




## ORIGINAL ARTICLE

# Explicit and Implicit Hopelessness and Self-injury

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**Abstract**

**Objective:** This study examined the relationship between explicit and implicit measures of hopelessness and self-injurious behavior (defined here as self-harming or suicidal actions and thoughts).

**Method:** A community sample of 267 participants completed explicit measures of hopelessness (Beck's Hopelessness Scale and a Feeling Thermometer), an implicit measure of hopelessness (Hopelessness Implicit Association Test), and a self-report measure of their history of self-injurious behavior.

**Results:** The results showed that high levels of hopelessness, measured both explicitly or implicitly, were associated with a past and recent history of self-injury. However, there was also an interaction between the implicit and explicit measures such that explicit hopelessness was more strongly predictive of self-injury in people with high levels of implicit hopelessness.

**Conclusion:** The findings show that the implicit measurement of hopelessness can help predict past and recent self-injury beyond what explicit measures of hopelessness currently achieve and could be used in the assessment of risk of both self-harming and suicidal behaviors.

## INTRODUCTION

Self-injury (defined here as including both suicidal behavior and self-harm) is an important public health concern. Suicide is one of the three leading causes of deaths worldwide for men and women between the ages of 15 and 44 (WHO, 2012), and there were approximately 6,500 suicides registered in the UK last year (Office of National Statistics, 2018). Non-suicidal self-injury (NSSI), termed here as self-harm, is the intentional injuring or destruction of one's own body tissue that causes immediate damage, but without suicidal intent and for purposes not culturally endorsed (Nixon et al., 2008). Considering both the high prevalence rates and the potentially lethal consequences of both suicidal behavior

and self-harm, research must enhance our understanding of the factors driving such behavior. From a clinical perspective, measures are needed that are predictive of self-injury so that individuals at risk of such behavior can be given therapeutic intervention. Given that many individuals who may wish to self-injure may not want to report this behavior, we examined whether the use of an implicit measure of hopelessness might aid in the detection/prediction of self-injurious behavior.

## HOPELESSNESS

Hopelessness is defined as a set of negative expectations toward the future (Beck et al., 1974) and is a well-established

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construct in the understanding of self-injury (McMillan et al., 2007). Evaluating levels of hopelessness forms an essential part of assessing suicide risk (American Psychological Association, 2003), and hopelessness is integral to many different theoretical models of suicidal behavior (e.g., Abramson et al., 2002). An individual experiencing great emotional, psychological, or physical pain is unlikely to consider suicide unless that pain is coupled with an expectation that their situation cannot improve (Klonsky & May, 2015).

The Beck Hopelessness Scale (BHS; Beck et al., 1974) is the most widely used measurement of hopelessness. Beck et al. (1975), in an investigation of 384 suicide attempters, found hopelessness to be the key variable that mediated the relationship between depression and suicidal behavior. More recently, a meta-analysis (McMillan et al., 2007) of four prospective studies ( $n = 2,559$ ) found that a score of nine or more on the BHS could predict which individuals died by suicide with a degree of accuracy ( $AUC = 0.70$ ) greater than or equal to a range of current risk assessment scales specifically designed to predict suicidal behavior (Steeg et al., 2018).

Hopelessness is also reliably associated with self-harm. Brittlebank et al. (1990) followed up patients who attended hospital after an episode of self-injury. They found patients who reattended hospital for self-injurious behavior reported higher levels of hopelessness at their initial episode. Hopelessness was also found to be a prospective predictor of self-harm in adolescents in a two-year longitudinal study (Hankin & Abela, 2011). Thus, the current literature indicates that hopelessness is central to our current understanding of what mediates both suicidal and self-harming behavior.

## IMPLICIT MEASURES

The assessment of hopelessness forms an important component of suicide risk assessment procedures, and the BHS is often used to aid clinicians' decision making (National Collaborating Centre for Mental Health, 2012). However, the almost universal reliance on self-report methods in both research and clinical practice is problematic when investigating suicidal and self-injurious behavior (Nock et al., 2010). Individuals are often motivated to hide their feelings of hopelessness or suicidality for a variety of reasons (e.g., stigma or shame). Further, individuals may lack insight into their own thoughts and feelings. Busch et al. (2003) reported that 78% of patients who die by suicide explicitly denied any suicidal thoughts or intentions in their last communications with others. Therefore, tools that can accurately and reliably assess the risk of suicide without reliance on self-report, or could complement self-report measures, would be of immense value.

The development of implicit tests, such as the Implicit Association Test (IAT; Greenwald et al., 1998), represent potentially useful ways of overcoming problems associated with self-report measures. The IAT measures implicit attitudes, beliefs, or internal states by assessing the strength of a participant's unconscious, automatic associations between concepts (e.g., black or white faces) and attributes (e.g., pleasant or unpleasant). Notably, the IAT has demonstrated predictive validity of future behavior beyond self-report measures across socially sensitive subjects such as interracial behavior (Greenwald, et al., 2009) and sexual interest (Snowden et al., 2008).

Recently, research has explored whether IATs can identify individuals at risk of suicidal behavior or self-harm. Participants with a history of self-harm have demonstrated stronger self-harm related implicit associations relative to individuals with no such history (Glenn et al., 2017). Performance on a "Self-Injury IAT" (an IAT that examines an individual's associations between self-injury and their concept of self) has been shown prospectively to predict self-injurious behavior above and beyond well-known risk factors (Cha et al., 2016). Cross-sectional studies have also demonstrated that performance on a "Suicide IAT" (an IAT that examines an individual's associations between suicide their concept of self) could predict past engagement with suicidal behavior (Glenn et al., 2017) and current suicidal ideation (Nock & Banaji, 2007). In addition, a "Death/Suicide IAT" (an IAT that examines an individual's associations between death or suicide their concept of self) can prospectively predict suicide attempts over a 6-month follow-up above and beyond clinician prediction, patient prediction, and past self-injurious behavior (Barnes et al., 2017; Nock et al., 2010).

However, this research into implicit measures has focused on the extent individuals associate themselves with the concept of self-harm or suicide. Despite hopelessness having a reliable link to suicidal and self-harming behavior, no research has examined the link between individuals' implicit levels of hopelessness and engagement with self-injurious behavior.

Two previous studies have attempted to measure participant's implicit levels of hopelessness in relation to the presence of depressive symptoms. Meites et al. (2008) developed a "hopelessness IAT" that examined automatic associations between "the future" and "mood state" but found no difference in performance between depressed individuals and healthy controls. Kosnes et al. (2013) used the Implicit Relations Assessment Procedure to measure participants' positive and negative expectations toward the future. They found healthy controls had greater positive expectations for the future compared to individuals with sub-clinical depression. Thus, there is some suggestion that implicit measures of hopelessness can predict depressive symptoms, but no

research has examined whether implicit hopelessness can predict self-injurious behavior.

According to dual-process models, humans have two interacting models of information processing; an automatic, intuitive, unconscious processing system, and a deliberative, rational, conscious processing system (Epstein, 1994). In line with this, implicit tools are thought to measure the automatic system, with explicit measures measuring the more deliberative system (Creemers et al., 2012). With regard to hopelessness, it is likely that we possess both a rational, deliberative, conscious perception of our degree of hope toward the future as well as an automatic, reflexive, emotionally driven level of hope toward the future. Given that these two systems interact to inform our thoughts, feelings, and behavior (Richetin et al., 2007), explicit and implicit measures should not be looked at in isolation when assessing their relation to target behavior. Indeed, research from the self-esteem literature has demonstrated how the interaction between implicit and explicit measures of self-esteem can predict levels of depression, suicidal ideation (Creemers et al., 2012), and aggressive behavior (Sandstrom & Jordan, 2008) beyond either measure alone. Therefore, this present investigation measured both explicit and implicit measures of hopelessness and examined whether either measure in isolation, or the interaction between the two measures of hopelessness, was linked to self-injurious behavior. We tested three hypotheses: (H1) high levels of explicit hopelessness would be related to self-injurious behavior, (H2) high levels of implicit hopelessness would be related to self-injurious behavior, and (H3) there would be an interaction between explicit and implicit measures of hopelessness in their relation to self-injurious behavior such that people with high levels of both implicit and explicit hopelessness would have greater levels of self-injurious behavior.

## METHODS

### Participants

Based on previous findings and our pilot work, typical effect sizes in research examining implicit measures and self-aggression are often on the order of  $r = 0.20$ . A power calculation ( $\alpha$  (one-tailed) = 0.05, power = 0.80) showed a minimum sample size of 154. In reality, we over-sampled this number in order to account for lost data.

Posters were placed around the Swansea University Morriston Campus, the surrounding area, and on Social Media. Participants signed up by contacting the researcher via the email address on the poster. Participants were required to be native English speakers, and below the age of 65. In all, 274 participants were tested. However, data from

seven people were removed due to excessive errors on the implicit measures (see below). The final sample consisted of 267 people (90 men, 177 women) with a mean age of 29.3 (SD = 10.4, range 18–61).

### Apparatus/Materials

#### Explicit hopelessness

Beck's Hopelessness Scale (BHS; Beck et al., 1988) consists of 20 dichotomous true-false items assessing hopelessness about the future. Each item is given the score 0 or 1 to produce a score from 0 to 20, with higher scores representing a greater degree of negative attitudes about the future. The BHS has proven validity in both clinical and non-clinical samples (Steed, 2001).

#### Feeling thermometer

Participants were instructed to indicate "How hopeless do you feel" on a scale from 0 to 100 by marking a line on the thermometer to indicate their current level of hopelessness. Such visual rating scales have demonstrated construct validity in other domains (Hawker et al., 2011) and good to excellent test-retest reliability when measuring concepts such as anxiety ( $r = 0.86$ ; Cella & Perry, 1986) or pain ( $r = 0.94$ ; Hawker et al., 2011).

#### Implicit hopelessness

A hopelessness IAT was constructed that consisted of the concurrent classification of words as either "me" or "not-me" and the classification of pictures as either "hopeful" or "hopeless." The concept of me was represented by words (the participant's first name, star sign, date of birth, place of birth, and nationality) collected at the start of the study. The concept of not-me used foils of other first names, star signs, etc. Twenty images representing the constructs of *hopelessness* and *hopefulness* were initially selected by the authors as representing these concepts. A pilot study had participants ( $n = 29$ ) rate each image regarding their representation of either hopelessness or hopefulness on a scale from 0 to 10. Five images per construct with the highest mean scores were used in the hopelessness IAT.

The hopelessness IAT consisted of two blocks of trials. Block 1 consisted of the instructions to classify the "me" words and "hopeful" pictures on the left button (and "not-me" words and "hopeless" pictures on the right button). Following 8 practice trials (which were discarded), each image and word were presented three times in a random

order (60 trials). During the second block, the button for the classification of the construct of hopeful vs hopeless was reversed, and a further 68 trials (8 practice and 60 main) were completed.

Each trial consisted of a fixation cross (500 ms) followed by the stimulus. Prompts reminding the participant of the current classification task remained on the screen (besides each image). Participants were requested to classify the stimulus as quickly as possible while minimizing errors. No trial feedback was given.

The program DirectRT v2016 was used on personal laptop devices (Windows10, resolution 1,366 × 768 [32 bit] [60 Hz]) to conduct the IAT. The images were of size 6 cm by 6 cm, and the words consisted of letters of size 1 cm (height). Participants sat approximately 57 cm from the screen.

### Self-injurious actions and thoughts

The Cardiff Self-Injury Inventory (CSII; Snowden, unpublished) is a brief 8-item questionnaire that measures the quantity of previous self-injurious actions and thoughts, with the participant indicating the frequency on an ordinal scale with five options (“none,” “once,” “two or three,” “four to ten,” and “more than ten”). The CSII was developed to provide a simple measure of the quantity of self-injurious behavior and deliberately does not ask for any details of the incidents or the motivations behind the acts or thoughts. It is therefore less intrusive, less distressing, and less time-consuming compared to other measures of self-injurious behavior.

The first section (four questions) asks about behavior across the whole life span. The first question asks about actual self-injury *without* intent to die (which we term self-harm), while the second question asks about thoughts about such self-harming. These two questions are then repeated for behavior and thoughts *with* the intent to die (which we term suicide). The second section repeats these four questions but with reference to their recent or current behaviors defined as in the past three months only.

Similar single-item measures of past suicidal behaviors and suicidal thoughts have demonstrated good test–retest reliability (Collins et al., 2018; Flisher et al., 2004), good convergent and discriminant validity (May & Klonsky, 2011), and single-item measures of suicidal thoughts have shown strong relationships with gold standard, multi-item assessments of suicidal ideation such as Beck's Scale for Suicide Ideation (Beck et al., 1979; Desseilles et al., 2012), making them appropriate methods for fast, non-intrusive screening of the general population. Additionally, single-item measures of self-harming thoughts and behaviors are commonly used in self-harm research and have been shown to produce consistent estimates of prevalence (Claes et al., 2013;

Muehlenkamp et al., 2012). Moreover, research has demonstrated that single-item measures of self-harm are strongly correlated with well validated, multi-item questionnaires such as the Deliberate Self-Harm Inventory (Gratz, 2001).

### Procedure

This project was approved by the College of Human and Health Sciences Research Ethics Committee at Swansea University. After reading the information sheet, participants gave written consent to participate and were asked for the personal information needed for the IAT. They then completed the hopelessness IAT and then the explicit measures of hopelessness. Finally, they completed the CSII. After data collection, participants were given a debrief form that explained the aims of the study and provided contact information in case any issues arose during the survey or if they needed support.

### Data analysis

Participants with an excessive number of errors (<30%) were discarded ( $n = 7$ ). Reaction times (RTs) and errors were then used to construct a D-score for each participant along the lines suggested by Greenwald et al. (2003). Briefly, (1) trials were discarded if the RT was less than 300 or >2,000 ms, (2) trials on which an error occurred were given a 600 ms penalty, and (3) the D-score is the difference in the means for each block of trials divided by the pooled standard deviation.

Visual inspection of the data showed skewed distributions for most of the variables, especially the hopelessness thermometer, BHS, and CSII items—with most of the participants' scores being at the low end of the scales (e.g., low hopelessness, no or little suicidal behavior, etc.). For this reason, non-parametric statistical analyses were performed.

### RESULTS

Scores from the explicit and implicit measures of hopelessness are displayed in Table 1. The BHS showed high internal reliability ( $\alpha = 0.92$ ) in line with many previous studies (e.g., Steed, 2001). The internal reliability of the IAT was assessed via a split-half (odd vs even trials) reliability with the Spearman-Brown correction. This also showed high reliability ( $\alpha = 0.86$ ) particularly for a RT-based measure. The Feeling Thermometer gives only a single indication of hopelessness, so no reliability measure could be calculated.

The mean scores for the Feeling Thermometer and BHS were low indicating that most people had explicit cognitions

**TABLE 1** Descriptive statistics for the measures of hopelessness and their correlations (Spearman's  $\rho$ )

	Mean (SD)	Median	Internal reliability	1	2	3
1. Feeling thermometer	28.5 (24.8)	20.0	N/A	–	0.54**	0.26**
2. Becks hopelessness Scale	4.8 (5.1)	3.0	0.92		–	0.22**
3. Hopelessness IAT	–0.33 (0.48)		0.86			–

\*  $p < .05$

\*\*  $p < .01$ .

**TABLE 2** Percentage of people reporting the different levels of self-injury behavior

	Past				Current/recent			
	Self-harm incidents	Self-harm thoughts	Suicide attempts	Suicide thoughts	Self-harm incidents	Self-harm thoughts	Suicide attempts	Suicide thoughts
None	60.3	44.2	76.4	57.3	89.1	76.0	98.9	81.3
Once	6.4	8.2	10.5	9.7	4.9	9.7	0.7	7.1
Two to four	11.2	13.5	8.6	12.4	4.9	6.7	0.4	8.6
Five to ten	10.1	10.5	3.7	7.1	0.7	4.1	0	1.9
More than ten	12.0	23.6	0.7	13.5	0.4	3.4	0	1.1

of being hopeful. The mean score for the hopelessness IAT was negative showing the most people had an implicit score indicating an association between themselves and being hopeful. All three measures were significantly correlated.

Table 2 illustrates the levels of self-injurious behavior. While there is substantial overlap between all of the different aspects of self-injury measured here, prior research has demonstrated important differences between self-harming and suicidal behavior in the associated risk factors (Brausch & Gutierrez, 2010; Muehlenkamp & Gutierrez, 2004), prevalence rates (Nock et al., 2008; Swannell et al., 2014) and mortality levels (Halicka & Kiejna, 2015). Past research has also established key sociodemographic and clinical differences between suicide ideators and suicide attempters (May & Klonsky, 2016). Therefore, no measure of internal reliability is given and the results for each item are presented separately, as each question was designed to measure different aspects of self-injury. For most of the variables, the sample showed substantial levels of self-injurious behavior, the exception was for “recent suicide attempts” where only 1.1% (three individuals – all female) reported any such behavior. Due to this low level of occurrence, no further tests were performed using this outcome variable.

First, we examined the zero-order correlations between the measures of hopelessness and self-injurious behavior (see Table 3). As hypothesized (H1), there were significant relationships between the indices of self-injurious behavior (both past and current/recent) and both of the explicit measures of hopelessness (BHS and Feeling Thermometer). The magnitude of

these associations was “moderate” and appeared similar across all the items of the CSII and for both explicit measures.

Our second hypothesis (H2) was supported as the implicit measure of hopelessness was significantly correlated with each of the items of the CSII. The magnitude of these correlations was “small” and was similar for all items of the CSII.

Our third hypothesis (H3) was that there would be an interaction between explicit and implicit measures of hopelessness. This hypothesis could be addressed by examining the ability of the interaction term to predict variance in a hierarchical linear regression. However, the ordinal nature of the dependent variable(s) precluded linear regression.<sup>1</sup> In order to test our hypothesis, we divided the sample into a high vs low group based on their hopelessness IAT scores (median split) and then compared the correlation of the BHS to our dependant variables in each of the high and low groups. As illustrated in Table 4, the BHS showed greater correlations with the BHS when implicit levels of hopelessness were high compared to low. For example, the BHS was strongly (large effect size,  $\rho = 0.51$ ) related to current/recent suicidal thoughts for those with high hopelessness IAT scores but was

<sup>1</sup>There has been considerable debate as to the use of parametric statistics for ordinal data. Current thinking (see Miricioiu & Atkinson, 2017) suggests that parametric analysis leads to a more in-depth analysis and is more discriminant as long as the number of responses is large (>15). We, therefore, also performed a series of hierarchical multiple regressions on the scales of the CSII using the z-scored BHS and hopelessness IAT at step one and their interaction of these at step two. The results were fully supportive of the pattern reported here and are available from the corresponding author.



TABLE 3 Correlations (Spearman's  $\rho$ ) between self-injury and the measures of hopelessness.

	Past				Current/recent		
	Self-harm incidents	Self-harm thoughts	Suicide attempts	Suicide thoughts	Self-harm incidents	Self-harm thoughts	Suicide thoughts
Feeling thermometer	0.28**	0.31**	0.28**	0.29**	0.24**	0.36**	0.34**
Becks Hopelessness Scale	0.32**	0.30**	0.29**	0.33**	0.26**	0.34**	0.38**
Hopelessness IAT	0.14*	0.12*	0.12*	0.15**	0.15*	0.21*	0.23**

\*  $p < 0.05$ \*\*  $p < 0.01$ .TABLE 4 Correlations (Spearman's  $\rho$ ) between self-injury and the measures of hopelessness. The upper section shows the correlation of the BHS with the CSII scales for the low and high hopelessness IAT scorers. The lower section shows the correlation of the hopelessness IAT with the CSII scales for the low and high BHS scorers

	Past				Current/recent		
	Self-harm incidents	Self-harm thoughts	Suicide attempts	Suicide thoughts	Self-harm incidents	Self-harm thoughts	Suicide thoughts
BHS							
Low IAT	<b>0.18</b>	<b>0.20</b>	<b>0.20</b>	<b>0.21</b>	<b>0.22</b>	0.17	0.12
High IAT	<b>0.39*</b>	<b>0.34</b>	<b>0.31</b>	<b>0.39*</b>	<b>0.24</b>	<b>0.40*</b>	<b>0.51**</b>
IAT							
Low BHS	0.03	0.001	0.05	0.002	0.08	0.09	-0.001
High BHS	<b>0.19</b>	<b>0.18</b>	0.14	<b>0.28**</b>	0.10	<b>0.26**</b>	<b>0.35**</b>

Boldface: correlation  $> 0$ ,  $p < 0.05$ .Correlation between high and low differ: \* $p < 0.05$ , \*\* $p < 0.01$ .

not related for those with low hopelessness IAT scores. A complementary analysis, which divided participants into low and high explicit scorers based on their BHS score, showed that the hopeless IAT was not significantly related to any CSII scores for the low explicit hopelessness group, but was significant for several of the measures in the high explicit hopelessness group. Hence, hypotheses 3 was also supported.

## DISCUSSION

This investigation examined the relationship between implicit and explicit levels of hopelessness and self-injurious behavior. As expected, the explicit measures of hopelessness were correlated with all measures of self-injury, including both self-harm and suicide, both actions and thoughts, and both past and recent incidents, with medium effect sizes. We also found that our implicit measure of hopelessness was correlated with participants' history of self-injury, including current suicidal thoughts, with small to moderate effect sizes. Finally, we found that the effects of explicit hopelessness in determining self-injurious behavior depended on the level of implicit hopelessness (and vice

versa). Explicit hopelessness was strongly associated with self-injury for those who also had high levels of implicit hopelessness.

### Explicit hopelessness and self-injury

The finding that the BHS was associated with past and current suicidal and self-harming thoughts and behavior is in line with many past studies (e.g., McMillan et al., 2007) and is consistent with the theories that claim hopelessness plays a facilitatory role in the development of suicidal ideation (Abramson et al., 2002; Klonsky & May, 2015). While not lengthy, the BHS consists of 20 questions and takes approximately 10 minutes to complete (Beck et al. 1988). It also asks detailed questions about the person's current feelings and risks, potentially triggering a worsening in mood. The BHS is also a propriety instrument and its cost might deter or exclude its use in some clinical settings. It is, therefore, of interest that the single-item Feeling Thermometer showed a strong correlation to the BHS and showed significant association to all aspects of the CSII that were similar in magnitude to those of the BHS. Hence, this simple single-item measure of hopelessness may be of value in situations where

the clinician or researcher has limited time or funds in which to assess this construct.

## Implicit hopelessness and self-injury

This is the first study to demonstrate that performance on a hopelessness IAT was associated with past and/or recent self-injurious behavior. Previous work into implicit hopelessness used a different implicit technique (the IRAP) that measured participants' positive and negative expectations for the future (Kosnes et al., 2013). Their results demonstrated that sub-clinically depressed participants held greater negative implicit expectations for the future, relative to healthy controls. Together, these two studies indicate that implicit hopelessness is a construct relevant to negative clinical outcomes such as depression, self-harm, and suicide.

Meites et al. (2008) found no significant effects for their version of a hopelessness IAT. The present experiment differed from that of Meites et al. (2008) as it measured participants' implicit associations between the self (me vs not-me words) and hopelessness (hopeless vs hopeful images), while that of Meites et al. (2008) examined automatic associations between the future (past vs future words) and mood state (good mood vs bad mood words) in remitted depression patients. It seems possible that feelings of hopelessness would have occurred in the past, especially in remitted depression, and would therefore be associated with the past as well as the future. This would lead to a "null effect" on the IAT of Meites et al., (2008) even if the individual did feel hopeless about the future. We argue that associating the self with hopelessness is a better design to evaluate current feelings of hopelessness.

## Explicit/implicit hopelessness interaction and self-injury

Traditionally, implicit measures have been perceived as a method of circumventing the problems of socially desirable responding and limited introspective access that are associated with self-report measures, with some authors claiming that they offer a better alternative to explicit measures when examining socially sensitive areas (Greenwald, et al., 2008). Such a view treats implicit techniques as just another method for assessing the same concepts that are assessed by more traditional explicit measures. However, others (see Introduction) have suggested implicit techniques assess different forms of a concept, with implicit techniques able to assess fast automatic components while explicit techniques assess more deliberative components.

Previous studies looking at implicit and explicit measures of self-esteem have shown that some individuals hold quite discrepant explicit and implicit self-esteem, and the

magnitude of this discrepancy is predictive of psychological problems. People who have high explicit but low implicit self-esteem (termed defensive self-esteem) appear more hostile and aggressive (Kernis et al., 2008; Sandstrom & Jordan, 2008), while those with low explicit but high implicit self-esteem (termed damaged self-esteem) have elevated rates of depression, loneliness and self-harm (Creemers et al., 2012; Creemers et al., 2013; Frank et al., 2007; Kim & Moore, 2019; Schröder-Abé et al., 2007). The present results also show that there is an interaction between explicit and implicit measurements, but in this case for the concept of hopelessness. Further, the interaction in the present experiment is not related to a discrepancy between the explicit and implicit measures but appears more like a multiplicative interaction where high rates of self-injury are associated with high rates of both explicit and implicit hopelessness—or put another way, that low hopelessness on either explicit or implicit measures is protective against self-injury. Clearly, the present results measuring hopelessness point to a different pattern of results to those using measuring self-esteem. In turn, this suggests that hopelessness and self-esteem are quite distinct concepts.

## Limitations

These results must be interpreted in the light of several limitations. Firstly, this sample consisted primarily of students and members of the general population and it is unclear whether the findings would be replicated in clinical samples. Secondly, this study was reliant on participants' honestly reporting their past self-injurious behavior. While participants were reassured that their responses were confidential and would be held anonymously, participants may have under-reported instances of such behaviors for fear of the negative consequences or stigma that might accompany such a report (Swannell et al., 2014). Furthermore, this research used a series of single-item self-report measures for both suicidal and self-harming thoughts and behaviors. Single-item measures of self-harm behaviors often lead to lower prevalence rates compared to specific behavior checklists (Muehlenkamp et al., 2012), and single-item measures of suicidal behaviors can result in the misclassification of prior suicidal behavior (Hom et al., 2016). This research employed these shorter less intrusive methods for reasons of time management and participant well-being; however, future research should use multi-item self-report assessments of suicidal and self-harming thoughts and behaviors to ensure accurate classification of such behavior.

Thirdly, this investigation employed a correlational design which precludes causal inferences being drawn. Longitudinal research investigating whether measures of implicit and explicit hopelessness can prospectively

“predict” suicidal and self-harming behaviors is required before causal inferences can be made. Fourthly, this investigation examined past and current self-injurious thoughts and defined “current” as having occurred within the past three months. One could argue that an individual who last engaged in self-harm three months ago is not “currently” engaging in self-harming. However, the definition of current was broadened due to the low prevalence of self-harm and suicidal behaviors in the general population (Swannell et al., 2014). Future investigations should examine implicit and explicit hopelessness in individuals with active self-injurious thoughts and behaviors.

## Clinical implications

The present findings carry important clinical implications. Firstly, the powerful interaction found between the implicit and explicit measures of hopelessness in relation to “current” suicidal and self-harming thoughts and behaviors suggests that individuals who score highly on both implicit and explicit measures of hopelessness are at a high risk of engaging in self-injurious behaviors. The hopelessness IAT in combination with explicit measures of hopelessness could aid a clinician's assessment of risk of self-injurious behavior. Risk assessment of suicidal and self-harming behavior is a vital step in suicide prevention, yet current clinical tools designed to assess suicide risk have demonstrated poor predictive ability and clinical utility (Steege et al., 2018). If feasible, incorporating explicit and implicit tools as an adjunct to clinical interview could help improve the accurate identification of individuals at risk of engaging in suicidal behaviors.

## CONCLUSION

This investigation examined the relationship between implicit and explicit levels of hopelessness and self-injury. The findings reiterate the importance of hopelessness as a correlate of self-injurious thoughts and behaviors, but also show that explicit and implicit hopelessness interact so that the combination of high explicit and high implicit produces high levels of self-injury. We suggest that the current successful development of effective implicit measures of hopelessness, used alongside an explicit measure of hopelessness, could be of great value to the clinician assessing risk of self-harm or suicide attempts and in maximizing effective risk management and safeguarding of vulnerable people.

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