face-to-face studies, a larger sample size would have been desirable to increase statistical power. The study also relied upon self-report measures which can be prone to inaccuracy due to bias or forgetfulness (Angold et al., 1996). Although research by Hardt and Rutter (2004) suggests that bias in the recall of adverse experiences is not sufficient to invalidate studies using this method.

The present study used the Barrett Impulsiveness Scale to measure impulsivity, and found that the ideation group and the attempt group differed on this factor. However recent research by Klonsky and May (2015) has suggested that impulsivity may actually be a heterogeneous construct consisting of 4 distinct traits: Urgency (responding rashly to negative emotions), poor premeditation (difficulties foreseeing consequences of actions), poor perseverance (tendency to give up easily) and sensation seeking (preference for excitement and stimulation). They propose that those in the ideation group and those in the attempt group only differ on premeditation. Future studies may wish to investigate this further and consider breaking down the construct of impulsivity into these traits.

Further directions for future research include investigating the mechanisms behind the volitional moderators, including how each moderator has its effect upon ideation. For example, whether exposure to suicide has its influence through social learning or through another mechanism, such as a tendency for individuals to associate with similar others. Identifying these relationships could help to also identify periods/phases of vulnerability and/or feed into the design of interventions based around boosting resilience. Although beyond the scope of the present study, given the recent research suggesting that the BSSI may assess suicidal desire and preparatory acts (Dhingra et al., 2019), it would be interesting to explore the nature of assessment of suicidal ideation in future research. Finally, it would be fruitful if future research also sought to include important bio-markers of suicide risk (e.g., cortisol levels) in order to help understand the interplay between the central components of the IMV model and related biological mechanisms (e.g., see O'Connor et al., 2017, O'Connor and Kirtley, 2018).

In conclusion, the results of the current study support the IMV model of suicidal behaviour and highlight that entrapment should be routinely included in suicide risk assessments. Further research to test predictors of the transition from suicide ideation to suicide attempts is crucial to inform future intervention development and health care delivery.

Declarations of interest

None.

All authors have seen and approved the final version of the

Table 5
Predictors of ideation (BSSI) at Each time point; controlling for age, gender and previous ideation.

Step		Baseline					1-month follow-up					6-month follow-up				
		B	SE(B)	Beta	*t*	R^2(adj)	B	SE(B)	Beta	*t*	R^2(adj)	B	SE(B)	Beta	*t*	R^2(adj)
1	Age	-.05	.05	-.07	−1.00		-.01	.05	-.02	-.26		.01	.06	.02	.24	
	Gender	.78	.99	.05	.78		.94	.96	.06	.98		.53	1.20	.03	.44	
	Employment	3.03	1.05	.19	2.88**		1.16	1.05	.07	1.11		1.08	1.34	.06	.80	
	SITBI #5†	.04	.01	.48	7.38***	.28 (.27)***	.05	.01	.60	9.52***	.39 (.37)***	.04	.01	.47	6.47***	.24 (.22)***
2	Age	-.02	.04	-.03	-.48		.00	.04	.00	.07		.03	.06	.04	.50	
	Gender	.60	.90	.04	.66		.94	.91	.06	1.03		.45	1.17	.03	.39	
	Employment	.54	1.05	.03	.52		-.50	1.07	-.03	-.47		-.30	1.39	-.02	-.22	
	SITBI #5†	.04	.01	.40	6.63***		.05	.01	.54	8.87***		.04	.01	.43	5.78***	
	Defeat	.19	.03	.39	6.05***	.41 (.39)***	.13	.03	.28	4.26***	.4 (.44)***	.11	.04	.23	2.89**	.28 (.26)***
3	Age	-.03	.04	-.04	-.65		-.01	.04	-.01	-.21		.03	.06	.04	.50	
	Gender	.59	.89	.04	.66		.85	.90	.06	.94		.46	1.17	.03	.39	
	Employment	.67	1.04	.04	.65		-.25	1.06	-.02	-.23		-.31	1.40	-.02	-.22	
	SITBI #5†	.03	.01	.37	6.23***		.04	.01	.52	8.42***		.04	.01	.43	5.68***	
	Defeat	.10	.05	.22	2.23*		.04	.05	.09	.83		.12	.06	.24	1.87	
	Entrapment	.10	.05	.22	2.23*	.42 (.40)***	.11	.05	.24	2.40*	.47 (.45)***	-.01	.06	-.02	-.12	.28 (.25)***

Note: Only ideation and attempt groups are included. ***p < .001 **p < .01 * p < .05. All models are significant (p < .001) Significant R^2 changes are shown in the table. Ideation measured using Beck Scale for Suicidal Ideation (BSSI). †SITBI: Self-Injurious Thoughts and Behaviours Interview. SITBI #5 = previous suicidal ideation (over past year).

Table 6
Mediation Analysis Controlling for Age, Gender and Previous Ideation (Over past year). IV = Defeat, DV = Ideation, Mediator = Entrapment.

Effect	Baseline (n = 193)			1 month (n = 173)			6 month (n = 160)		
	B (SE)	*p*	CI	B	p	CI	B (SE)	P	CI
Total effect	.185 (.028)	< .001	.130–.239*	.1189 (.027)	< .001	.065–.173*	.103 (.035)	.004	.034–.172*
Direct effect	.109 (.044)	.015	.022–.197*	.032 (.044)	.467	-.054-.118	.107 (.058)	.065	-.007-.221
Indirect effect (mediation)	.075 (.033)		.007–.136*	.087 (.032)		.025–.152*	-.004 (.041)		-.089-.074

Note: ***p < .001 **p < .01 * p < .05.

manuscript being submitted.

R.O and D.O were involved in planning the work. D.O supervised the work. D.B and J.G collected and processed the experimental data. D.B. prepared the final dataset, performed the analysis and drafted the manuscript. E.F performed the power calculations. D.B, R.O and D.O interpreted the results and worked on refining the analysis. All authors discussed the results and commented on the manuscript.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jpsychires.2019.07.007.

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