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A structural test of the Integrated Motivational-Volitional model of suicidal behaviour

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ABSTRACT

Suicidal behaviours are highly complex, multi-determined phenomena. Despite this, historically research has tended to focus on bivariate associations between atheoretical demographic and/or psychiatric factors and suicidal behaviour. The aim of this study was to empirically test the Integrated Motivational-Volitional model of suicidal behaviour using structural equation modelling. Healthy adults ($N=1809$) completed anonymous self-report surveys. The fit of the proposed model was good, and explained 79% of variance in defeat, 83% of variance in entrapment, 61% of variance in suicidal ideation, and 27% of variance in suicide attempts. All proposed paths were significant except for those between goal re-engagement and two factors of suicide resilience (Internal Protective and External Protective) and suicidal ideation; and impulsivity and discomfort intolerance and suicide attempts. These findings represent a preliminary step towards greater clarification of the mechanisms driving suicidal behaviour, and support the utility of basing future research on the Integrated Motivational–Volitional model of suicidal behaviour.

1. Introduction

Each year approximately 6000 people in the U.K. and approximately 804,000 people worldwide die by suicide, making it the 14th leading cause of death globally (Office for National Statistics, 2013; World Health Organization [WHO], 2014). A history of suicidal behaviour is one of the most robust predictors of future suicide (Hawton and van Heeringen, 2009), and is, therefore, frequently the focus of research efforts to better understand the aetiology of suicide (Suominen et al., 2004). Although our knowledge of distal suicide risk factors (e.g., mental disorders) has increased considerably in recent decades (O'Connor and Nock, 2014), how and why certain factors work together to increase suicide risk is unclear. Results of psychological autopsy studies suggest that more than 90% of people who die by suicide have a mental disorder before their death. However, most people with a mental disorder never become suicidal (i.e., experience suicide ideation, make suicide attempts, or die by suicide; Bostwick and Pankratz, 2000; O'Connor and Nock, 2014). Thus, distal factors are not sufficiently

specific to be clinically useful. For this reason, it is crucial that we advance our understanding of how distal risk factors may be translated into suicidal thoughts and behaviour via proximal psychological risk processes, as well as the psychological processes that underpin both suicidal ideation and the decision to act on suicidal thoughts. Such work is needed to inform the development of evidence-informed treatment interventions in this area.

Many theorists have sought to explain suicide (e.g., Baumeister, 1990; Shneidman, 1985; Williams, 2001; Williams et al., 2008), and although these theories have been useful in guiding research and prevention efforts, there is no evidence of sustained reductions in suicide rates (WHO, 2014). A commonality between these theories that may be limiting progress in our understanding suicide is that they do not account for why most people who have thoughts of suicide do not attempt suicide (Klonsky and May 2014; O'Connor and Nock, 2014). Indeed, with only a few notable exceptions, these models have failed to differentiate between those who develop suicidal ideation (but do not attempt suicide) from those who go on to engage in suicidal behaviour.

The Integrated Motivational–Volitional (Fig. 1) Model of suicidal behaviour (O'Connor, 2011) attempts to address this very issue. Integrating predominant factors from existing theoretical models, the Integrated Motivational–Volitional model conceptualises suicide as a behaviour (rather than a by-product of mental disorders)

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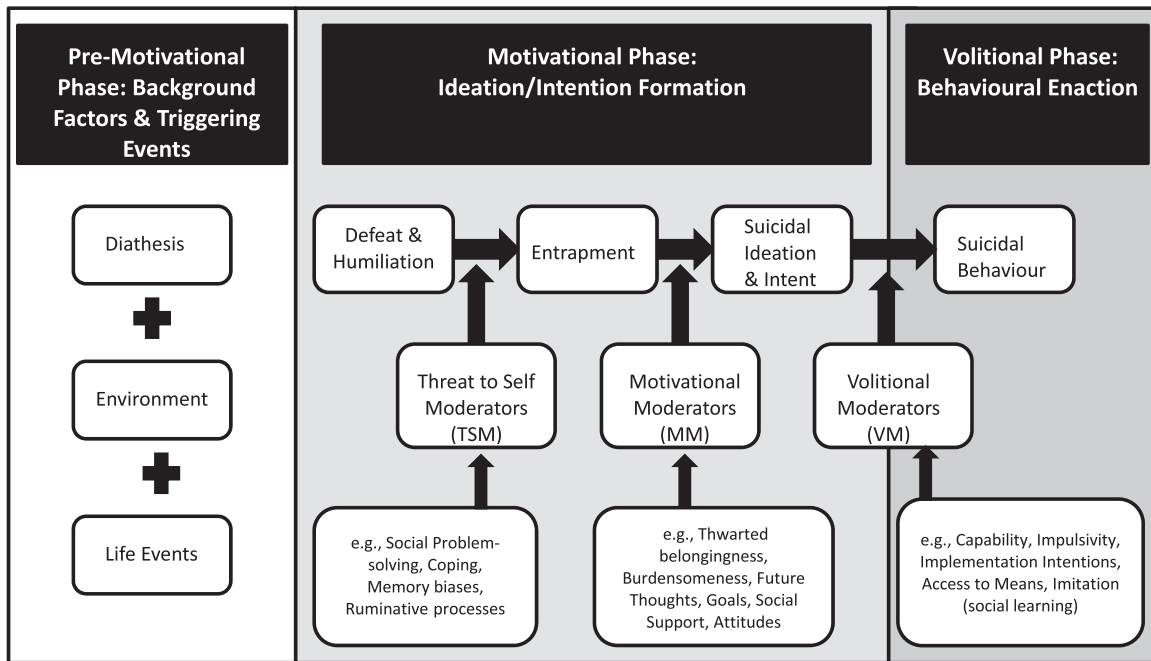Rory.OConnor@glasgow.ac.uk (R.C. O'Connor).

Fig. 1. Integrated Motivational–Volitional model of suicidal behaviour (O'Connor, 2011).

that develops through motivational and volitional phases. The motivational phase describes the factors that govern the development of suicidal ideation and intent; whereas, the volitional phase outlines the factors that determine whether an individual attempts suicide. Extending the "arrested flight" model of Williams (2001), the theory posits that suicidal thoughts derive from feelings of entrapment where suicidal behaviour is seen as the salient solution to life circumstances, and entrapment is triggered by defeat/humiliation appraisals. Feelings of entrapment are exacerbated by specific state moderators (i.e., factors that facilitate/obstruct movement between stages), such as brooding (ruminative cognitions which repetitively compare one's present situation with another unachieved benchmark), poor problem solving, and attribution biases. In the presence of motivational moderators such as interpersonal states (i.e., perceived burdensomeness and thwarted belongingness), impaired subjective goals, and disrupted future positive thinking, such appraisals lead to suicidal ideation. The translation from thoughts to actions is determined by behavioural enaction factors (volitional moderators) which include access to the means of suicide, acquired capability (fearlessness about death and pain insensitivity), exposure to the suicidal behaviour of others, and impulsivity.

Although relatively new, different aspects of the Integrated Motivational–Volitional model have already been tested empirically, yielding a number of encouraging findings. For instance, one study found that entrapment was a proximal predictor of repetition of suicidal behaviour over time. Specifically, whereas, suicide ideation, past suicide attempts, depression, hopelessness, defeat and entrapment were each univariate predictors of suicide attempts four years after an index attempt, entrapment was the only modifiable predictor (alongside frequency of previous suicide attempts) in multivariate analysis (O'Connor et al., 2013). Different components of the motivational phase of the model have also received empirical support. For example, in a number of studies, impaired positive future thinking (anticipation of positive experiences in the future) has been found to be a key factor within the suicidal process (e.g., Hunter and O'Connor, 2003; O'Connor et al., 2000; O'Connor et al., 2004; O'Connor et al., 2015). Indeed, within a sample of adults hospitalised following a suicide attempt,

impaired positive future thinking was a better predictor of Time 2 suicidal ideation (approximately 2.5 months following discharge) than global hopelessness (O'Connor et al., 2008). The way in which individuals respond to unachievable goals (i.e., goal regulation) has also been found to predict repetition of self-harm/suicide (O'Connor et al., 2012b, O'Connor et al., 2009). O'Connor et al. (2012a), for instance, found evidence to suggest that suicide attempters who tend not to re-engage with new goals (in the face of existing unattainable goals) were at increased risk of readmission to hospital after self-harm, and that this association was further affected by the extent of existing goal disengagement.

Although the Integrated Motivational–Volitional model was developed with suicidal ideation and behaviour in mind, the central tenets of the model can, and have been, applied to self-harm irrespective of intent. For instance, in a sample of 5604 adolescents, as predicted by the Integrated Motivational–Volitional model, motivational phase variables did not distinguish between adolescents who only thought about self-harm (i.e., ideators-only) and those who actually engaged in self-harm (i.e., enactors); whereas, the volitional phase variables did (O'Connor et al., 2012a). In other words, volitional moderators bridged the intention-behaviour gap.

Other research findings are consistent with the Integrated Motivational–Volitional model and its contention that pre-motivational/motivational and volitional phase variables should differentially predict suicidal ideation and behaviour (May and Klonsky, in press; Séguin et al., 2004; Taliaferro and Muehlenkamp, 2014; Taylor et al., 2011). Séguin et al. (2004) did not find significant differences between adolescents who attempted suicide from those who only experienced suicidal ideation on measures of depression, self-esteem, irrational beliefs, reasons for living, parent–child relationships, or family functioning. Taliaferro and Muehlenkamp (2014) found that hopelessness and depression were higher among adolescent ideators than non-suicidal adolescents, but comparable between ideators and attempters; conversely, a self-injury history (a volitional phase factor) was more likely among attempters than ideators. There is also evidence to suggest that suicide capability is elevated among suicide attempters relative to suicide ideators (Smith et al., 2010; Van Orden

et al., 2008), and that restricted physical access to lethal means may reduce the likelihood of suicide attempts (Barber and Miller, 2014).

1.1. The current study

Although the above findings are promising, they are limited by providing support for only a limited selection of the model's components. Indeed, research to date has yet to test the inter-relations between the key components of the theory simultaneously. The aim of the present study, therefore, is to provide a direct test of the Integrated Motivational-Volitional (Fig. 1) Model of suicidal behaviour through the application of latent variable modelling techniques. Such techniques allow for the connections between several constructs to be simultaneously tested. A promising implication of studying the applicability of the Integrated Motivational–Volitional model is the development of more parsimonious risk assessment tools. Specifically, individuals frequently experience numerous risk factors, making risk prediction especially challenging; while the Integrated Motivational–Volitional model proposes a more proximal pathway from risk factors to suicidal behaviour whereby individual factors are hypothesised to confer risk when they involve or increase the likelihood that individuals will experience feelings of entrapment. In addition, validating the Integrated Motivational–Volitional model could lead to the development of valuable intervention approaches that could target suicidal thoughts when they first emerge, before they progress to a suicide attempt, or help to identify which suicide ideators are at greatest risk of making a suicide attempt.

2. Method

2.1. Sample

Participants ($N=1809$) were 1333 female and 476 male university students recruited from various faculties in three UK universities. Participants were aged between 18 and 66 years ($M=24.05$; $SD=8.09$). One thousand four hundred and forty four participants identified themselves as White (77.6%), 224 as Asian (12.4%), 73 as Mixed (4%), 67 as Black (3.7%), 39 as Other (2.2%). Two of the participants did not give any information regarding their race. Most students described their sexual orientation as heterosexual/straight (84.7%).

2.2. Measures

2.2.1. Motivational phase variables
2.2.1.1. Defeat. The Defeat Scale, a self-report measure of 16 questions assessing individuals' perceptions of losing rank position and failed struggle during the past seven days (e.g., "I feel defeated by life") (Gilbert and Allan, 1998), measured defeat. Items are rated on a five-point scale; higher scores indicate greater feelings of defeat.

2.2.1.2. Entrapment. Entrapment represents the sense of being unable to escape feelings of defeat and rejection (e.g., "I am in a situation I feel trapped in"), and was measured by the 16-item Entrapment Scale (Gilbert and Allan, 1998). Items are rated on a five-point scale; higher scores indicate more feelings of entrapment.

2.2.1.3. Brooding rumination. Consistent with previous research (e.g., O'Connor and Williams, 2014; Polanco-Roman et al., 2014), brooding, defined as the extent to which individuals passively focus on the reasons for their distress (e.g., "Think, 'Why can't I

handle things better?"), was measured using the five items from the Response Styles Questionnaire (RSQ; Nolen-Hoeksema, 1991). Given that reflection is inconsistently associated with suicidality (Morrison and O'Connor, 2008), it was not included in the present study.

2.2.1.4. Suicide resilience. Suicide resilience was assessed using the Suicide Resilience Inventory 25 (SRI-25; Osman et al., 2004). The SRI-25 is a 25-item self-report measure used to assess factors that help defend against suicidal thoughts and behaviours (e.g., "I can ask for emotional support from people close to me if I were to think about killing myself"). The scale is comprised of three subscales, two of which (External Protective and Emotional Stability) include the assessment of suicide-specific resilience. The External Protective subscale assesses people's positive perceptions or beliefs that they are able to seek help from those close to them should they experience suicidal thoughts; the Emotional Stability subscale assesses people's positive perceptions or beliefs that they are able to resist acting on suicidal thoughts when experiencing them. The third subscale, the Internal Protective subscale, assesses people's satisfaction with life and positive feelings about themselves overall.

2.2.1.5. Perceived burdensomeness and thwarted belongingness. Perceived burdensomeness and thwarted belongingness were measured with the 12-item version of the Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2008). The INQ assesses respondent's current beliefs about feeling connected to others (i.e., thwarted belongingness; e.g., "I feel disconnected from other people") and feeling like a burden on the people in their lives (i.e., perceived burdensomeness; e.g., "The people in my life would be better off if I were gone"). Seven items measure belongingness, and five items measure burdensomeness. 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 and burdensomeness.

2.2.1.6. Goal reengagement and disengagement. The goal adjustment scale (GAS; Wrosch et al., 2003) is a 10-item instrument that consists of two subscales: (i) goal disengagement (4 items) and, (ii) goal reengagement (6 items). Goal disengagement measures one's perceived difficulty in reducing effort and relinquishing commitment toward unobtainable goals (e.g., "It's easy for me to reduce my effort toward the goal" [reverse scored]). The goal reengagement subscale taps one's perceived ability to reengage in other new goals if they face constraints on goal pursuits (e.g., "I think about other new goals to pursue").

2.2.2. Volitional phase variables
2.2.2.1. Discomfort intolerance. The Discomfort Intolerance Scale (DIS; Schmidt et al., 2007) is a five-item self-report index of the degree to which individuals tolerate physical discomfort, including pain (e.g., "I can tolerate a great deal of physical discomfort" [reverse scored]). Participants rate the questions on a scale ranging from 0 ("not at all like me") to 6 ("extremely like me"). In the current study, we used the two items indexing the ability to withstand physical discomfort.

2.2.2.2. Impulsivity. Two items ("I do things on the spur of the moment" and "I do things impulsively") based on research by O'Connor et al. (2012b) were selected from the Plutchik Impulsivity Scale (Plutchik et al., 1989) to assess this construct.

2.2.2.3. Exposure to suicidal behaviour. Respondents were asked the following two questions about self-harm by close friends and family: 'Has anyone among your close friends [your family]

attempted suicide or deliberately harmed themselves?' Items were drawn from research by O'Connor et al. (2012b).

2.2.2.4. Fearlessness about death.
To measure fearlessness about death we used the seven-item fearlessness about death subscale of the ACSS (Ribeiro et al., 2014). Participants rated items on a 5-point scale, with higher scores on the scale indicating greater fearlessness about death.

2.2.3. Mood and suicidal ideation and behaviour
2.2.3.1. Anxiety and depression.
The Hospital Anxiety and Depression Scale (HADS; Zigmond and Snaith, 1983) was employed to measure anxiety and depression. The scale consists of 14 questions, of which seven correspond to the anxiety subscale (e.g. "Worrying thoughts go through my mind") and seven correspond to the depression subscale (e.g. "I have lost interest in my appearance"). Items are rated on a 0–3 point scale indicating strength of agreement with each item.

2.2.3.2. Suicide ideation.
The 4-item Depressive Symptom Index – Suicidality Subscale (DSISS; Joiner et al., 2002) was used to identify the frequency and intensity of suicidal ideation and impulses in the past two weeks. Scores on each item range from 0 to 3 (e.g., "I do not have thoughts of killing myself" to "I always have thoughts of killing myself"), and on the overall questionnaire from 0 to 12, with higher scores reflecting greater severity of suicidal ideation.

2.2.3.3. Suicide attempts.
A single item, which was adapted from Nock et al., 2007, was used to assess suicide attempt history. Rather than "have you ever," we used "how many times have you" before "made an actual attempt to kill yourself in which you had at least some intent to die?" Number of suicide attempts ranged from 0 to 4 ($M=0.21$, $SD=0.49$). Sixteen percent reported one attempt and 2% reported two or more attempts.

2.3. Procedure

The research protocol was reviewed and approved by the institutional ethics panels of all three participating universities. The study adhered to the British Psychological Society's ethical guidelines (BPS, 2004). Participants were recruited via an email invite to participate in a study of suicide. Within this email, it was made clear to potential participants that they did not need to have experienced suicidal thoughts and behaviours to take part. The study was also advertised on two of the participating university's websites. Participants completed the study online using Qualtrics, a Web interface that allows for secure remote data collection through the distribution of anonymous secure links to the protocol. Participants were required to consent before the survey was presented online. Participation in the current study was voluntary and no inducements or obligations were used. All participants were debriefed and given details of local mental health services, and telephone, postal and electronic contacts for useful support organisations.

2.4. Analysis

Preliminary analysis was carried out in SPSS 22 to ensure that the data were suitable for structural equation modelling (SEM; Bollen, 1989). Pearson product-moment correlation coefficients were used to examine relationships between all variables included in further analysis. The structural model of the Integrated Motivational–Volitional model of suicidal behaviour (Fig. 2) was specified and tested using Mplus 7.11 (Muthén and Muthén, 2008–2010) with robust maximum likelihood (MLR) estimation. SEM is a combination of two analytical procedures: confirmatory factor analysis (CFA), which assesses the measurement component of a theoretical model, and path analysis, which assesses the relationship between latent variables. Within a SEM framework, the structural and measurement elements of analysis are estimated simultaneously (MacCallum and Austin, 2000). A number of other features make the use of SEM procedures appropriate for the
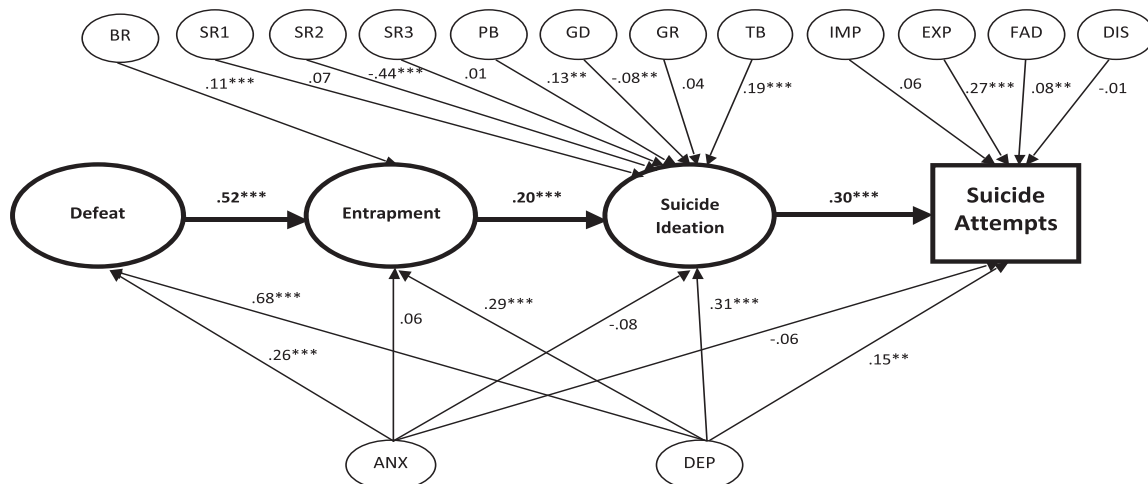
BR = Brooding rumination, SR1 = suicide resilience Factor 1 (Internal Protective), SR2 = suicide resilience Factor 2 (Emotional Stability), SR3 = suicide resilience Factor 3 (External Protective), PB = perceived burdensomeness, GD = goal disengagement, GR = goal reengagement, TB = thwarted belongingness, IMP = impulsivity, EXP = exposure, FAD = fearlessness about death, DIS = discomfort intolerance, ANX = anxiety, DEP = depression.

Statistical significance: **p <.01, ***p < .001.

Fig. 2. Structural model of the Integrated Motivational-Volitional Model of Suicidal Behaviour. BR=Brooding rumination, SR1=suicide resilience Factor 1 (Internal Protective), SR2=suicide resilience Factor 2 (Emotional Stability), SR3=suicide resilience Factor 3 (External Protective), PB=perceived burdensomeness, GD=goal disengagement, GR=goal reengagement, TB=thwarted belongingness, IMP=impulsivity, EXP=exposure, FAD=fearlessness about death, DIS=discomfort intolerance, ANX=anxiety, DEP=depression. Statistical significance: **p < 0.01,***p < 0.001.

current analysis. These include controlling for systematic and random measurement error and the ability to include a number of endogenous variables within a single model (Bollen, 1989). For the purpose of the current research, 17 latent factors were identified: defeat, entrapment, anxiety, depression, suicide ideation, brooding rumination, suicide resilience (3 factors), perceived belongingness, goal disengagement, goal reengagement, thwarted belongingness, impulsivity, exposure, discomfort tolerance, and fearlessness about death. Suicide attempts was a count (observed) variable.

The following statistics were used to assess model fit: Chi-square ($\chi2$), root mean square residual (RMSR), root mean square error of approximation (RMSEA; Steiger, 1990) with a 90% confidence interval (90% CI), the Incremental Fit Index (IFI; Bollen, 1989), and Comparative Fit Index (CFI; Bentler, 1990). A non-significant Chi-square (Kline, 2005) and values above 0.95 for the IFI and CFI are considered to reflect a good model fit (Hu and Bentler, 1999; Vandenberg and Lance, 2000). However, for CFI and IFI, values above 0.90 indicate adequate fit (Bentler, 1990; Hu and Bentler, 1999). RMSEA and RMSR values less than 0.05 suggest good fit and values of up to 0.08 indicate reasonable errors of approximation in the population (Browne and Cudeck, 1989).

3. Results

3.1. Descriptive statistics and correlations

Descriptive statistics, including means (M) and standard deviations (SD) for all continuous measures are presented in Table 1, along with Cronbach's alphas. Results indicate that participants experienced relatively high levels of fearlessness about death, anxiety, and depression, as well as moderate levels of defeat, entrapment, and perceived burdensomeness. Intercorrelations among all continuous variables are presented in Table 2.

3.2. Model testing—SEM

To test the proposed model, a two-step procedure was adopted. The first step was to analyse the overall model fit, which included all direct paths (Fig. 2). The fit of the proposed model was good, $\chi^2(6441) = 19092.18$, $p < 0.05$, CFI = 0.912; TLI = 0.901, RMSEA = 0.034 (90% CI = [0.033, 0.034]), SRMR = 0.045, and

Table 1
Descriptive statistics for all continuous variables.

Variable	M	SD	Min	Max	α
Defeat	35.87	12.23	16	75	0.95
Entrapment	34.49	16.01	16	78	0.86
Fearlessness about death	21.90	7.07	7	35	0.83
Brooding rumination	12.64	3.64	5	20	0.78
Goal disengagement	10.76	3.44	4	20	0.82
Goal reengagement	20.58	4.96	6	30	0.91
Discomfort intolerance	16.84	4.64	5	30	0.62
Impulsivity	4.95	1.79	2	8	0.61
Anxiety	16.72	4.49	7	28	0.83
Depression	12.26	4.09	7	26	0.83
Burdensomeness	17.26	10.34	7	49	0.93
Belongingness	22.74	7.81	5	35	0.86
Suicide ideation	5.16	2.07	4	15	0.91
Suicide attempts	0.21	0.49	0	4	N/A
Suicide resilience 1	37.31	10.91	9	54	0.94
Suicide resilience 2	40.66	8.41	8	48	0.93
Suicide resilience 3	37.36	9.92	8	48	0.93
Discomfort intolerance	16.85	4.64	5	30	0.90
Exposure	0.79	0.78	0	2	0.61

Note: suicide resilience 1=Internal Protective, suicide resilience 2=Emotional Stability, suicide resilience 3=External Protective.

explained 79% of variance in defeat, 83% of variance in entrapment, 61% of variance in suicidal ideation, and 27% of variance in suicide attempts.

Table 3 presents the standardized factor loadings for the measurement level of the model; whereas, Table 4 presents the regression path weights for the structural level of the model. As can be seen in Table 4 (and in Fig. 2), a strong positive relationship existed between defeat and entrapment, while weak-moderate positive relationships existed between entrapment and suicidal ideation and suicidal ideation and suicide attempts. Anxiety and depression were controlled for at all four stages of the model. There were significant positive relationships between anxiety and defeat, depression and defeat, depression and entrapment, depression and suicidal ideation, and depression and suicide attempts. None of the other relationships between depression and anxiety, and the stages of the model were statistically significant. Brooding rumination was weakly related to entrapment. In terms of motivational covariates, suicide resilience Factor 2 (Emotional Stability) was negatively related to suicidal ideation as was goal disengagement, while perceived belongingness and thwarted belongingness were positively associated with suicidal ideation. Goal reengagement and the other two suicide resilience factors (Internal Protective and External Protective) were not significantly related to suicidal ideation. Two of the volitional covariates, namely exposure and fearlessness about death, were positively related to suicide attempts. Impulsivity and discomfort intolerance were not significantly associated with suicide attempts.

4. Discussion

Seeking to fill an important gap in the literature, the aim of the present study was to use latent variable modelling techniques to specify and test a structural model of the Integrated Motivational–Volitional Model of suicidal behaviour. Results indicated that the model was a good fit of the data, and explained a considerable amount of variance in suicide attempts, suicidal ideation, defeat, and entrapment.

The use of SEM in the current study allowed us to simultaneously test the connections between several constructs (both risk and protective factors) and the main Integrated Motivational–Volitional model components (defeat, entrapment, suicide ideation, and suicide attempts). This is important, as despite widespread recognition that the aetiology of suicide is complex, encompassing a wide array of factors, few studies have looked at the ways in which factors may together contribute to the development of suicidal behaviour. Indeed, most prior research has examined the extent to which individual factors predict the onset and persistence of suicidal behaviour (i.e., suicide ideation, plans, and attempts) (Nock et al., 2008). Thus, by applying a latent variable modelling approach, we were able to yield estimates closer to the true values for the relations between the involved variables.

In line with previous research, we found significant relationships between entrapment (O'Connor et al., 2013), perceived burdensomeness (e.g., Ribeiro et al., 2015), thwarted belongingness (e.g., Van Orden et al., 2008), and goal disengagement (O'Connor et al., 2009) and suicidal ideation; and exposure to self-injurious behaviour in others (e.g., Haw et al., 2013) and fearlessness about death (e.g., Van Orden et al., 2008) and suicide attempts. Contrary to prior findings by O'Connor et al. (2009), difficulties with goal reengagement (one's perceived ability to reengage in other new goals if they face constraints on goal pursuits) was not an independent predictor of suicidal ideation in the present study. Furthermore, although impulsivity is often singled out as key for facilitating the transition from suicidal thoughts to attempts (see Klonsky and May, 2014 for a review), it was not

Table 2
Correlations among all continuous variables.

	DS	ES	FAD	BR	GD	GR	IMP	EXP	ANX	DEP	PB	TB	SI	SA	SR1	SR2	SR3	DIS
DS	1																	
ES	0.84***	1																
FAD	0.001	0.06*	1															
BR	0.63***	0.61***	−0.07**	1														
GD	0.15***	0.13***	−0.01	0.06*	1													
GR	−0.37***	−0.31***	−0.03	−0.19***	−0.12***	1												
IMP	0.02	0.07*	0.08**	0.06*	−0.01	0.07	1											
EXP	0.15***	0.19***	0.03	0.15***	−0.01	−0.06*	0.08**	1										
ANX	0.65***	0.65***	−0.06	0.57***	−0.03	−0.20***	0.05	0.21***	1									
DEP	0.73***	0.71***	0.07*	0.49***	0.12***	−0.32***	0.01	0.14***	0.60***	1								
PB	0.72***	0.71***	0.11***	0.52***	0.09**	−0.32***	0.03	0.12***	0.52***	0.63***	1							
TB	0.63***	0.64***	−0.07*	−0.47***	−0.10***	0.25***	0.04	0.10**	−0.49***	−0.61***	−0.64***	1						
SI	0.61***	0.61***	0.18***	0.39***	0.01	−0.26***	0.06*	0.19***	0.44***	0.55***	0.61***	0.61***	1					
SA	0.35***	0.35***	0.13***	0.23***	−0.01	−0.15***	0.10***	0.25***	0.26***	0.31***	0.35***	0.29***	0.43***	1				
SR1	−0.80***	−0.74***	−0.04	−0.56***	−0.15***	0.42***	0.04	−0.16***	−0.60***	−0.71***	−0.71***	0.66***	−0.57***	−0.31***	1			
SR2	−0.60***	−0.58***	−0.07*	−0.43***	−0.04	0.33***	−0.03	−0.15***	−0.47***	−0.52***	−0.61***	0.50***	−0.66***	−0.40***	0.65***	0.58***		
SR3	−0.53***	−0.53***	−0.08**	−0.35***	−0.11***	0.26***	−0.05	−0.07*	−0.36***	−0.52***	−0.55***	0.60***	−0.46***	−0.30***	0.56***	−0.01	1	
DIS	0.07**	0.11***	0.18***	0.04	−0.09**	0.05	0.16***	0.06*	0.05	0.07**	0.07**	−0.05	0.09	0.05	0.01	−0.01	−0.08**	1

Note: DS=defeat, ES=entrapment, FAD=fearlessness about death, BR=brooding rumination, GD=goal disengagement, GR=goal reengagement, IMP=impulsivity, EXP=exposure, ANX=anxiety, DEP=depression, PB=perceived burdensomeness, TB=thwarted belongingness, SI=suicide ideation, SA=suicide attempts, SR1=suicide resilience Factor 1 (Internal Protective), SR2=suicide resilience Factor 2 (Emotional Stability), SR3=suicide resilience Factor 3 (External Protective), DIS=Discomfort intolerance. Statistical significance:

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

Table 3
Standardized factor loadings and standard errors (measurement level of the model).

Scale and Items	β	SE
Suicide Ideation (SI)		
1.Thinking about suicidal behaviour	0.86***	0.02
2. Has made a tangible plan for a suicide attempt	0.87***	0.02
3. Intends to engage in suicidal behaviour	0.91***	0.01
4. Experiences impulses to engage in a suicide attempt	0.74***	0.02
Entrapment (ES)		
1. In a situation I feel trapped in	0.74***	0.01
2. have a strong desire to escape from things in my life	0.74***	0.01
3. In a relationship I can't get out of	0.30***	0.02
4. Often have the feeling that I would just like to run away	0.75***	0.01
5. Feel powerless to change things	0.81***	0.01
6. Feel trapped by my obligations	0.73***	0.01
7. Can see no way out of my current situation	0.79***	0.01
8. Would like to get away from other more powerful people in my life	0.57***	0.02
9. Have a strong desire to get away and stay away from where I am now	0.71***	0.02
10. Feel trapped by other people	0.68***	0.02
11. Want to get away from myself	0.85***	0.01
12. Feel powerless to change myself	0.82***	0.01
13. Would like to escape from my thoughts and feelings	0.82***	0.01
14. Feel trapped inside myself	0.86***	0.01
15. Would like to get away from who I am and start again	0.84***	0.01
16. Feel I'm in a deep hole I can't get out of	0.87***	0.01
Internal Protective (SR1)		
1. There are many things that I like about myself	0.78***	0.02
2. Most of the time, I see myself as a happy person	0.83***	0.01
5. I like myself	0.85***	0.01
9. Most of the time I set goals that are reasonable for me to meet	0.58***	0.02
11. I am satisfied with most things in my life	0.82***	0.01
13. I am proud of many good things about myself	0.85***	0.01
19. I feel that I am an emotionally strong person	0.69***	0.02
20. Regardless of the problem situation I face, I can be happy with myself	0.87***	0.01
25. I feel cheerful about myself	0.93***	0.01
Emotional Stability (SR2)		
4. Can deal with the emotional pain of rejection without thinking of killing myself	0.69***	0.01
8. I can resist thoughts of killing myself when I feel emotionally hurt	0.86***	0.01
10. I can resist the urge to kill myself when I feel depressed or sad	0.79***	0.02
12. Resist thoughts of killing myself when faced with a difficult or life-threatening situation	0.81***	0.02
14. Can control urge to harm or hurt myself when criticized by someone	0.71***	0.02
18. Can handle thoughts of killing myself when I feel lonely or isolated	0.78***	0.01
23 Resist thoughts of killing myself when faced with humiliating or embarrassing situations	0.79***	0.01
24. Resist thoughts of killing myself when I feel hopeless about the future	0.87***	0.01
External Protective (SR3)		
3. People close to me would find the time to listen if I were to talk seriously about killing myself	0.72***	0.02
6. Could openly discuss thoughts of killing myself with people who are close to me, when it is necessary	0.59***	0.02
7. Can find someone close to me to give me support if in a jam	0.73***	0.02
15. I can ask for emotional support from people close to me if I were to think about killing myself	0.88***	0.01
16. Even if people close to me are angry with me, I can approach them if I want to talk about my personal problems	0.78***	0.01
17. I can find someone (parent, friend, spouse, or relative) who can help me cope if I should think about killing myself	0.92***	0.01
21. If I am in trouble, I can ask for help from people close to me rather than attempt to kill myself	0.84***	0.01
22. I have close friends or family members that I could turn to for	0.91***	0.01

Table 3 (continued)

Scale and Items	β	SE
emotional support if I were to think of killing myself		
Defeat (DS)		
1. Feel that I have not made it in life	0.68***	0.02
2. Feel that I am a successful person	0.57***	0.02
3. Feel defeated by life	0.79***	0.01
4. Feel that I am basically a winner	0.51***	0.02
5. Feel that I have lost my standing in the world	0.75***	0.01
6. Feel that life has treated me like a punch bag	0.66***	0.02
7. Feel powerless	0.78***	0.01
8. Feel that my confidence has been knocked out of me	0.77***	0.01
9. Feel able to deal with whatever life throws at me	0.57***	0.02
10. Feel that I have sunk to the bottom of the ladder	0.82***	0.01
11. Feel completely knocked out of action	0.83***	0.01
12. Feel that I am one of life's losers	0.82***	0.01
13. Feel that I have given up	0.81***	0.01
14. Feel down and out	0.83***	0.01
15. Feel that I have lost important battles in life	0.77***	0.01
16. Feel that there is no fight left in me	0.80***	0.01
Fearlessness about death (FAD)		
1. The fact that I am going to die does not affect me	0.58***	0.03
2. The pain involved in dying frightens me	0.64***	0.02
3. I am very much afraid to die	0.86***	0.02
4. It does not make me nervous when people talk about death	0.44***	0.03
5. The prospect of my own death arouses anxiety in me	0.78***	0.02
6. I am not disturbed by death being the end of life as I know it	0.50***	0.03
7. I am not at all afraid to die	0.76***	0.02
Exposure (EXP)		
1. Close friends attempted suicide or deliberately harmed themselves	0.64***	0.05
2. Family attempted suicide or deliberately harmed themselves	0.50***	0.05
Impulsivity (IMP)		
1. I do things on the spur of the moment	0.88***	0.06
2. I do things impulsively	0.93***	0.06
Discomfort Intolerance (DIS)		
1. I can tolerate a great deal of physical discomfort	0.94***	0.03
2. I have a high pain threshold	0.87***	0.03
Perceived Burdensomeness (PB)		
1. The people in my life would be better off if I were gone	0.89***	0.01
2. The people in my life would be happier without me	0.87***	0.01
3. I think I have failed the people in my life	0.85***	0.01
4. I feel like a burden on the people in my life	0.90***	0.01
5. I think the people in my life wish they could be rid of me	0.80***	0.02
6. I think I make things worse for the people in my life	0.90***	0.01
7. I think I contribute to the well-being of the people in my life	0.51***	0.03
Thwarted Belongingness (TB)		
1. I feel like I belong	0.81***	0.02
2. I am fortunate to have many caring and supportive friends	0.70***	0.02
3. I feel disconnected from other people	0.76***	0.02
4. I often feel like an outsider in social gatherings	0.71***	0.02
5. I am close to other people	0.73***	0.02
Goal disengagement (GD)		
1. It's easy for me to reduce my effort toward the goal	0.63***	0.02
2. I stay committed to the goal for a long time; I can't let it go	0.83***	0.02
3. I find it difficult to stop trying to achieve the goal	0.72***	0.02
4. It's easy for me to stop thinking about the goal and let it go	0.73***	0.02
Goal reengagement (GR)		
1. I think about other new goals to pursue	0.76***	0.02
2. I seek other meaningful goals	0.82***	0.02
3. I convince myself that I have other meaningful goals to pursue	0.77***	0.02
4. I tell myself that I have a number of other new goals to draw on	0.80***	0.02

Table 3 (continued)

Scale and Items	β	SE
5. I start working on other new goal	0.84***	0.02
6. I put effort toward other meaningful goals	0.81***	0.02
Brooding rumination (BR)		
1. Think "What am I doing to deserve this?"	0.52***	0.03
2. Think "Why do I always react this way?"	0.68***	0.02
3. Think about a recent situation, wishing it had gone better	0.65***	0.02
4. Think "Why do I have problems other people don't have?"	0.61***	0.02
5. Think "Why can't I handle things better?"	0.79***	0.02
Anxiety (ANX)		
1. I feel tense or 'wound up'	0.65***	0.02
2. Get a frightened feeling as if something awful is about to happen	0.71***	0.02
3. Worrying thoughts go through my mind	0.78***	0.01
4. I can sit at ease and feel relaxed:	0.66***	0.02
5. I get a sort of frightened feeling like 'butterflies' in the stomach	0.57***	0.02
6. I feel restless as if I have to be on the move:	0.40***	0.03
7. I get sudden feelings of panic:	0.78***	0.02
Depression (DEP)		
1. I still enjoy the things I used to enjoy	0.66***	0.02
2. I can laugh and see the funny side of things	0.64***	0.02
3. I feel cheerful	0.76***	0.02
4. I feel as if I am slowed down	0.60***	0.02
5. I have lost interest in my appearance	0.47***	0.03
6. I look forward with enjoyment to things	0.76***	0.02
7. I can enjoy a good book or radio or TV programme	0.46***	0.03

*** $p < 0.001$.

Table 4
Standardized regression weights (with standard errors) for the specified structural equation model of the Integrated Motivational-Volitional model of suicidal behaviour.

	β	SE
Suicide attempts (SA) < - Suicide ideation (SI)	0.30***	0.05
Suicide attempts (SA) < - Fearlessness about death (FAD)	0.08**	0.03
Suicide attempts (SA) < - Exposure (EXP)	0.27***	0.05
Suicide attempts (SA) < - Impulsivity (IMP)	0.06	0.03
Suicide attempts (SA) < - Discomfort intolerance (DIS)	−0.01	0.03
Suicide attempts (SA) < - Anxiety (ANX)	−0.06	0.06
Suicide attempts (SA) < - Depression (DEP)	0.15*	0.07
Suicide Ideation < - Entrapment Scale (ES)	0.20***	0.06
Suicide Ideation < - Perceived Burdensomeness (PB)	0.19***	0.05
Suicide Ideation < - Thwarted Belongingness (TB)	0.13**	0.05
Suicide Ideation < - Goal disengagement (GD)	−0.08**	0.03
Suicide Ideation < - Goal reengagement (GR)	0.04	0.03
Suicide Ideation < - Internal Protective (SR1)	0.07	0.06
Suicide Ideation < - Emotional Stability (SR2)	−0.44***	0.04
Suicide Ideation < - External Protective (SR3)	0.01	0.04
Suicide Ideation < - Anxiety (ANX)	−0.08	0.05
Suicide Ideation < - Depression (DEP)	0.31**	0.10
Entrapment < - Defeat Scale (DS)	0.52***	0.04
Entrapment < - Brooding rumination (BR)	0.11***	0.03
Entrapment < - Anxiety (ANX)	0.06	0.04
Entrapment < - Depression (DEP)	0.29***	0.05
Defeat < - Anxiety (ANX)	0.26***	0.05
Defeat < - Depression (DEP)	0.68***	0.05

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

significantly related to suicide attempts in the present study, when controlling for the influence of all other variables, and neither was discomfort intolerance. The non-significant relationship between impulsivity and suicide attempts may be due to our conceptualisations of impulsivity (Klonsky and May 2010), the

adoption of only two items to index this construct, or because the mean age of our sample is older than many of the previously published studies. It may also be that impulsivity only relates to a sub-group of suicide attempters. The finding in relation to discomfort intolerance is not altogether unexpected as we assessed lifetime frequency of suicide attempts and prior research indicates that tolerance for physical pain, which has been argued than an individual must acquire through repeated exposure to painful and provocative experiences, in order to enact self-harm (Joiner, 2005), may be subject to temporal variation. For instance, results of one study suggested that higher pain thresholds associated with self-injury engagement might normalise following behavioural cessation (Ludäscher et al., 2009). Taken together, these findings highlight that many causes of suicidal behaviour remain unexplained. Thus, gaining a better understanding of the factors that predict which suicide ideators will go on to make a suicide attempt is arguably the greatest priority for suicide research going forward.

The potential clinical implications of these findings are considerable and should inform the development and rigorous evaluation of theoretically-driven clinical interventions. Applying the Integrated Motivational–Volitional model of suicidal behaviour to risk appraisal suggests that risk assessment frameworks should explicitly address the degree to which patients are currently experiencing feelings of entrapment, as well as the degree to which they have acquired the psychological capability for lethal self-injury (i.e., fearlessness about death) and have been exposed to the self-injurious behaviour of others. Assessing and targeting the factors which involve or increase an individual's fearlessness about death, in particular, is important, as this may prevent the transition from ideation to acts. Determining exposure to suicide should be routinely assessed in all individuals who present in distress. Risk assessment grounded in the Integrated Motivational–Volitional model, if supported empirically, would allow for a more parsimonious and clinically useful conceptualisation of the aetiology of suicide because this conceptualisation does not presume that to assess an individual's degree of risk for suicide requires measurement (or approximation of) a vast array of risk and protective factors. The findings also suggest that prevention efforts targeting resilience, particularly individual unique factors (i.e., emotional stability; Factor 2), may be effective, as consistent with the results of previous research in military personnel (Youssef et al., 2013), misusers of alcohol and illegal drugs, and prisoners (Roy et al., 2011), results indicate that resilience may confer a protective effect against the development of suicidal ideation. The findings further suggest, given the non-predictive nature of two of the suicide resilience subscales, that combining the three components of resilience into a composite variable would be ill-advised.

Our results also suggest that individuals experiencing suicidal ideation would benefit from interventions that highlight the importance relinquishing commitment to particular goals in the face of adversity (i.e., goal disengagement). This may be particularly true for those individuals who struggle with re-engaging with new goals (O'Connor et al., 2012b), although the interaction between goal disengagement and reengagement was not tested in the present study. Cognitive and behavioural strategies designed to reduce the desire for suicide (Joiner et al., 2009; O'Connor, 2011) despite increased acquired capability (e.g., fearlessness about death) and exposure to the attempted suicide or self-injury of family members and close friends also warrant further consideration.

4.1. Limitations and future directions

The results should be interpreted in the light of potential limitations. First, the analysis was based on retrospective self-reports,

which may contain inaccuracies due to reporting biases or forgetting (Angold et al., 1996). There is, however, some evidence to suggest that past events can be recalled with sufficient accuracy to support their validity (Hardt and Rutter, 2004). Second, many factors known to play a role in the occurrence of suicidal behaviour were not included in this model. Therefore, an important direction for future research is the illumination of how different types of risk and protective factors (e.g., genetic, environmental, psychological) interact to produce suicidal behaviour. Third, although the use of SEM offers several advantages to other multivariate analytic techniques, none of these methods, as such, are able to confirm causal relations using cross-sectional data. An important next step, therefore, is to test the usefulness of these factors in longitudinal studies. Such studies would also help determine the extent to which volitional factors and acute life stress actually predict which individuals with thoughts of suicide go on to attempt suicide. Fourth, although we found similar rates of suicidal ideation and attempts to previous studies (Garlow et al., 2008; Tyssen et al., 2001), there may also have been a selection bias favouring individuals with a suicidal history. As a condition of ethical approval, all potential participants were informed about the nature of the study which may have influenced those affected by suicide to participate more. Consequently, we cannot comment on the prevalence of suicidal ideation and behaviour in this study or the relative distribution of the other factors studied herein. Fifth, the fact that participants were students limits the generalisability of the results given that students are not representative of those who die by suicide. Moreover, in light of our recruitment method, we cannot be certain that the sample is generalizable to the entire student population. Consequently, there is a need to replicate the findings in other populations. Sixth, in the present study, we focused on shared variance between factors rather than testing moderating effects, due to the demanding nature of the specified model. Thus, an important direction for future research is to test each of the moderating pathways in turn to establish which factors are necessary and sufficient to lead to suicidal behaviour. Finally, we examined past two-week suicide ideation (and other proximal factors) and lifetime history of suicide attempts. This timeframe inconsistency, which was required in order to form a continuous latent suicide attempt variable, may have caused differences between ideators and attempters to be conflated with differences between those currently in crisis and those who experienced crisis many years earlier. Thus, research is warranted to investigate this possibility further. Related to this, although our measure of suicide attempt history is taken from a widely used measure, we acknowledge that it will not capture the complexity and heterogeneity of suicidal behaviour. As noted by Klonsky et al. (2016), although a desire to die is, by definition, a motivation underlying all suicide attempts, two superordinate dimensions of attempt motivations exist: internal (self-oriented) motivations (e.g., hopelessness, intense emotional pain, and a need to escape) and communication (other-oriented) motivations (e.g., a desire to influence, communicate with, or seek help from others).

Despite the aforementioned considerations, the results presented here complement and extend previous research by testing for the first time a structural model of the Integrated Motivational–Volitional model, and, in doing so, providing a clearer understanding of the unique associations between each risk and protective factor and suicidal behaviour. The results indicate that the Integrated Motivational–Volitional model is a useful conceptual framework for organising known risk factors and for guiding future tests of the development of suicidal behaviour. Additionally, the results suggest that the Integrated Motivational–Volitional model offers promise for aiding in the prediction of risk, contributing to risk formulation, and ultimately preventing suicide deaths.

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