Research report

Self-regulation of unattainable goals in suicide attempters: A two year prospective study

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ABSTRACT

Background: Although suicide is a global public health concern with approximately one million people dying by suicide annually, our knowledge of the proximal risk mechanisms is limited. In the present study, we investigated the utility of two proximal mechanisms (goal disengagement and goal reengagement) in the prediction of hospital-treated self-harm repetition in a sample of suicide attempters.
Methods: Two hundred and thirty-seven patients hospitalised following a suicide attempt completed a range of clinical (depression, anxiety, hopelessness, suicidal ideation) and goal regulation measures (goal reengagement and disengagement) while in hospital. They were followed up two years later to determine whether they had been re-hospitalised with self-harm between baseline and the follow-up.
Results: Self-harm hospitalisation in the past 10 years, suicidal ideation and difficulty reengaging in new goals independently predicted self-harm two years later. In addition, among younger people, having difficulty re-engaging in new goals further predicted self-harm re-hospitalisation when disengagement from existing unattainable goals was also low. Conversely, the deleterious impact of low reengagement in older people was elevated when goal disengagement was also high.
Limitations: Only hospital-treated self-harm and suicide were recorded at follow-up, episodes of less medically serious self-harm were not recorded.
Conclusions: Suicidal behaviour is usefully conceptualised in terms of goal self-regulation following the experience of unattainable goals. Treatment interventions should target the self-regulation of goals among suicide attempters and clinicians should recognise that different regulation processes need to be addressed at different points across the lifespan.

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1. Introduction

Suicide is a major public health problem accounting for approximately one million deaths annually across the globe (World Health Organisation, 2012). A history of hospital-treated self-harm, with or without suicide intent, is one of the most robust predictors of completed suicide (Cooper et al., 2005; Hawton et al., 2012), and therefore is often the focus of research efforts to better understand the aetiology of suicide. Although our understanding of distal suicide risk factors (e.g., mental disorders) has grown markedly in recent decades (Mann et al., 1999; Hawton and Van Heeringen, 2009), it is not clear how these translate into proximal suicide risk mechanisms. For example, we know that people with mood disorders are at increased risk of suicide compared to those without mood disorders, but the vast

majority do not die by suicide (Cavanagh et al., 2003; Bostwick and Pankratz, 2000). The problem is that the distal factors are not sufficiently specific to be clinically useful and our understanding of the proximal risk processes that link distal risk to suicidal behaviour is limited. Therefore, the aim of the present study is to investigate two key proximal risk processes that ought to be targeted for treatment if they are shown to predict suicide risk.

Although there have been welcome advances in the identification of proximal risk processes in recent years (e.g., Nock et al., 2010; O'Connor et al., 2008, 2009; Williams et al., 2005, 2008; Van Orden et al., 2010), for the most part, such studies have not identified in sufficient detail the proximal risk mechanisms. To address this gap in knowledge, the integrated motivational–volitional model of suicidal behaviour (Fig. 1, O'Connor, 2011; O'Connor et al., 2012) has been proposed to provide a theoretical map of how distal risk may be translated into suicidal behaviour via proximal psychological risk processes. In short, this model proposes that perceptions of defeat and entrapment represent the final common pathway to suicide. It further identifies key
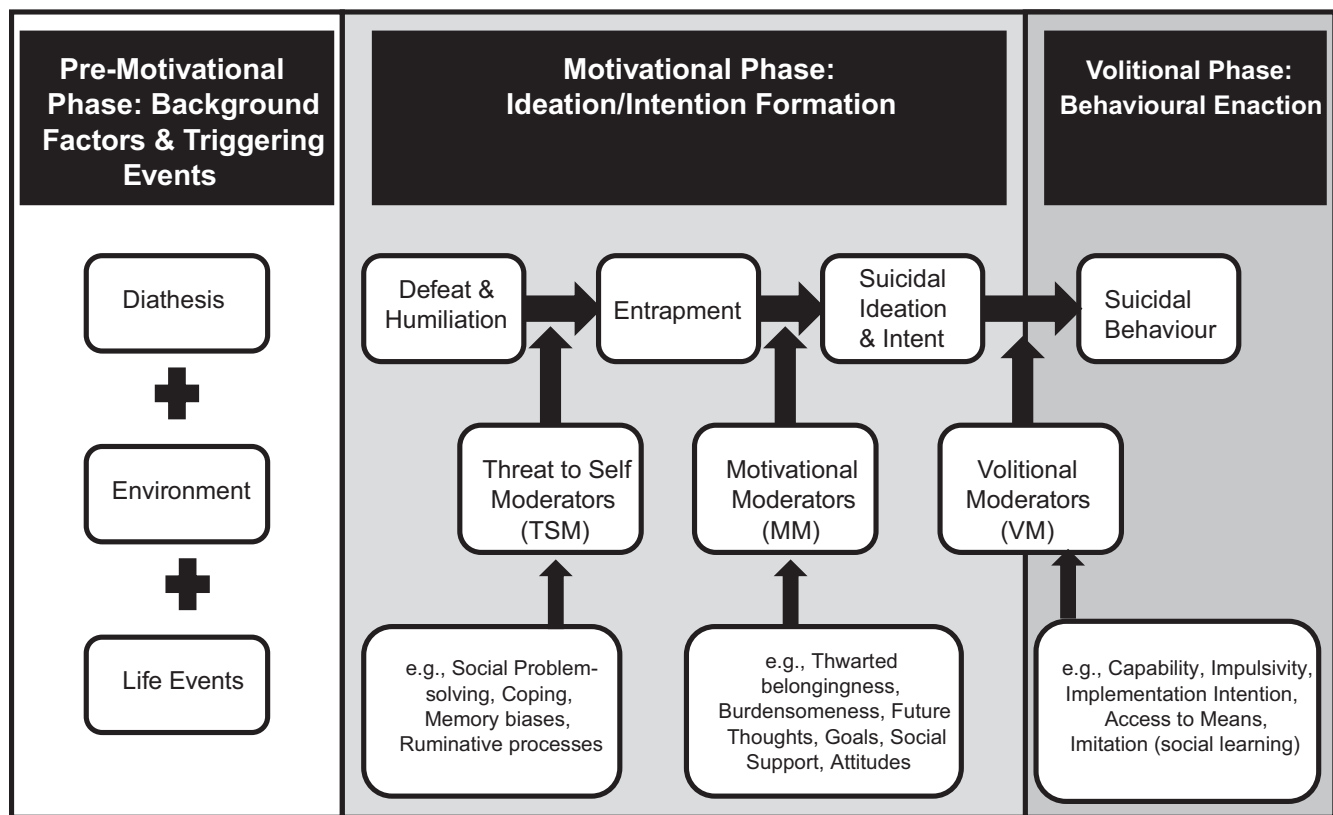
Fig. 1. Integrated motivational–volitional model of suicidal behaviour (IMV; O'Connor, 2011).

psychological processes (motivational moderators) that increase the likelihood that entrapment (defined as one's attempt to escape from a defeating circumstance) is translated into suicidal behaviour. The present study focuses on two such processes which contribute to the self-regulation of goals, because in a preliminary study the former have been shown to predict suicidal ideation 2.5 months following a suicide attempt (O'Connor et al., 2009) and regulating goals is integral to effective social problem-solving, and a deficit in the latter is characteristic of suicide attempters (Williams et al., 2005).

Much of the previous research into proximal mechanisms has also been limited to non-clinical samples (Taylor et al., 2011), short-term follow-ups (Wingate et al., 2005), self-reported primary outcomes (e.g., suicidal ideation; Dixon et al., 1991) or it is been plagued by significant participant loss to follow-up (O'Connor et al., 2007). We address each of these limitations here by employing a national linkage methodology that allows us to follow up almost 100% of an acute sample of hospitalised suicide attempters over a two year period to investigate whether goal self-regulation processes predict re-admission to hospital with medically serious self-harm (usually by overdose).

1.1. Self-regulation of goals and suicide risk

Self-regulation of goals can refer to different psychological processes (e.g., Carver and Scheier, 1998; Watson et al., 1988) but for the present purposes it refers to those processes that are activated when goal accomplishment is thwarted (Wrosch, 2010). These processes are derived from personality research and are thought to be generalised tendencies to respond in a particular way when faced with difficulties in attaining a goal (Wrosch et al., 2003a,b). At some point, if goal attainment is not likely or possible, we ought to consider relinquishing commitment to that particular

goal and give up on its attainment, i.e., disengage from the goal. From an evolutionary biology perspective, to continue with the pursuit of goal attainment in such cases is a waste of limited cognitive, behavioural or emotional resources (Klinger, 1975; Wrosch and Scheier, 2003). Consequently, when goal attainment is unlikely, not only will disengagement help us avoid ongoing feelings of failure (Nesse, 2000) which are associated with suicide risk, it will also free up resources which we can direct at the pursuit of other more attainable goals, i.e., goal reengagement (Heckhausen et al., 2010). However, disengaging from existing, unattainable goals is not always advantageous, it may only be adaptive when there are other alternative goals available (Wrosch and Scheier, 2003). Indeed, there is also growing evidence that the benefits of different goal regulation strategies vary across the lifespan (Wrosch et al., 2003b). In older populations, giving up on unattainable goals without being able to engage in new, meaningful goals is associated with low emotional well-being (Wrosch et al., 2003b, Study 2) because opportunities for new goal attainment decline across the lifespan (Wrosch, 2010; Heckhausen, 1999). The corollary being that if an older individual disengages from existing unattainable goals and has difficulty re-engaging in new goals (possibly because there are fewer opportunities), emotional distress is more likely to ensue (Wrosch, 2010; Scheier and Carver, 2001). This suggests that goal disengagement may not be adaptive when new goals are not forthcoming in older populations thereby potentially increasing suicide risk.

Conversely, low levels of goal reengagement are strongly associated with decreased emotional well-being when disengagement is difficult in younger populations (Wrosch et al., 2003b; Study 2). This reluctance to disengage from unachievable goals is consistent with MacLeod and Conway's (2007) concept of painful engagement where people maintain goal engagement because they believe happiness is dependent on their attainment. Younger adults are thought to be more persistent in their pursuit of

unattainable goals as they are also still learning whether goals are attainable or not (Reynolds et al., 2006; Wrosch and Miller, 2009). Consequently, young adults are expending valuable, limited resources which may constrain their capacity to seek out new, alternative goals thereby increasing their perception that they are trapped in their thwarted goal pursuit and thus potentially triggering emotional (e.g., depression) and behavioural responses (e.g., suicidal behaviour). In short, the regulation of unattainable goals is governed by two processes (goal disengagement and goal reengagement; Wrosch, 2010; Wrosch and Scheier, 2003) which may increase suicide risk if they become dysfunctional.

One recent study has provided preliminary evidence of the utility of the regulation of unattainable goals in the context of suicide risk (O'Connor et al., 2009). This study found that 'complete disengagement' (Carver and Scheier, 1998) was associated with significantly higher levels of suicide ideation 2.5 months following a suicide attempt. Specifically, suicide ideation was significantly higher in individuals who reported high levels of disengagement and low levels of reengagement at baseline, compared to those who reported low levels of disengagement. In addition, difficulty with reengagement was an independent predictor of suicidal ideation.

1.2. The present study

Although the O'Connor et al. (2009) findings are promising, the study was not set up to investigate age differences, it employed a short-term self-reported outcome measure (suicide ideation) and it suffered considerable participant loss to follow-up. Therefore, the aim of the present study is to investigate whether goal regulation processes have predictive utility when these limitations are addressed. As repeat self-harm is a stronger predictor of repetition and completed suicide than first time self-harm (Appleby. et al., 1999; Owens et al., 2002), we limited recruitment to those patients who reported that they had self-harmed at least once prior to their index suicide attempt. It is also worth noting that this is not a study of self-injury (usually defined as behaviours which result in the destruction of skin tissue) as the vast majority of participants in our study (>90%) were admitted to hospital with overdose. Drawing on the research summarised above, we formulated two study hypotheses. First, we hypothesised that difficulty in goal reengagement would independently predict re-admission to hospital with self-harm between Time one (baseline) and Time two (two years later) in a large sample of suicide attempters. Second, we hypothesised that the interaction between goal reengagement and goal disengagement would vary as a function of age. Among younger participants, self-harm repetition would be more likely among those who had difficulty disengaging from thwarted goals and difficulty reengaging in new goals (i.e., low goal disengagement+low goal reengagement). Conversely, self-harm repetition would be more likely among older participants who had difficulty in goal reengagement and in whom disengagement was also high (i.e., high goal disengagement+low goal reengagement).

2. Method

2.1. Participants and procedure

We recruited patients from a general hospital following an episode of self-harm (ICD 10 codes X60–X84 and Y10–Y34) between January 2005 and April 2006. Two hundred and thirty-seven patients (16 years of age or older) who were seen by the Liaison Psychiatry service the morning after presenting at the Royal Infirmary of Edinburgh, Scotland (at the Emergency

Department (ED) and Combined Assessment Unit Toxicology ward) following acute self-poisoning (90%), physical self-injury (6%) or both (4%), were recruited to the study. Exclusions were limited to participants who reported no previous self-harm history, no suicidal intent associated with current self-harm episode, who were unfit for interview (e.g., actively psychotic), unable to give informed consent (e.g., medically unfit to give informed consent) or unable to understand English. Thirty one per cent of participants (31.2% ($n=74$) reported one previous episode, 16.5% ($n=39$) reported 2 previous episodes, 10.1% ($n=24$) reported 3 previous episodes and 42.2% ($n=100$) reported 4 or more episodes. The majority of patients were recruited from the Combined Assessment Unit (90.3%). The profile of participants recruited from the ED (in terms of age and sex) was similar to that of those recruited from the Combined Assessment Unit. Consistent with other such studies (e.g., MacLeod et al., 1997), this did not represent a consecutive sample; rather it reflects the practical limitations of recruiting via a general hospital. The lack of consecutive sampling was because of staff and funding limitations. Those patients who were approached to participate in the study did not differ significantly from those were not approached on age and sex. Approximately 10% of participants who were approached declined to take part. We recruited 150 females and 87 males with an overall mean age of 36.8 years (SD=13.0, range=16 to 73 years). The men ($M=39.4$, SD=11.9) were significantly older than the women ($M=35.3$, SD=13.4), $t(2 3 5)=2.44$, $p=.016$. We did not record ethnicity, however the overwhelming majority of participants was White. Indeed, 97.99% of the Scottish population is White (Scottish Government, 2004).

Ethical approval had been obtained from the Local National Health Service Research Ethics Committee and the University Department. At Time 1, patients were interviewed in hospital, usually within 24 h of admission and completed a range of clinical and psychological measures. The Information Services Division of the National Health Service National Services Scotland maintains a national database of hospital records and mortality data. This nationally-linked database allowed us to determine whether a patient was re-admitted to hospital in Scotland with self-harm at any time between their index episode and 2 years later. In addition, we were able to determine whether each patient had been hospitalised in Scotland with self-harm at any time in the 10 years prior to the index episode.

2.2. Baseline measures

Goal Rengagement and Disengagement. The goal adjustment scale (GAS; Wrosch et al., 2003b) 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. The goal reengagement subscale tap's one's perceived ability to reengage in other new goals if they face constraints on goal pursuits. Both subscales were internally consistent (Cronbach's $\alpha=.84$ and.70 for reengagement and disengagement, respectively). The GAS is well validated in a wide range of populations (e.g., Miller and Wrosch, 2007).

Suicidal Ideation. Suicidal ideation was assessed using the suicidal ideation subscale of the Suicide Probability Scale (SPS; Cull and Gill, 1988). The subscale is comprised of 8 items pertaining to suicidal cognitions, negative affect, and presence of a suicide plan. The scale is reliable and valid (Cull and Gill, 1988). Internal consistency was very good (Cronbach's $\alpha=83$). The SPS measures an individual's self-reported attitudes and behaviours that are related to suicide risk (Cull & Gill, 1988; Larzelere et al., 1996).

Suicidal Intent. All participants were asked whether they had intended to end their life. Only respondents who answered 'yes'

to this question were included in the study. In a recent study (O'Connor et al., 2010), 52% of self-harm patients who were classified as 'high' on the Beck Suicide Intent Scale (Beck et al., 1974a) answered yes to this question compared to 10% who answered 'no/don't know/ambivalent'.

Hopelessness. Hopelessness was measured using the 20-item Beck Hopelessness Scale (BHS; Beck et al., 1974b). Respondents are asked to indicate either agreement or disagreement with statements that assess pessimism for the future. This is a reliable and valid measure that has been shown to predict eventual suicide (Beck et al., 1985; Beck al., 1974a,b). In the present study, internal consistency was very good (Kuder-Richardson−20=.91).

Anxiety and Depression. The Hospital Anxiety and Depression Scale (HADS; Zigmond and Snaith, 1983) was employed to measure anxiety and depression. It consists of 14 questions, seven each to measure depression and anxiety. The HADS is a well established, widely used reliable and valid measure of affect (Bjelland et al., 2002; Mykletun et al., 2001; Zigmond and Snaith, 1983). Internal consistency (Cronbach's α) for depression and anxiety was .72 and .71, respectively.

Social Deprivation. The Carstairs deprivation quintiles (Carstairs, 1995), based on the 2001 Census data and postcode (ZIP code) at baseline, were employed here to assess social deprivation. Quintile 5 is most deprived and quintile 1 is the least deprived. The quintiles are constructed using indicators of poverty which include male unemployment, level of household overcrowding and car ownership as recorded in the 2001 Census statistics.

2.3. Outcome measure

Re-Admission to Hospital with Self-harm. An episode of self-harm was recorded if a patient was admitted to any hospital in Scotland with self-harm in the two years following their index episode (ICD codes: ICD10: X60–X84, Y87.0 (intentional self-harm) and ICD10: Y10–Y34, Y87.2 (event of undetermined intent)). Individuals who were treated in the EDs but not admitted to hospital are not included in the linkage database. ISD Scotland employs probability matching to link participants. For this dataset, ISD Scotland successfully linked 97% of the sample ($n=237/245$). All subsequent analyses are based on the linked sample. As the vast majority of hospital admissions following self-harm are cases of self-poisoning, we are confident that at least 90% of the follow-up admissions are for self-poisoning not self-injury at follow-up.

2.4. Statistical analyses

We present univariate and multivariate logistic regression analyses, to probe the two hypotheses. Clinical (e.g., depression) and sociodemographic variables (e.g., social deprivation) which are known to be associated with suicide risk are explored in the univariate analyses and entered as control variables in the multivariate analyses, as appropriate. In addition, the univariate logistic regression analyses informed the selection of variables for inclusion in the multivariate analyses. As we tested specific hypotheses, hierarchical logistic regression analysis is employed in the multivariate analysis. All predictors were mean centred before inclusion in the multivariate regression analyses.

3. Results

Between Time one and Time two (two years following index episode), 40.9% ($n=97$) of participants were re-admitted to hospital presenting with self-harm. There were approximately equal proportions of men and women (41.4% men and 40.7.6% women). Of those re-admitted to hospital, 62% were re-admitted within six months of index episode and three quarters (80%) within 12 months. Three participants died by suicide in this time. All of the indices of mood were inter-correlated (range $r=.56-.30$, $p < .0001$), goal reengagement and disengagement were not correlated ($r=-.02$, ns).

3.1. Univariate predictors of self-harm repetition

None of the demographic variables was associated with self-harm repetition (see Table 1). Being hospitalised for self-harm in the previous 10 years was strongly associated with re-admission (OR=3.08, 95% CI=1.69–5.63, $p < .0001$). Baseline suicidal ideation (OR=1.12, 95% CI=1.06–1.18, $p < .0001$) was the only index of mood to predict self-harm. Finally, goal reengagement but not disengagement predicted self-harm repetition (OR=.47, 95% CI=.32–.69, $p < .0001$). There were no other univariate predictors.

3.2. Multivariate predictors of self-harm repetition

Next, we conducted a multivariate logistic regression to directly test the two hypotheses concerning goal reengagement/disengagement and age (see Table 2). Before entering the goal adjustment variables into the regression analyses we controlled for the effects of those variables which were significant in the univariate analyses (namely, past hospitalisation for self-harm and baseline suicidal ideation). Although age and disengagement were not univariately associated with self-harm, they were included in the multivariate analyses as their inclusion is required to test our second hypothesis which posited an age by goal adjustment interaction. In the first step of each logistic regression, we entered the significant univariate predictors, then, to test the hypotheses, we entered age, goal reengagement and disengagement in step two, followed by the two way interactions in step three and the age by reengagement by disengagement interaction in step four.

Past history of self-harm hospitalisation (OR=2.73, 95% CI=1.85–5.39, $p < .005$) and baseline suicidal ideation (OR=1.09, 95 CI=1.03–1.17, $p < .01$) were significant predictors of self-harm in the final model. Difficulty reengaging in new goals was also independently predictive of whether a patient was admitted to hospital with self-harm, two years after baseline (OR=.48, 95% CI=.29–.78, $p < .005$). Therefore, for each unit decrease in goal reengagement, the probability of self-harm increases by approximately 50%. The main effect of goal reengagement was qualified by the predicted three way interaction of goal disengagement by reengagement by age (OR=.91, 85% CI=.86–.96, $p < .001$).

To explore the three way interaction, consistent with Aiken and West (1991), we probed the relationships between goal reengagement and disengagement among younger age and older age participants (one standard deviation above and below the mean on each variable). To this end, we conducted four post hoc simple slope analyses as illustrated in Fig. 2 (Panel A and B). These analyses showed that among older participants (In Panel A, 1 SD above the mean equates to 50 years of age) who found it easy to disengage from unattainable goals (i.e., high disengagement), their probability of self-harm was significantly higher if they also had difficulty reengaging in new goals (i.e., low reengagement) compared to those who found it easy to reengage (OR=.13, 95% CI=.04−.44, $p=.001$). No such simple effect was discernible among those older participants who had difficulty disengaging from unattainable goals as a function of goal reengagement (OR=.82, 95% CI=.27−2.46, $p=.721$).

A different pattern of relationships was evident among the younger members of the sample (In Panel B, 1 SD below the mean

Table 1
Univariate associations between predictors and hospital-treated self-harm between T1 and T2.

Variable	N (%)	% Self-harmed at T2	OR	95% CI	P-value
Gender					
Male	87 (36.7)	41.4	1.00	–	–
Female	150 (63.3)	40.7	.97	.57–1.66	.914
Marital status					
Married/partner	68 (28.7)	39.7	–	–	–
Single/other	169 (71.3)	41.4	1.08	.61–1.91	.808
Employment status					
Working	98 (41.5	35.7	1.00	–	–
Not working	138 (58.5)	44.9	1.47	.86–2.50	.157
Social deprivation					
1st	24 (10.1)	37.5	1.00	–	–
2nd	26 (11.0)	26.9	.61	.19–2.03	.425
3rd	46 (19.41)	54.3	1.98	.72–5.45	.184
4th	49 (20.7)	36.7	.97	.35–2.66	.949
5th	92 (38.8)	41.3	1.17	.47–2.96	.735
Self-harm hospitalisation past 10 years					
No	79 (33.3)	–	–	–	–
Yes	158 (66.7)	49.4	3.08	1.69–5.63	.0001
	Mean	**SD**			
Age[a]					
No self-harm (T1–T2)	37.05	13.52	–	–	–
Self-harm (T1–T2)	36.47	12.24	1.00	.98–1.02	.733
Suicidal ideation[a]	Mean	SD			
No self-harm (T1–T2)	20.69	5.95	–	–	**–**
Self-harm (T1–T2)	24.00	4.67	1.12	1.06–1.18	.0001
Hopelessness[a]	Mean	SD			
No self-harm (T1–T2)	14.31	4.79	–	–	**–**
Self-harm (T1–T2)	15.37	4.04	1.05	.99–1.11	.113
Depression[a]	Mean	SD			
No self-harm (T1–T2)	12.40	4.16	–	–	–
Self-harm (T1–T2)	13.21	4.57	1.05	.98–1.11	.159
Anxiety[a]	Mean	SD			
No self-harm (T1–T2)	14.92	3.93	–	–	–
Self-harm (T1–T2)	15.37	3.91	1.03	.96–1.10	.388
Goal reengagement[a]	Mean	SD			
No self-harm (T1–T2)	3.24	.67	–	–	**–**
Self-harm (T1–T2)	2.87	.72	.47	.32–69	.0001
Goal disengagement[a]	Mean	SD			
No self-harm (T1–T2)	2.80	.72	–	–	–
Self-harm (T1–T2)	2.86	.78	1.12	.79–1.58	.540

    [a] Odds ratio for 1 point increase in score.

Table 2
Multivariate predictors of self-harm repetition.

Variable	OR	95% CI	P-value
Past 10 year self-harm hospitalisation	2.73	1.38–5.39	.004
Suicidal ideation	1.09	1.03–1.17	.006
Age	1.00	.97–1.03	.994
Goal reengagement	.48	.29–.78	.003
Goal disengagement	1.25	.80–1.94	.332
Age × goal reengagement	.97	.93–1.02	.198
Age × goal disengagement	1.03	.99–1.06	.103
Goal reengagement × goal disengagement	1.04	.54–2.00	.911
Age × goal reengagement × goal disengagement	.91	.86–.96	.001

equates to 24 years of age). In this case, those who displayed low disengagement from unattainable goals were significantly more likely to be re-admitted to hospital with self-harm if they also had difficulty reengaging in new goals (low reengagement) compared to those who found it easy to reengage (OR=.26, 95% CI=.09−.78, p=.016). There was no significant relationship between goal reengagement and self-harm probability among those who could easily

disengage from unattainable goals (OR=1.81, 95% CI=.77−4.26, p=.173).

4. Discussion

The aim of this study was to investigate whether the self-regulation of goals was implicated in the prediction of medically serious self-harm in a sample of suicide attempters. Our rationale for this study was that previous preliminary research had not investigated whether the effects of goal regulation processes had different effects for older versus younger people, it had also not employed an objective and long term clinical outcome measure and it suffered significant participant loss to follow-up. Our findings provide clear evidence in support of our two hypotheses. First, difficulty in goal reengagement following the experience of unattainable goals independently predicted self-harm repetition two years following a suicide attempt. Second, as hypothesised, the age by goal disengagement by reengagement interaction was significant. When it was decomposed, we found that high levels of goal disengagement among older participants combined with difficulty reengaging in new goals to predict higher levels of self-harm compared to those disengagers who could easily reengage in new goals. Conversely, among the younger aged patients, it was the conjoint effect of
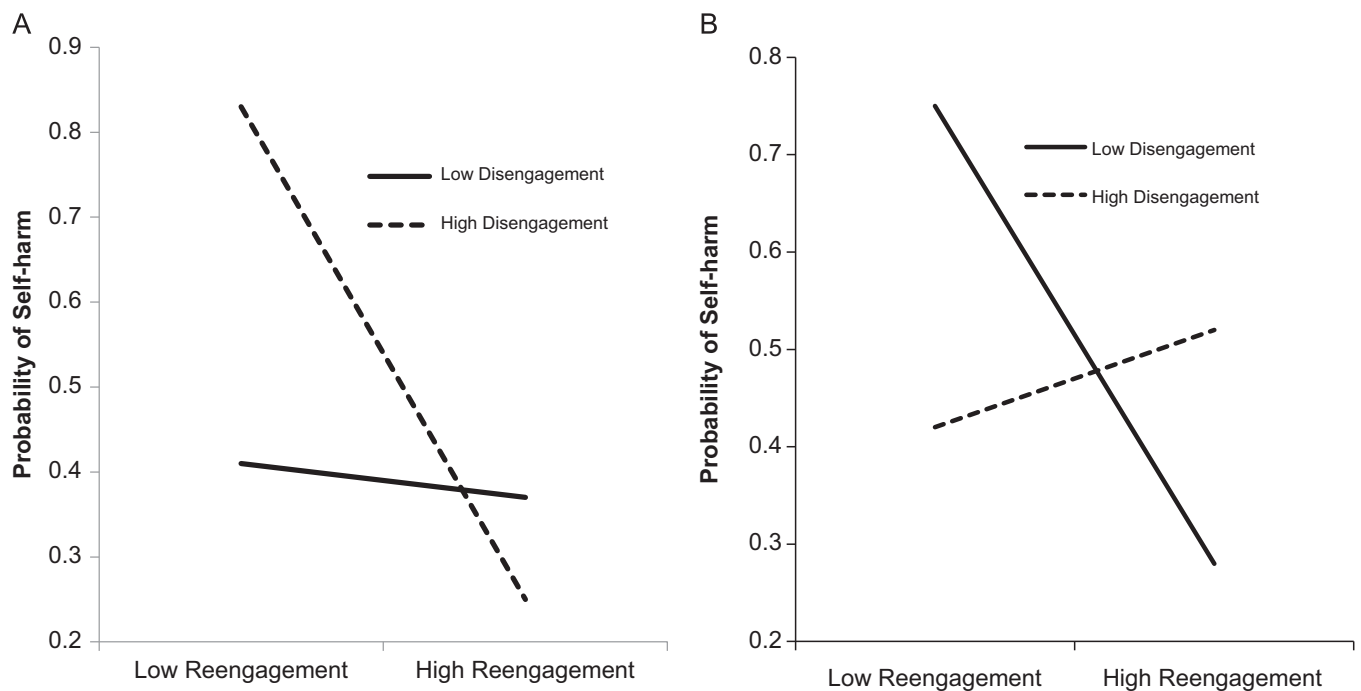
Fig. 2. Panel A. Probability of self-harm as a function of goal reengagement and disengagement among older age participants (1 SD above mean). *Note*: 1 SD above the mean on age equates to 50 years. Panel B. Probability of self-harm as a function of goal reengagement and disengagement among younger age participants (1 SD below mean). *Note*: 1 SD below the mean on age equates to 24 years.

having difficulty disengaging from unattainable goals and difficulty reengaging in new goals that was particularly pernicious.

Our findings suggest that giving up on goals is maximally adaptive among older adults when goal reengagement capacity is high. In contrast, persistence with unattainable goals is maladaptive among younger people who are incapable of reengaging in new goals. This pattern of findings supports lifespan perspectives on goal disengagement which suggest that younger people are still learning whether unattainable goals are possible or not (Reynolds et al., 2006; Wrosch and Miller, 2009), so they persist with difficult goals. We would posit, therefore, that this persistence is a waste of resources, which, when experienced conjointly with the inability to reengage in new goals can trigger emotional and behavioural responses, including self-harm.

Our findings also highlight that goal disengagement is not universally adaptive, as it is associated with deleterious outcomes when there are few new goals to strive for. This interaction is of interest in the light of current theories of successful aging (e.g., Heckhausen and Schulz, 1995) which emphasise the importance of goal disengagement. In addition, high disengagement and low reengagement when experienced concomitantly are consistent with the notion of complete disengagement, which Carver and Scheier (1998) suggest is the essence of the motivation for suicide. Our results also extend O'Connor et al.'s (2009) preliminary findings by highlighting the importance of investigating age differences, as failing to do so limits the opportunity to design tailored developmentally-specific interventions. More generally, the findings highlight the importance of including a lifespan perspective when considering the relationship between personality processes and clinical outcomes.

4.1. Implications

Of clinical relevance, the present study highlights the importance of being able to identify, commit to, move away from and pursue new goals in the face of adversity in the aetiology of suicidal behaviour. When assessing suicide risk, we would suggest that clinicians evaluate potential barriers to goals that a patient values highly and assesses the availability of alternative goals if these barriers are insurmountable. The findings are consistent with the integrated motivational–volitional model of suicidal behaviour (O'Connor, 2011) as they identify proximal mechanisms that may explain when feelings of entrapment are translated into suicidal behaviour, i.e., in the face of goal self-regulation failure. Next steps should include a direct test of the entrapment–goal regulation–suicidal behaviour relationship as well as exploring candidate physiological mechanisms associated with goal self-regulation. The latter is especially timely given the growing evidence that individual differences in goal adjustment and other self-regulatory processes are associated with systemic inflammation and abnormalities of the hypothalamic-pituitary-adrenal axis (Miller and Wrosch, 2007; Wrosch et al., 2009). For example, in one study, adolescents who had difficulty disengaging from unattainable goals exhibited increasing concentrations of the inflammatory molecule C-reactive protein (CRP) over a one year follow period (Miller and Wrosch, 2007). It may also be that those suicide attempters who self-harmed again had, in reality, fewer goals to engage in than those who did not repeat self-harm, so it may be the paucity of available goals rather than reduced motivational capacity to engage in new goals which is important. Future research should endeavour to track the availability of alternative goals as well as one's motivation to re-engage in new goals over time to determine the extent to which availability influences goal re-engagement.

The potential clinical implications of these findings are considerable and should inform the development and rigorous evaluation of theoretically-driven clinical interventions. Such interventions would usefully have two aims. First, given that goal reengagement appears to have both direct and buffering effects on risk of repeat self-harm, cognitive-behavioural therapeutic efforts directed at increasing one's capacity to identify, commit to and pursue new goals ought to be beneficial. Second, the personal meaning of goal disengagement to the individual should also be explored in any goals-oriented intervention. For example, the present study suggests that tailoring therapeutic interventions according to age is particularly important.

4.2. Limitations and future research

The linkage methodology employed in our study gives rise to two potential limitations. The national linkage database is a powerful resource, however, it does not capture those self-harm patients who present to the emergency department but who are not admitted to hospital, nor does it record those patients who are admitted to hospital in another country. Although we acknowledge these methodological constraints, as we are not conducting a prevalence study they do not detract from the substantive findings or our conclusions. Furthermore, our use of the hospitalisation outcome criterion, by definition, means that we have been successful in identifying predictors of serious self-harm that required hospital admission. Nonetheless, it would be useful to target those self-harm patients who are not admitted to hospital following presentation at emergency department in future research. Although we were unable to ascertain suicide intentionality at follow-up, the findings remain clinically valid as hospital-treated self-harm irrespective of suicide intent predicts suicide (Cooper et al., 2005). It is also worth noting that the self-regulation of goals was assessed via self-report. It would be useful to investigate the extent to which an individual's perception of their own goal regulation taps their actual behaviour. This does not detract, however, from the fact that this self-report measure has high predictive validity, as it predicts actual behaviour (hospitalisation) two years following a suicide attempt.

Future research is required to investigate whether the self-regulation of unattainable goals has similar utility for predicting first-time self-harm. Specifically, it would be clinically important to investigate whether first-time self-harm is associated with lower levels of goal regulation processes. More research is also required on the development of goal regulation processes across the lifespan, as the majority of lifespan studies have focused either on adolescence or older adult populations. Beyond observing in the present study that the developmental shift in the role of goal disengagement is evident when we compare those who are 50 years (i.e., 1 SD above the mean age) versus 24 years (i.e., 1 SD below the mean age), we have yet to ascertain when this developmental shift occurs and the extent to which it varies as a function of life experience.

Another unanswered question is: What factors determine the regulation of unattainable goals? Given that the present sample was predominantly White, the role of ethnicity should also be determined. Future research should also explore whether the relationship between goal regulation differs as function of the motivations underpinning self-harm, as it is well recognised that such motives are many and varied (Hjelmeland et al., 2002). We did not include participants who presented with non-suicidal self-injury at baseline in the present study (indeed self-poisoning not self-injury was the primary focus of this study), so it is important to investigate whether non-suicidal self-injury, involving tissue damage, is related to goal regulation in a similar way to taking a medically serious overdose and expressing a wish to die.

5. Conclusions

The findings suggest that how one responds to unattainable goals is a proximal predictor of serious self-harm repetition in suicide attempters. The study extends the goal regulation literature into a new domain and affords a theoretical framework on which psychological interventions to manage suicide risk should be based.

References

Aiken, L.S., West, S.G., 1991. Multiple Regression: Testing and Interpreting Interactions. Sage, Newbury Park, CA.

Appleby., L., Shaw, J., Amos, T., McDonnell, R., Harris, C., McCann, K., Kiernan, K., Davies, S., Bickley, H., Parsons, R., 1999. Suicide within 12 months of contact with mental health services: national clinical survey. British Medical Journal 318, 1235–1239.

Bostwick, J.M., Pankratz, V.S., 2000. Affective disorders and suicide risk: a reexamination. American Journal of Psychiatry 157, 1925–1932.

Beck, A.T., Schuyler, D., Herman, I., 1974a. Develoment of suicidal intent scales. In: Beck, A.T., Resnik, H.L.P., Lettieri, D.J. (Eds.), The Prediction of Suicide. Charles Press, Philadelphia, PA, pp. 45–56.

Beck, A.T., Steer, R.A., Kovacs, M., Garrison, B., 1985. Hopelessness and eventual suicide: a 10-year prospective study of patients hospitalised with suicidal ideation. American Journal of Psychiatry 142, 559–563.

Beck, A.T., Weissman, A., Lester, D., Trexler, L., 1974b. The measurement of pessimism: the hopelessness scale. Journal of Consulting & Clinical Psychology 42, 861–865.

Bjelland, I., Dahl, A.A., Haug, T.T., Neckelmann, D., 2002. The validity of the Hospital Anxiety and Depression Scale. An updated literature review. Journal of Psychosomatic Research 52, 69–77.

Carstairs, V, 1995. Deprivation indices: their interpretation and use in relation to health. Journal of Epidemiology and Community Health 49 (Suppl. 2), S3–8.

Carver, C.S., Scheier, M.F., 1998. On the Self-regulation of Behaviour. Cambridge University Press, New York.

Cavanagh, J.T.O., Carson, A.J., Sharpe, M., Lawrie, S.M., 2003. Psychological autopsy studies of suicide: a systematic review. Psychological Medicine 33, 395–405.

Cooper, J., Kapur, N., Webb, R., Lawlor, M., Guthrie, E., Mackway-Jones, K., Appleby, L., 2005. Suicide after deliberate self-harm. American Journal of Psychiatry 162, 297–303.

Cull, J.G., Gill, W.S., 1988. Suicide Probability Scale (SPS) Manual. Western Psychological Services, Los Angeles.

Dixon, W.A., Heppner, P.P., Anderson, W.P., 1991. Problem-solving appraisal, stress, hopelessness and suicide ideation in a college population. Journal of Counseling Psychology 38, 51–56.

Hawton, K., Saunders, K.E.A., O'Connor, R.C., 2012. Self-harm and Suicide in Adolescents. The Lancet 379, 2373–2382.

Hawton, K., Van Heeringen, K., 2009. Suicide Lancet 373, 1372–1381.

Heckhausen, J., 1999. Developmental Regulation in Adulthood. Cambridge University Press, New York.

Heckhausen, J., Schulz, R., 1995. A life-span theory of control. Psychological Review 102, 284–304.

Heckhausen, J., Wrosch, C., Schulz, R., 2010. A motivational theory of life-span development. Psychological Review 117, 32–60.

Hjelmeland, H., Hawton, K., Nordvik, H., Bille-Brahe, U., De Leo, D., Fekete, S., Grad, O., Haring, C., Kerkhof, J., Lonnqvist, J., Michel, K., Salander-Renberg, E., Schmidtke, A., Van Heeringen, K., Wasserman, D, 2002. Why people engage in parasuicide: a cross-cultural study of intentions. Suicide and Life-Threatening Behavior 32, 380–393.

Klinger, E., 1975. Consequences of commitment to and disengagement from incentives. Psychological Review 82, 1–25.

Larzelere, R.E., Smith, G.L., Batenhorst, L.M., Kelly, D.B., 1996. Predictive validity of the suicide probability scale among adolescents in group home treatment. Journal of the American Academy of Child & Adolescent Psychiatry 35, 166–172.

MacLeod, A.K., Conway, C, 2007. Well-being and positive future thinking for the self versus others. Cognition & Emotion 21, 1114–1124.

MacLeod, A.K., Pankhania, B., Lee, M., Mitchell, D., 1997. Parasuicide, depression, and anticipation of positive and negative future experiences. Psychological Medicine 27, 973–977.

Mann, J.J., Waternaux, C., Haas, G.L., Malone, K.M., 1999. Toward a clinical model of suicidal behaviour in psychiatric patients. American Journal of Psychiatry 156, 181–189.

Miller, G.E., Wrosch, C., 2007. You've gotta know when to fold 'em: goal disengagement and systemic inflammation in adolescence. Psychological Science 18, 773–777.

Mykletun, A., Stordal, E., Dahl, A.A., 2001. Hospital Anxiety and Depression (HAD) scale: factor structure, item analyses and internal consistency in a large population. British Journal of Psychiatry 179, 540–544.

Nesse, R.M., 2000. Is depression an adaptation? Archives of General Psychiatry 57, 14–20.

Nock, M.K., Park, J.M., Finn, C.T., Deliberto, T.L., Dour, H.J., Banaji, M.R., 2010. Measuring the suicidal mind: implicit cognition predicts suicidal behavior. Psychological Science 21, 511–517.

O'Connor, R.C., 2011. Towards an integrated motivational–volitional model of suicidal behaviour. In: O'Connor, R.C., Platt, S., Gordon, J. (Eds.), The International Handbook of Suicide Prevention: Research, Policy and Practice. John Wiley & Sons, Chichester, pp. 181–198.

O'Connor, R.C., Fraser, L., Whyte, M.C., MacHale, S., Masterton, G., 2009. Self-regulation of unattainable goals in suicide attempters: the relationship between goal disengagement, goal renegation and suicidal ideation. Behaviour Research and Therapy 47, 164–169.

O'Connor, R.C., Whyte, M.C., Fraser, L., Masterton, G., Miles, J., MacHale, S., 2007. Predicting short-term outcome in well-being following suicidal behaviour: the conjoint effects of social perfectionism and positive future thinking. Behaviour Research and Therapy 45, 1543–1555.

O'Connor, R.C., Fraser, L., Whyte, M.C., MacHale, S., Masterton, G., 2008. A comparison of specific positive future expectancies and global hopelessness as predictors of suicidal ideation in a prospective study of repeat self-harmers. Journal of Affective Disorders 110, 207–214.

O'Connor, R.C., Rasmussen, S., Hawton, K., 2012. Distinguishing adolescents who think about self-harm from those who engage in self-harm. British Journal of Psychiatry 200, 330–335.

O'Connor, R.C., Ryan, C., Smyth, R., Williams, J.M.G., Masterton, G., 2010. The Role of Psychological Factors in Predicting Short-term Outcome Following Suicidal Behaviour Final Report. Chief Scientist Office, Edinburgh.

Owens, D., Horrocks, J., House, A., 2002. Fatal and non-fatal repetition of self-harm: systematic review. British Journal of Psychiatry 181, 193–199.

Reynolds, J., Steward, M., Macdonald, R., Sischo, L., 2006. Have adolescents become too ambitious? High school seniors' educational and occupational plans, 1976–2000. Social Problems 53, 186–206.

Scheier, M.F., Carver, C., 2001. Adapting to cancer: the importance of hope and purpose. In: Baum, A, Andersen, BL (Eds.), Psychosocial Interventions for Cancer. American Psychological Association, Washington, DC, pp. 15–36.

Scottish Government (2004). Analysis of Ethnicity in the 2001 Census—Summary Report. Edinburgh: HMSO. ⟨www.scotland.gov.uk/Publications/2004/02/18876/32939⟩.

Taylor, P.J., Wood, A.M., Gooding, P.A., Tarrier, N., 2011. Prospective predictors of suicidality: defeat and entrapment lead to changes in suicidal ideation over time. Suicide and Life Threatening Behavior 41, 297–306.

Van Orden, K., Witte, T.K., Cukrowicz, K.C., Braithwaite, S., Selby, E.A., Joiner, T.E., 2010. The interpersonal theory of suicide. Psychological Review 117, 575–600.

Watson, D., Clark, L.A., Tellegen, A., 1988. Development and validation of brief measures of positive and negative affect: the PANAS scales. Journal of Personality and Social Psychology 54, 1063–1070.

World Health Organisation (2012). (Page accessed on 18th Feb. 2012 ⟨www.who.int/mental_health/prevention/suicide/country_reports/en/index.html⟩.

Williams, J.M.G., Barnhofer, T., Crane, C., Beck, A.T., 2005. Problem-solving deteriorates following mood challenge in formerly depressed patients with a history of suicidal ideation. Journal of Abnormal Psychology 114, 421–431.

Williams, J.M.G., Van der Does, A.J.W., Barnhofer, T., Crane, C., Segal, Z.S., 2008. Cognitive reactivity, suicidal ideation and future fluency: preliminary investigation of a differential activation theory of hopelessness/suicidality. Cognitive Therapy and Research 32, 83–104.

Wingate, L.R., Van Orden, K.A., Joiner, T.E., Williams, F.M., Rudd, M.D., 2005. Comparison of compensation and capitalization models when treating suicidality in young adults. Journal of Consulting & Clinical Psychology 73, 756–762.

Wrosch, C., 2010. Self-regulation of unattainable goals and pathways to quality of life. In: Folkman, S. (Ed.), Oxford Handbook of Stress, Health and Coping. Oxford University Press, Oxford.

Wrosch, C., Miller, G.E., 2009. Depressive symptoms can be useful: self-regulatory and emotional benefits of dysphoric mood in adolescence. Journal of Personality and Social Psychology 96, 1181–1190.

Wrosch, C., Miller, G.E., Schulz, R., 2009. Cortisol secretion and functional disabilities in old age: importance of using adaptive control strategies. Psychosomatic Medicine 71, 996–1003.

Wrosch, C., Scheier, M.F., 2003. Personality and quality of life: the importance of optimism and goal adjustment. Quality of Life Research 12, 59–72.

Wrosch, C., Scheier, M.F., Carver, C.S., Schulz, R., 2003a. The importance of goal disengagement in adaptive self-regulation: when giving up is beneficial. Self and Identity 2, 1–20.

Wrosch, C., Scheier, M.F., Miller, G.E., Schulz, R., Carver, C.S., 2003b. Adaptive self-regulation of unattainable goals: goal disengagement, goal reengagement and subjective well-being. Personality and Social Psychology Bulletin 33, 251–265.

Zigmond, A.S., Snaith, R.P., 1983. The hospital anxiety and depression scale. Acta Psychiatrica Scandinavica 67, 361–370.