The Relationship Between Alexithymia and Self-Harm: the Mediating Role of Mindfulness

Abstract

Objectives. Self-harm, defined as any act of self-injury, irrespective of motivation, is a phenomenon which can have serious consequences for the individual, as well as significant public health costs. Many correlational studies have established a significant association between self-harm and alexithymia, a cognitive deficit in emotion processing, characterised by a difficulty identifying and describing feelings and an externally orientated thinking style. The current study investigated whether this relationship is explained by low levels of dispositional mindfulness. **Methods.** An opportunity sample of 325 community-based adults completed an online survey measuring their history of self-harm, alexithymia (Toronto Alexithymia Scale) and mindfulness (Five Facets of Mindfulness Questionnaire). **Results.** Alexithymia was significantly higher among participants with a history of self-harm, compared with participants with no history of self-harm. All mindfulness facets were significantly lower among participants with a history of self-harm except the facet Observe which was significantly higher in that group. A multiple mediation analysis found that the mindfulness facets Non-judge and Non-react were positive, significant mediators of the relationship between alexithymia and self-harm, but the facet Observe suppressed the relationship. **Conclusions.** The relationship between alexithymia and self-harm can be explained in part by deficits in mindfulness skills, particularly the ability to accept emotional experience without judgment or reaction. Conversely, the external orientation of alexithymia may itself be protective against self-harm, through the avoidance of excessive introspection. Thus, merely learning to observe inner experience, without the ability to understand and accept that experience, may have adverse consequences.

Key Words: Self-harm; alexithymia; mindfulness; mediation

The Relationship Between Alexithymia and Self-Harm: the Mediating Role of Mindfulness

Self-harm, defined as any act of self-poisoning or self-injury irrespective of motivation (National Institute for Health and Care Excellence, NICE, 2013), accounts for an estimated 200 000 hospital admissions a year in England (Tsiachristas et al., 2020) and up to ten times as many incidences in the community (Geulayov et al., 2018). Self-harm is a significant risk factor for subsequent death by suicide (Whitlock et al., 2013). As the evidence to support effective treatments is patchy (Hawton et al., 2016), there remains a need to investigate the correlates of this behaviour and potential mechanisms for change.

People who engage in self-harm tend to score more highly on measures of alexithymia, with a small to medium effect size (Greene et al., 2020; Norman et al., 2020). Alexithymia is a cognitive deficit in emotion processing characterised by a difficulty understanding and describing feelings and an external, rather than internal, cognitive focus (Taylor et al., 1997). It is most commonly measured using the Toronto Alexithymia Scale (TAS20), a twenty-item self-report scale, with three factors, difficulty identifying feelings, difficulty describing feelings and externally-orientated thinking (Bagby, Parker, et al., 1994). Taxometric analysis of the TAS20 indicates that alexithymia is a dimensional, rather than a categorical trait, with a normal distribution in the population (Parker et al., 2008). Between 5 and 17% of community samples and 30 and 60% of clinical samples (Parker et al., 2008) score above a threshold indicating 'high' alexithymia (Taylor et al., 1997). Longitudinal studies have shown that alexithymia has relative, rather than absolute stability. Thus, although individual scores may change, for example as a result of illness such as depression (Honkalampi et al., 2000), or in response to treatment (Cameron et al., 2014), inter-individual differences remain broadly consistent over time.

Alexithymia is associated with difficulties in emotion regulation (Stasiewicz et al., 2012). In a study of adolescents, Venta et al. (2013) found the relationship between alexithymia and poor emotion regulation was mediated by experiential avoidance. This suggests that people with high alexithymia may find it difficult to tolerate emotional experiences that they struggle to understand, and is consistent with evidence associating alexithymia with suppressive regulation strategies (Swart et al., 2009). Without effective emotion regulation skills, people with high alexithymia may turn to less adaptive strategies to manage unwanted aversive emotional experience, including self-harm (Norman et al., 2020).

The relationship between alexithymia and self-harm may therefore be attributable to deficits in emotion regulation skills, including the absence of positive emotion regulation strategies, such as those inherent in dispositional, or trait, mindfulness. With its roots in eastern spiritual traditions, mindfulness has been defined as "*paying attention in a particular way: on purpose, in the present moment, and non-judgmentally*" (Kabat-Zinn, 1994, p.4) - a skill that can be learnt through meditation practice. Mindfulness has been conceptualised in different ways by different people, and operationalised in a range of measurement tools. For example, the Mindfulness Attention Awareness Scale (MAAS) is a single factor scale, which focusses on the ability to pay attention to, and act with awareness of, present moment experience (Brown & Ryan, 2003). Other single factor scales, such as the Revised Cognitive and Affective Scale (CAMS-R, Feldman et al., 2007) and the Child and Adolescent Mindfulness Measure (CAMM, Greco et al., 2011) also incorporate items relating to the non-judgmental acceptance of experience. In contrast, others view mindfulness as a multi-faceted construct. Derived from five previous scales, the Five Facet Mindfulness Questionnaire (FFMQ) provides an overarching measure of trait mindfulness, as well as five separate factors: non-reactivity to inner experience (Non-react), observing sensations, thoughts and feelings (Observe), acting with awareness (Act aware), describing with words (Describe) and

non-judging of experience (Non-judge) (Baer et al., 2006). This multi-faceted approach allows for a nuanced analysis of the underlying mechanisms by which mindfulness might be beneficial to wellbeing.

The empirical literature consistently shows dispositional mindfulness to be lower among people with a history of self-harm, irrespective of the measure used. In studies using the MAAS, mindfulness was significantly lower in people who self-harm, in samples of adolescents (Lundh et al., 2007) and young adults (Heath et al., 2016). Using the FFMQ, Caltabiano and Martin (2017) found the mindfulness facets non-react, non-judge and act aware were significantly lower among adults with a history of self-harm. Although the majority of studies are cross-sectional, Garisch and Wilson (2015) assessed an adolescent sample at two time points and found not only that mindfulness (CAMS-R) was significantly negatively associated with self-harm, but also that higher mindfulness at Time 1 predicted lower self-harm at Time 2. Taken together, these results provide evidence for the protective role of dispositional mindfulness in the context of self-harm. The evidence also suggests that the mindfulness skill of not reacting to present moment experience might be an important mechanism in the relationship between mindfulness and self-harm. Caltabiano and Martin (2017) found the mindfulness facet non-react to be a unique predictor of self-harm, and, in an internet-based study of adults, the relationship between mindfulness and self-harm was mediated by self-control (Yusainy & Lawrence, 2014). This may be particularly relevant for people with high alexithymia, given the evidence linking alexithymia with the suppression and avoidance of emotions (Venta et al., 2013). Lower levels of mindfulness may therefore be an explanatory factor for the observed relationship between alexithymia and self-harm.

Dispositional mindfulness is, in many ways, the conceptual opposite of alexithymia and empirical evidence indicates the two traits are negatively correlated (Baer et al., 2006). The external orientation of alexithymia results in a lack of attention paid to inner experiences,

with the result that health outcomes are attributed to external factors over which the individual feels they have no control (Hungr et al., 2016). In contrast, integral to mindfulness is an awareness of present moment experience, including thoughts, feelings and sensations, which contributes to greater emotional clarity (Coffey & Hartman, 2008). The current study, therefore, aimed to test the mediating role of mindfulness, and its component facets, in the relationship between alexithymia and self-harm.

Mindfulness practice forms part of some of the therapeutic treatments for self-harm such as Dialectical Behavioural Therapy (DBT; Linehan, 1993). Whilst a systematic review indicated tentatively promising results for DBT in treating self-harm (Turner et al., 2014), little research has been conducted to identify the types of people engaging in self-harm for whom mindfulness training would be most beneficial. In addition, greater understanding of the differential relationship between individual mindfulness facets and self-harm would improve understanding of the mechanisms involved in the therapeutic use of mindfulness practice.

Aims of the Study

The objective of the study was to examine the relationships between alexithymia, mindfulness and self-harm in a community sample of adults, in order to inform possible preventative or therapeutic interventions. Previous studies of alexithymia and self-harm have sampled principally from three main groups: adolescents, university students and adults in clinical settings (Greene et al., 2020; Norman et al., 2020). There are therefore very few studies of adults in the community, a gap which this study sought to address.

The study had two main aims:

1) To replicate the findings of previous studies that alexithymia is significantly higher, and mindfulness significantly lower, among those with a history of self-harm in a community sample of adults.

2) To test the hypothesis that mindfulness mediates the relationship between alexithymia and self-harm.

Method

Design

This cross-sectional study was based on an online questionnaire measuring history of self-harm, alexithymia and dispositional mindfulness.

Participants

Participants were adults over 18 years of age recruited from the general population. Opportunity sampling was used and the study was advertised within Middlesex University, and to the general public, via social media and on posters. It was also advertised on websites designed to attract research participants (e.g. www.Callforparticipant.com) and with a specific focus on self-harm and suicide (e.g. Samaritans and the National Self-Harm Network). Participants were predominantly female (89%) and were aged between 18 and 76 with a mean age of 28.75 years (SD = 12.9; Mdn = 24). In the final sample (N = 325), 151 participants (47%) had a history of engagement in self-harm. Further demographic details are given in Table 1.

Measures

Demographic data. Participants were asked for demographic information including age, gender, ethnicity, level of education and employment status. Participants were also asked questions about their experience of, and views on, mindfulness training. For the most part, these data were the subject of a separate analysis and are not reported here.

Self-harm. Participants were asked " Have you ever deliberately harmed yourself, for example by cutting, biting, scratching, burning or hitting yourself, by self-poisoning or by other methods?". If they said yes to this question they were directed to additional questions about self-harm, based on part one of the Inventory of Statements about Self-injury (ISAS;

Klonsky & Glenn, 2009). Correlations between the ISAS and clinical measures indicate good construct validity (Klonsky & Glenn, 2009). In addition to its psychometric properties, the ISAS was chosen as a measure for this study because it was validated using a non-clinical sample of young adults (Klonsky & Glenn, 2009).

Although this survey focussed on self-harm without specifying motivation, there is strong evidence that people who self-harm are at elevated risk of subsequent completed suicide (Whitlock et al., 2013). In addition, it was felt that some people might have attempted to take their own life, but not view that as 'self-harm'. History of suicidal self-harm was measured by a single, additional question: have you ever attempted suicide? This question was put to all participants, whether or not they had indicated earlier in the survey that they had a history of self-harm.

Mindfulness. The FFMQ (Baer et al., 2006) is a 39 item scale measuring five facets of mindfulness (Non-react, Observe, Act aware, Describe and Non-judge). Respondents are asked to rate statements such as "I perceive my feelings and emotions without having to react to them" on a five point Likert scale ranging from 1 (never or very rarely true) to 5 (very often or always true). The five factors were found to have good internal reliability (Baer et al., 2006) and construct validity (Baer et al., 2008). In the current study the FFMQ and its subscales had good internal consistency, with Cronbach's Alpha coefficients ranging from .83 (Non-react) to .92 (Non-judge; Table 3).

Alexithymia. Alexithymia was measured using the TAS20 (Bagby et al., 1994). The TAS20 was chosen for its psychometric properties and its wide use in the empirical literature. Participants rate statements on a five point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The items measure three different aspects of alexithymia: difficulty identifying feelings (DIF; e.g. "I am often confused about what emotion I am feeling"), difficulty describing feelings (DDF; e.g. "It is difficult for me to find the right words for my

feelings") and externally-orientated thinking (EOT; e.g. "I prefer to just let things happen rather than to understand why they turned out that way."). The TAS-20 was validated using student and clinical samples and has demonstrated good internal consistency (α = .80 to .83 across different samples; Bagby, Parker, et al., 1994), test-retest reliability (r = .77; Bagby, Parker, et al., 1994) and construct validity (Bagby, Taylor, et al., 1994). It has also been validated for online data collection (Bagby et al., 2014). In the current sample the Cronbach's Alphas indicated good internal consistency for the total TAS20 score (α = .89), DIF (.89) and DDF (.84). In common with the original validation study (Bagby, Parker, et al., 1994), the consistency of the EOT subscale was slightly below the recommended threshold, at .65. Because of the low internal consistency of EOT, the use of the total score rather than the individual subscales has been recommended, including by the original scale authors (Luminet et al., 2018). The decision was taken to report results for the total TAS20 and subscales, but to use only the total score in the mediation analysis.

Procedures

The study was given the name of the Mindfulness and Emotion Management (MEM) Study. Participants were alerted to the study on the University's research portal or by email, Twitter, by seeing a poster or via a link on a website. This initial contact made clear that the subject of the research was the relationship between self-harm, mindfulness and emotion management and that participants were sought both with a history of self-harm and also with no history of self-harm, to allow comparisons to be made. Participants were directed to a bespoke website www.memstudy.org where they were presented with briefing information about the survey and the voluntary nature of their participation. They were asked to indicate their consent by ticking a box; only having ticked the box were they able to continue to the survey itself. Participants were given the opportunity to be entered into a prize draw to win a £50 Amazon voucher. Email addresses for this purpose were collated separately from the

rest of the survey data to maintain anonymity. In addition, psychology students at Middlesex University were granted course credits in exchange for participation.

Ethics

The study was granted ethical approval by Middlesex University Ethics Committee (reference PG011). Care was taken to ensure participants were fully briefed about the nature of the study before they agreed to take part. In view of the sensitive nature of the questions concerning self-harm participants were asked at two points during the survey if they needed help now. If they responded 'yes', they were given advice on accessing immediate help. Details of a range of relevant support organisations were included in the debriefing documentation.

Data Analysis

All analysis was conducted using SPSS v.25. Data were initially checked for missing values and computed variables were examined using Chi-squared tests to check there was no significant relationship between missing data and a history of self-harm. To test for univariate outliers, boxplots were examined and z-scores calculated. The data were tested for multivariate outliers using Mahalnobis D^2. Tests for outliers and normality were conducted with the presence or absence of self-harm as the grouping variable.

In order to be consistent with the definition of self-harm as any act of self-injury, irrespective of motivation (NICE, 2013), any participant responding yes to the question about attempted suicide was included as having a history of self-harm. Eight participants who answered 'no' to the question about self-harm indicated that they had attempted suicide. The analysis presented here includes these participants in the group with a history of self-harm. A sensitivity analysis was conducted excluding these participants from the sample and there was no effect on the pattern of results.

Tests of association were conducted using Chi-Square and the difference between groups tested using Students t test or one-way ANOVA. Pearson's r correlation coefficients were derived to test the strength of bilateral relationships between all continuous predictor variables. Following convention, the threshold for statistical significance was set at 0.05. Where multiple tests of significance were carried out on the same data, a Bonferroni correction was used in which the level of significance was divided by the number of tests. Bivariate analyses were conducted 'pairwise', to maximise the use of participant data.

A logistic regression was used to test whether alexithymia and mindfulness predicted self-harm, controlling for age, ethnicity, education, employment status and mindfulness experience. To test whether the individual facets of mindfulness explained the relationship between self-harm and alexithymia, a multiple mediation analysis was carried out using Hayes' (2018) PROCESS macro for SPSS, v 3.4 (model 4). The PROCESS macro uses logistic regression to test a mediation model in which the outcome is dichotomous (self-harm / no self-harm). Confidence intervals were estimated using bootstrapping (Preacher & Hayes, 2004), based on 5000 bootstrap samples. Multi-collinearity between predictor variables was assessed using tolerance and VIF statistics. Tolerance of below 0.1 and VIF greater than 10 were taken as indicators of multi-collinearity (Field, 2013). In the multi-variate analyses, cases were excluded 'listwise' (following Field, 2013) to ensure that the calculation was based on a complete set of data.

Power Analysis. A medium effect size of the relationship between alexithymia and self-harm was expected (Norman et al., 2020). Using G*Power 3 (Faul et al., 2007), it was estimated that a medium effect size of a significant difference between two independent groups could be reliably identified with a sample size of 176 participants. The study is therefore sufficiently powered for the tests of difference to be reliable. Logistic regression requires a larger sample than linear regression to achieve sufficient power. Bujang et al.

(2018) recommend a sample of at least 500 cases, unless a large effect is expected. As previous studies have reported relatively small regression coefficients for TAS20 as a predictor of self-harm (e.g. β = .23, Lee, 2016), it is likely that the mediation analysis in the current study, based on 299 cases, was underpowered, increasing the risk of a Type II error.

Results

Data Preparation

386 people agreed to take part in the survey. One respondent did not meet the minimum age requirement of 18 years of age. A further 60 responses were excluded due to missing data (93% of these had not completed the outcome variable [history of self-harm] and the remaining four responses had not completed the majority of the predictor variable scales). The excluded respondents did not differ from included study participants in age, gender, ethnicity or employment status. There was a significant association between missing data and level of education ($\chi^2(5) = 20.58$, exact $p = .002$) with excluded respondents more likely to have no formal qualifications but also more likely to have a first degree as their highest qualification than the included participants. Missing values in the remaining dataset were found to be minimal and to be evenly distributed across participants with a history of self-harm and those with no such history. Two univariate outliers were identified (Z-scores above 3.29). An examination of these two cases revealed no clear reason to exclude them so they were retained in the data presented here. A sensitivity analysis excluding these two cases made no difference to the results. The final sample comprised 325 participants.

History of Self-Harm

In total, 151 (47%) participants reported having self-harmed at some point in the past. Of these, 58% had self-harmed within the past year. The mean age of first self-harm was 13.87 ($SD = 4.74$). A total of 57 participants (17.5%) said that they had attempted suicide.

Cutting was the most frequently endorsed method of self-harm (by 80% of participants with a history of self-harm), although, as Figure 1 shows, many participants reported using several methods.

Figure 1

Method of Self-Harm

Demographic Differences Among Participants According to History of Self-Harm

Details of participants' age, gender, ethnicity, employment status and educational achievement, according to their history of self-harm, are set out in Table 1. There was a significant difference in the mean age of those with a history of self-harm and those without a history of self-harm. Additional analysis showed that there was no significant difference in age between those who had self-harmed within the past year (M = 25.87, SD = 9.66 n = 82) and those who had self-harmed over a year ago (M = 28.25, SD = 9.71, n = 60; $t(140)$ = -1.45, p = 0.15 BCa 95% CI -5.44 to 0.94). There was a significant association between each of ethnicity, employment status and educational achievement and self-harm. There was no significant association between gender and self-harm.

Differences in Test Variables According to History of Self-Harm

Descriptive statistics and tests of the difference in FFMQ and TAS20 between those participants with and without a history of self-harm are set out in Table 2. There was a significant difference between the groups in all variables except the TAS20 subscale EOT. Scores for total TAS20 and the subscales DIF and DDF were significantly higher among those with a history of self-harm compared with those with no such history ($p < .001$). Total FFMQ and subscales were significantly lower among participants with a history of self-harm, except for the subscale Observe, which was significantly higher in this group. Effect sizes for those variables that were significantly different ranged from small (r = .18 for FFMQ

Observe) to medium (r = .34 for FFMQ Non Judge). The results therefore support the first hypothesis, that participants with a history of self-harm would score significantly higher on alexithymia and significantly lower on mindfulness.

Table 1

Participant Demographics, With and Without a History of Self-Harm

Effect of Mindfulness Training on Test Variables

There was no significant relationship between experience of mindfulness training and TAS20, FFMQ or their subscales. There was a significant relationship between experience of mindfulness training and self-harm ($\chi^2(1) = 5.78$, $p = .016$). Of those participants with a history of self-harm, 58% had some experience of mindfulness training, compared with 44% among participants with no history of self-harm.

Tests of Correlation

Pearson's bilateral tests of correlation between all continuous variables were calculated separately for those with and without a history of self-harm and are set out in Table 3. Alexithymia (TAS20) was significantly and negatively correlated with mindfulness (FFMQ) in participants with past self-harm ($r = -.743$) and those with no past self-harm ($r = -.680$). The TAS20 subscale DDF and the FFMQ subscale Describe were highly correlated, particularly in participants with a history of self-harm ($r = -.850$).

Table 2

Test Variables Descriptive Results, Including the Difference Between Participants With and Without a History of Self-Harm

Table 3

Correlations (Pearson's r) for Study Variables

Regression and Mediation Analysis

A logistic regression was conducted with total TAS20 and total FFMQ as the predictor variables together with those demographic variables which were significantly associated with self-harm, namely age, education, ethnicity, employment status and experience of mindfulness training. The presence or absence of self-harm was the dichotomous outcome variable. The final model was statistically significant (omnibus $\chi^2(16) = 82.96$, $p < .001$) and predicted 70.2% of cases accurately, compared to the constant only model (53.2%). Nagelkerke's pseudo R^2, which calculates the proportion of unexplained variance that is reduced by adding variables to the constant only model, was 0.32, indicating a medium relationship of 32% between TAS20, FFMQ, demographic factors and self-harm history. TAS20 was a significant predictor of self-harm history ($b = 0.04$, S.E = 0.02, $p = .008$). However, FFMQ was not a significant predictor of self-harm, with TAS20 in the model, ($b = -.01$, S.E = 0.01, $p = .250$). The full results are set out in Table 4.

Because the t-tests had shown a varying pattern of results across the different facets of mindfulness (Table 3), a multiple parallel mediation analysis was carried out to establish whether the five facets of mindfulness separately mediated between alexithymia (TAS20) and self-harm, controlling for age, education, ethnicity, employment status and mindfulness training (Figure 2). With the mediators in the model, the direct effect of alexithymia on self-harm was not significant, indicating that the five facets of mindfulness mediated the relationship between alexithymia and self-harm ($b = 0.03$, 95% CI -0.003 to 0.07, $p = .069$, $n = 299$). The indirect effect of alexithymia on self-harm via Non-judge ($b = 0.02$, 95% CI 0.01 to 0.05) and Non-react ($b = 0.01$, 95% CI 0.002 to 0.03) was positive and significant. There was also a significant, negative indirect path from alexithymia to self-harm via Observe ($b = -0.01$, 95% CI -0.02 to -0.001). Observe, therefore, suppressed the effect of the relationship between alexithymia and self-harm. The indirect effects via Describe and Act

Aware were not significant. Tolerance and VIF statistics for multi-collinearity were within the required thresholds.

Table 4

Logistic Regression Predicting Self-Harm History

Figure 2

Model of Alexithymia (TAS20) as a Predictor of Self-Harm, Mediated by the Five Facets of Mindfulness Controlling for Age (BCa bootstrapped CI based on 5000 samples; N = 299)

Discussion

This study set out to examine the relationships between mindfulness, alexithymia and self-harm. The results supported the first hypothesis, that alexithymia would be significantly higher, and mindfulness significantly lower, among those with a history of self-harm The association between alexithymia and self-harm in the current study was driven by the subscales Difficulty Identifying Feelings (DIF) and Difficulty Describing Feelings (DDF) and no difference was found in the subscale Externally Orientated Thinking (EOT), in line with previous review findings (Greene et al., 2020; Norman et al., 2020). The second hypothesis was that mindfulness would mediate the relationship between alexithymia and self-harm. While the total mindfulness score was not a significant mediator, a multiple mediation analysis found that facets Non-react, Non-judge and Observe significantly mediated between alexithymia and self-harm. Non-react and Non-judge were, as expected, positive mediators, while Observe appeared to suppress the relationship between alexithymia and self-harm.

A significant association was observed between mindfulness and self-harm, in line with other studies (Caltabiano & Martin, 2017; Heath et al., 2016). The facets Describe, Act Aware, Non-judge and Non-react were all significantly correlated with alexithymia (consistent with Baer et al., 2006) and also significantly lower among those with a history of self-harm. In contrast, the FFMQ Observe subscale was significantly *higher* among those with a history of self-harm. The Observe facet was also higher among participants with a history of self-harm in Caltabiano and Martin (2017), although in their study the difference was not significant. The finding is in line with previous analyses of the FFMQ, in which the Observe facet has been shown to be related to the other facets of mindfulness only among experienced meditators (Baer et al., 2006, 2008). Furthermore, among people with no meditation experience, the Observe facet has been found to correlate positively with measures of psychological distress (Baer et al., 2006). Emerson et al. (2018) found that the

Observe facet of mindfulness significantly predicted obsessive, intrusive thoughts, in contrast to the facets Act aware, Non-judge and Non-react which were protective against such thoughts. Taken together this evidence suggests that the tendency to be very attentive to internal and external experience, when not accompanied by other mindfulness skills such as acceptance, may increase the emotional stress that can lead to self-harm. Interestingly, half the participants in the current study said they had some experience of mindfulness training, and the proportion was greater among those with a history of self-harm. This may indicate that participants sought out mindfulness training in response to self-harm or emotional distress, however, this cannot be confirmed due to the cross-sectional nature of the study. The assumption that mindfulness training should result in an increase in dispositional mindfulness has been validated by a meta-analysis of randomised controlled trials of mindfulness training (Quaglia et al., 2016). In the current study, however, there were no significant differences in the FFMQ subscales between those with experience of mindfulness training and those with no experience. This suggests that their experience of mindfulness training had not been sufficient to make them 'experienced meditators', which might have protected against self-harm.

In addition to extending knowledge about the way in which alexithymia and mindfulness relate separately to self-harm, this study also set out to explore the mediating role of mindfulness. The five facets were analysed separately within the model, because the logistic regression had shown that the total FFMQ score was not a significant predictor of self-harm over and above TAS20. Three of the five facets of mindfulness (Observe, Non-judge and Non-react) were significant mediators in the relationship between alexithymia and self-harm, albeit in different directions. Non-judge and Non-react were positive mediators, indicating that deficits in these mindfulness traits help to explain the relationship between alexithymia and self-harm. The findings are in line with expectations, based on previous

evidence identifying mindfulness as a protective factor against self-harm (Garisch & Wilson, 2015) and negative associations between FFMQ Non-judge and Non-react and alexithymia (TAS20, Baer et al., 2006). The results suggest that people with high alexithymia find it hard to tolerate emotional experience that they struggle to understand. This is consistent with empirical evidence linking alexithymia with the avoidance of unwanted feelings (Panayiotou et al., 2015). It suggests that the Experiential Avoidance Model (EAM) of self-harm, in which "*the primary function of [deliberate self-harm is] the avoidance of, or escape from, unwanted or aversive states of emotional arousal*" (Chapman et al., 2006, p. 386), may be of particular relevance in the context of alexithymia. One mechanism through which mindfulness might protect against self-harm is the decoupling of associations made between internal experiences and reactive behaviour (Levin et al., 2015). Since self-report and laboratory studies indicate that overwhelming negative emotion tends to precede self-harm (Klonsky, 2007), increasing the person's ability to 'decouple' the emotion from their normative reaction to it may lead to a reduction in self-harm.

As well as the tendency to react to emotional experience, the results indicate that the mindfulness facet Non-judge was also a significant mediator of the relationship between alexithymia and self-harm. It may be that people with high alexithymia are more prone to self-criticism (Speranza et al., 2004) or perfectionism (Lundh et al., 2002), tendencies that have also been associated with self-harm (Zelkowitz & Cole, 2019). Alternatively, it may be that high scores on FFMQ Non-judge items such as "*I tell myself I shouldn't be feeling the way I'm feeling*" reflect the lack of emotional clarity inherent in alexithymia, which may make it harder to interpret feelings and attribute them to a logical cause.

In contrast to the mediating role of FFMQ facets Non-react and Non-judge, Observe 'suppressed' the relationship between alexithymia and self-harm: that is, with Observe in the model, the relationship became less significant. This perhaps surprising finding arose

because TAS20 (particularly DDF and EOT) was negatively correlated with Observe among people with a history of self-harm, but Observe was significantly higher among this group than among participants who had never self-harmed. The external-orientation of alexithymia may be related to a tendency to pay less attention to thoughts, feelings and sensations (Observe), which in turn *reduces* the likelihood of self-harm. It should be noted that the multivariate analysis was underpowered, beta coefficients in the mediation analysis were small and the confidence intervals close to zero. In addition, the high correlations between some of the facets of mindfulness and alexithymia may have obscured the underlying relationships to some extent. However, the implications are important and worthy of replication. They suggest that any intervention to reduce alexithymia should avoid merely focussing on the ability to observe one's inner experiences. Without the ability to understand and describe that experience, and without the detachment provided by other mindfulness skills, such an intervention could be potentially harmful and increase the risk of self-harm.

Clinical implications

This study found that dispositional mindfulness mediates the relationship between alexithymia and self-harm. Meta-analytic evidence has confirmed that dispositional mindfulness can increase as a result of mindfulness training (Quaglia et al., 2016). Mindfulness training might, therefore, be a useful intervention to treat, or to prevent, self-harm among people who struggle to identify and describe their feelings. A meta-analysis of mindfulness-based interventions found a significant effect of training on alexithymia (Norman et al., 2019), but no study has yet tested whether a significant decrease in alexithymia as a result of mindfulness training leads to a concurrent reduction in self-harm. In addition to its inclusion in specific therapeutic interventions for self-harm (such as Dialectical Behavioural Therapy; Linehan, 1993), mindfulness is becoming increasingly popular in non-clinical populations, through taught classes or self-help apps. This is of

particular interest, first because alexithymia per se is unlikely to be the explicit reason someone might be seeking treatment but is rather a comorbid, and potentially causal, feature of other presenting behaviours or psychological features (Taylor et al., 1997) and, second, it is known that a large proportion of people who self-harm do not seek help (Hawton et al., 2012). Universal, community-based mindfulness training, such as that tested in a randomised controlled trial of students (Galante et al., 2018), might be an effective way of accessing at-risk populations, and increasing resilience against self-harm, particularly among those who struggle to understand their feelings.

Limitations

This study has a number of limitations. First, it is a cross-sectional study which precludes any assessment of causal influences. Second, although responses distinguished those participants who had last self-harmed over a year ago from those who had self-harmed within the past year, it was not possible to be more specific as to how long in the past their self-harm had been. This made it impossible to know whether their self-harm had been limited to their teenage years, when the rates of self-harm are known to be higher, or had persisted into adulthood. In addition, a long lapse of time between the last incident of self-harm and the survey could increase the risk of bias already inherent in retrospective, self-report accounts of self-harm function (for a review of the limitations of retrospective accounts of non-suicidal self-harm see Hamza & Willoughby, 2015).

Third, the opportunity sampling technique carries the risk of bias which limits extrapolation to the general population. The prevalence of self-harm in the current sample, at 47%, was considerably higher than would be expected in a population-based community sample, where rates have been reported as 17.2% in adolescent samples, 13.4% among young adults and 5.5% among older adults (Swannell et al., 2014). Participants may have chosen to participate in the study because of their experience of self-harm, or because of particular

personal feelings about mindfulness, which may bias the results. In addition, a relatively high proportion of potential participants (16%) were excluded because of missing data. It is possible that people with high alexithymia might find self-report questions about emotional experience difficult, and therefore be more likely to abandon the survey at an early stage.

Fourth, the sample was heavily skewed towards women. Women are more likely to engage in self-harm than men (Bresin & Schoenleber, 2015) which may explain their greater interest in taking part in a survey of this nature. The low number of men in the sample precluded conclusive analysis by gender. Other demographic factors, which were found to be significantly associated with self-harm, were controlled for in the multivariate analyses. Future research might usefully test the current finding of the mediating role of mindfulness in the relationship between alexithymia and self-harm in specific populations, for example relating to ethnicity or level of education. Finally, it is also possible that other variables, such as depression (Lambert & de Man, 2007), might affect or explain the relationships between alexithymia, mindfulness and self-harm.

Conclusion

This study confirmed the significant relationships between self-harm and each of alexithymia and dispositional mindfulness. The Observe facet was higher among participants with a history of self-harm, consistent with previous research, and suppressed the relationship between alexithymia and self-harm. In contrast the facets Non-judge and Non-react were positive mediators between alexithymia and self-harm. Overall, the results indicate that mindfulness facets are protective against the risk of self-harm among people who struggle to identify and describe their feelings. However, merely learning to observe inner experience, without the capacity to understand and accept that experience, may have adverse consequences.

Ethics Approval

This study was granted ethical approval by Middlesex University Ethics Committee (reference PG011). Informed consent was obtained from all individual participants included in the study. Participants also gave their informed consent for their data to be submitted for publication in aggregated and anonymised form.

References

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, *13*(1), 27–45. https://doi.org/10.1177/1073191105283504

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., Duggan, D., & Williams, J. M. G. (2008). Construct validity of the five facet minBaer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., … Williams, J. M. G. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. Ass. *Assessment*, *15*(3), 329–342. https://doi.org/10.1177/1073191107313003

Bagby, R. M., Ayearst, L. E., Morariu, R. A., Watters, C., & Taylor, G. J. (2014). The Internet administration version of the 20-item Toronto Alexithymia Scale. *Psychological Assessment*, *26*(1), 16–22. https://doi.org/10.1037/a0034316

Bagby, R. M., Parker, J. D. A., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia scale-I. Item selection and cross-validation of the factor structure. *Journal of Psychosomatic Research*, *38*(1), 23–32. https://doi.org/10.1016/0022-3999(94)90005-1

Bagby, R. M., Taylor, G. J., & Parker, J. D. A. (1994). The twenty-item Toronto Alexithymia scale—II. Convergent, discriminant, and concurrent validity. *Journal of Psychosomatic Research*, *38*(1), 33–40. https://doi.org/10.1016/0022-3999(94)90006-X

Bresin, K., & Schoenleber, M. (2015). Gender differences in the prevalence of nonsuicidal self-injury: A meta-analysis. *Clinical Psychology Review*, *38*, 55–64. https://doi.org/10.1016/j.cpr.2015.02.009

Brown, K. W., & Ryan, R. M. (2003). The Benefits of Being Present: Mindfulness and Its Role in Psychological Well-Being. *Journal of Personality and Social Psychology*, *84*(4), 822–848. https://doi.org/10.1037/0022-3514.84.4.822

Bujang, M. A., Sa'At, N., Tg Abu Bakar Sidik, T. M. I., & Lim, C. J. (2018). Sample size guidelines for logistic regression from observational studies with large population: Emphasis on the accuracy between statistics and parameters based on real life clinical data. *Malaysian Journal of Medical Sciences*, *25*(4), 122–130. https://doi.org/10.21315/mjms2018.25.4.12

Caltabiano, G., & Martin, G. (2017). Mindless Suffering: the Relationship Between Mindfulness and Non-Suicidal Self-Injury. *Mindfulness*. https://doi.org/10.1007/s12671-016-0657-y

Cameron, K., Ogrodniczuk, J., & Hadjipavlou, G. (2014). Changes in alexithymia following psychological intervention: A review. *Harvard Review of Psychiatry*, *22*(3), 162–178. https://doi.org/10.1097/HRP.0000000000000036

Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour Research and Therapy*, *44*(3), 371–394. https://doi.org/10.1016/j.brat.2005.03.005

Coffey, K. A., & Hartman, M. (2008). Mechanisms of Action in the Inverse Relationship Between Mindfulness and Psychological Distress. *Complementary Health Practice Review*, *13*(2), 79–91. https://doi.org/10.1177/1533210108316307

Emerson, L. M., Heapy, C., & Garcia-Soriano, G. (2018). Which Facets of Mindfulness Protect Individuals from the Negative Experiences of Obsessive Intrusive Thoughts? *Mindfulness*, *9*(4), 1170–1180. https://doi.org/10.1007/s12671-017-0854-3

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191. https://doi.org/10.3758/BF03193146

Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: The development and initial validation of the Cognitive and

Affective Mindfulness Scale-Revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment*. https://doi.org/10.1007/s10862-006-9035-8

Field, A. (2013). Discovering statistics using IBM SPSS statistics. In *Statistics*.

Galante, J., Dufour, G., Vainre, M., Wagner, A. P., Stochl, J., Benton, A., Lathia, N., Howarth, E., & Jones, P. B. (2018). A mindfulness-based intervention to increase resilience to stress in university students (the Mindful Student Study): a pragmatic randomised controlled trial. *The Lancet Public Health*, *3*(2), e72–e81. https://doi.org/10.1016/S2468-2667(17)30231-1

Garisch, J. A., & Wilson, M. S. (2015). Prevalence, correlates, and prospective predictors of non-suicidal self-injury among New Zealand adolescents: Cross-sectional and longitudinal survey data. *Child and Adolescent Psychiatry and Mental Health*, *9*. http://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=psyh&AN=2015-30978-001&site=ehost-live&authtype=sso&custid=s5409946

Geulayov, G., Casey, D., McDonald, K. C., Foster, P., Pritchard, K., Wells, C., Clements, C., Kapur, N., Ness, J., Waters, K., & Hawton, K. (2018). Incidence of suicide, hospital-presenting non-fatal self-harm, and community-occurring non-fatal self-harm in adolescents in England (the iceberg model of self-harm): a retrospective study. *The Lancet. Psychiatry*, *5*(2), 167–174. https://doi.org/10.1016/S2215-0366(17)30478-9

Greco, L. a., Baer, R. A., &, & Smith, G. T. (2011). Child and Adolescent Mindfulness Measure (CAMM). *Psychological Assessment*.

Greene, D., Boyes, M., & Hasking, P. (2020). The associations between alexithymia and both non-suicidal self-injury and risky drinking: A systematic review and meta-analysis. In *Journal of Affective Disorders* (Vol. 260, pp. 140–166). https://doi.org/10.1016/j.jad.2019.08.088

Hamza, C. A., & Willoughby, T. (2015). Nonsuicidal Self-Injury and Affect Regulation:

Recent Findings From Experimental and Ecological Momentary Assessment Studies and Future Directions. *Journal of Clinical Psychology*, *71*(6). https://doi.org/10.1002/jclp.22174

Hawton, K., Saunders, K. E. A., & O'Connor, R. C. (2012). Self-harm and suicide in adolescents. *Lancet (London, England)*, *379*(9834), 2373–2382. https://doi.org/10.1016/S0140-6736(12)60322-5

Hawton, K., Witt, K. G., Taylor Salisbury, T. L., Arensman, E., Gunnell, D., Hazell, P., Townsend, E., & van Heeringen, K. (2016). Psychosocial interventions for self-harm in adults. *Cochrane Database of Systematic Reviews*. https://doi.org/10.1002/14651858.CD012189

Hayes, A. F. (2018). Introduction to Mediation, Moderation, and Conditional Process Analysis, Second Edition: A Regression-Based Approach. In *The Guilford Press*.

Heath, N. L., Joly, M., & Carsley, D. (2016). Coping Self-Efficacy and Mindfulness in Non-Suicidal Self-Injury. *Mindfulness*. https://doi.org/10.1007/s12671-016-0555-3

Honkalampi, K., Hintikka, J., Tanskanen, A., Lehtonen, J., & Viinamäki, H. (2000). Depression is strongly associated with alexithymia in the general population. *Journal of Psychosomatic Research*, *48*(1), 99–104. https://doi.org/10.1016/S0022-3999(99)00083-5

Hungr, C., Ogrodniczuk, J., & Sochting, I. (2016). Alexithymia and Locus of Control among Psychiatric Outpatients. *International Journal of Mental Health and Addiction*, *14*(6), 1047–1051. https://doi.org/10.1007/s11469-016-9687-x

Kabat-Zinn, J. (1994). Wherever you go ,There you are:Mindfulness meditation in Every-day Life.Hyperion. *Hyperion*. https://doi.org/10.1016/j.bbamcr.2005.12.011

Klonsky, E. D. (2007). The functions of deliberate self-injury: a review of the evidence. *Clinical Psychology Review*, *27*(2), 226–239. https://doi.org/10.1016/j.cpr.2006.08.002

Klonsky, E. D., & Glenn, C. R. (2009). Assessing the Functions of Non-suicidal Self-injury: Psychometric Properties of the Inventory of Statements about Self-injury (ISAS). *Journal of Psychopathology and Behavioral Assessment*, *31*(3), 215–219. https://doi.org/10.1007/s10862-008-9107-z

Lambert, A., & de Man, A. F. (2007). Alexithymia, depression, and self-mutilation in adolescent girls. *North American Journal of Psychology*, *9*(3), 555–566. http://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=psyh&AN=2007-19659-012&site=ehost-live&authtype=sso&custid=s5409946

Lee, W. K. (2016). Psychological characteristics of self-harming behavior in Korean adolescents. *Asian Journal of Psychiatry*, *23*, 119–124. https://doi.org/10.1016/j.ajp.2016.07.013

Levin, M. E., Luoma, J. B., & Haeger, J. A. (2015). Decoupling as a Mechanism of Change in Mindfulness and Acceptance: A Literature Review. *Behavior Modification*, *39*(6), 870–911. https://doi.org/10.1177/0145445515603707

Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder* . Guilford Press.

Luminet, O., Bagby, R. M., & Taylor, G. J. (2018). *Alexithymia: Advances in Research, Theory, and Clinical Practice*. Cambridge University Press.

Lundh, L. G., Johnsson, A., Sundqvist, K., & Olsson, H. (2002). Alexithymia, Memory of Emotion, Emotional Awareness, and Perfectionism. *Emotion*, *2*(4), 361–379. https://doi.org/10.1037/1528-3542.2.4.361

Lundh, L. G., Karim, J., & Quilisch, E. (2007). Deliberate self-harm in 15-year-old adolescents: A pilot study with a modified version of the Deliberate Self-Harm Inventory. *Scandinavian Journal of Psychology*. https://doi.org/10.1111/j.1467-9450.2007.00567.x

NICE. (2013). *Quality Standard 34: Self-Harm*. NICE Retrieved from https://www.nice.org.uk/guidance/qs34/resources/selfharm-pdf-2098606243525.

Norman, H., Marzano, L., Coulson, M., & Oskis, A. (2019). Effects of mindfulness-based interventions on alexithymia: A systematic review. In *Evidence-Based Mental Health* (Vol. 22, Issue 1, pp. 36–53). Royal College of Psychiatrists. https://doi.org/10.1136/ebmental-2018-300029

Norman, H., Oskis, A., Marzano, L., & Coulson, M. (2020). The relationship between self-harm and alexithymia: A systematic review and meta-analysis. *Scandinavian Journal of Psychology*, sjop.12668. https://doi.org/10.1111/sjop.12668

Panayiotou, G., Leonidou, C., Constantinou, E., Hart, J., Rinehart, K. L., Sy, J. T., & Björgvinsson, T. (2015). Do alexithymic individuals avoid their feelings? Experiential avoidance mediates the association between alexithymia, psychosomatic, and depressive symptoms in a community and a clinical sample. *Comprehensive Psychiatry*, *56*, 206–216. https://doi.org/10.1016/j.comppsych.2014.09.006

Parker, J. D. A., Keefer, K. V, Taylor, G. J., & Bagby, R. M. (2008). Latent structure of the alexithymia construct: a taxometric investigation. *Psychological Assessment*, *20*(4), 385–396. https://doi.org/10.1037/a0014262

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers*, *36*(4), 717–731. https://doi.org/10.3758/BF03206553

Quaglia, J. T., Braun, S. E., Freeman, S. P., McDaniel, M. A., & Brown, K. W. (2016). Meta-Analytic Evidence for Effects of Mindfulness Training on Dimensions of Self-Reported Dispositional Mindfulness. *Psychological Assessment*. https://doi.org/10.1037/pas0000268

Speranza, M., Corcos, M., Stéphan, P., Loas, G., Pérez-Diaz, F., Lang, F., Luc Venisse, J.,

Bizouard, P., Flament, M., Halfon, O., & Jeammet, P. (2004). Substance Use & Misuse Alexithymia, Depressive Experiences, and Dependency in Addictive Disorders. *Substance Use & Misuse*, *39*(4), 551–579. https://doi.org/10.1081/JA-120030058

Stasiewicz, P. R., Bradizza, C. M., Gudleski, G. D., Coffey, S. F., Schlauch, R. C., Bailey, S. T., Bole, C. W., & Gulliver, S. B. (2012). The relationship of alexithymia to emotional dysregulation within an alcohol dependent treatment sample. *Addictive Behaviors*, *37*(4), 469–476. https://doi.org/10.1016/j.addbeh.2011.12.011

Swannell, S., Martin, G. E., Page, A., Hasking, P., & St John, N. J. (2014). Prevalence of nonsuicidal self-injury in nonclinical samples: Systematic review, meta-analysis and meta-regression. In *Suicide and Life-Threatening Behavior* (Vol. 44, Issue 3, pp. 273–303). https://doi.org/10.1111/sltb.12070

Swart, M., Kortekaas, R., & Aleman, A. (2009). Dealing with feelings: Characterization of trait Alexithymia on emotion regulation strategies and cognitive-emotional processing. *PLoS ONE*, *4*(6). https://doi.org/10.1371/journal.pone.0005751

Taylor, G. J., Bagby, R. M., & Parker, J. D. A. (1997). *Disorders of affect regulation : alexithymia in medical and psychiatric illness*. Cambridge University Press.

Tsiachristas, A., Geulayov, G., Casey, D., Ness, J., Waters, K., Clements, C., Kapur, N., McDaid, D., Brand, F., & Hawton, K. (2020). Incidence and general hospital costs of self-harm across England: Estimates based on the multicentre study of self-harm. *Epidemiology and Psychiatric Sciences*. https://doi.org/10.1017/S2045796020000189

Turner, B. J., Austin, S. B., & Chapman, A. L. (2014). Treating nonsuicidal self-injury: a systematic review of psychological and pharmacological interventions. *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie*, *59*(11), 576–585. http://www.ncbi.nlm.nih.gov/pubmed/25565473

Venta, A., Hart, J., & Sharp, C. (2013). The relation between experiential avoidance,

alexithymia and emotion regulation in inpatient adolescents. *Clinical Child Psychology and Psychiatry*, *18*(3), 398–410. https://doi.org/10.1177/1359104512455815

Whitlock, J., Muehlenkamp, J., Eckenrode, J., Purington, A., Abrams, G. B., Barreira, P., & Kress, V. (2013). Nonsuicidal Self-Injury as a Gateway to Suicide in Young Adults) 486e492. *Journal of Adolescent Health*, *52*, 486–492. https://doi.org/10.1016/j.jadohealth.2012.09.010

Yusainy, C., & Lawrence, C. (2014). Relating mindfulness and self-control to harm to the self and to others. *Personality and Individual Differences*. https://doi.org/10.1016/j.paid.2014.02.015

Zelkowitz, R. L., & Cole, D. A. (2019). Self-Criticism as a Transdiagnostic Process in Nonsuicidal Self-Injury and Disordered Eating: Systematic Review and Meta-Analysis. *Suicide and Life-Threatening Behavior*, *49*(1), 310–327. https://doi.org/10.1111/sltb.12436

Figure 1

Method of Self-Harm

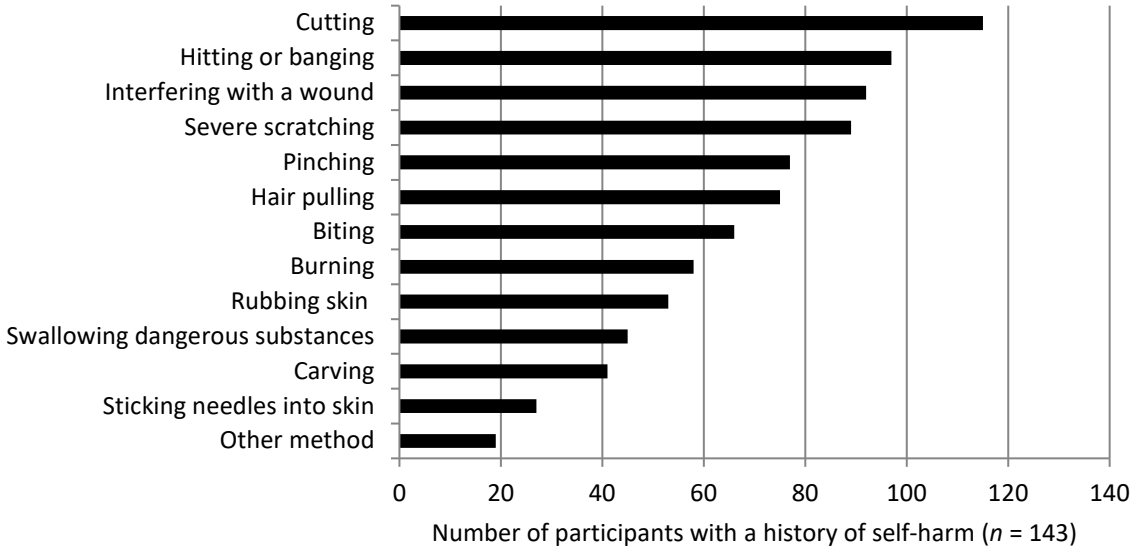

Table 1

Participant Demographics, With and Without a History of Self-Harm

Variable		Self-harm		No self-harm		Total		Association between test variable and self-harm
		n	%	*n*	%	*n*	%	
Gender	Female	134	88.7	155	89.1	289	88.9	$\chi^2(1, N = 321) = 0.38$, $p = .536$[a]
	Male	13	8.6	19	10.9	32	9.8	
	Other	4	2.6	0	0	4	1.2	
Ethnicity	White	100	66.2	96	55.2	196	60.3	$\chi^2(4, N = 325) = 10.23$, $p = .035$
	Black or black British	15	9.9	20	11.5	35	10.8	
	Asian or Asian British	14	9.3	37	21.3	51	15.7	
	Mixed ethnicity	11	7.3	8	4.6	19	5.8	
	Other/unknown/prefer not to say	11	7.3	13	7.5	24	7.4	
Employment status[b]	Student	68	45.0	79	45.4	147	45.2	$\chi^2(5, N = 325) = 19.91$, $p = .001$
	Employed	56	37.1	61	35.1	117	36.0	
	Unemployed	18	11.9	4	2.3	22	6.8	
	Self-employed	4	2.6	13	7.5	17	5.2	
	Retired	2	1.3	9	5.2	11	3.4	
	Home/caring responsibilities	3	2.0	8	4.6	11	3.4	
Level of education	No formal qualifications	14	9.3	2	1.1	16	4.9	$\chi^2(5, N = 325) = 22.54$, $p < .001$
	GCSEs	13	8.6	5	2.9	18	5.5	
	A levels	67	44.4	90	51.7	157	48.3	
	First degree	28	18.5	23	13.2	51	15.7	
	MSc/prof. qualification	25	16.6	45	25.9	70	21.5	
	PhD	4	2.6	9	5.2	13	4.0	
		M	*SD*	*M*	*SD*	*M*	*SD*	
Age		27.28	10.21	30.02	14.04	28.75	12.46	$t(311.88) = 2.02$, $p = .044$

[a]Chi square test calculated on the difference between men and women participants only, because of the small number of participants who identified as 'other' in this category.
[b]Data from five participants who said they were in the 'other' category were recoded based on the answers provided. Two participants who said they were students and in employment, and one participant who was a volunteer, were reclassified as employed. Two participants on disability benefits were reclassified as unemployed.

Table 2

Test Variables Descriptive Results, Including the Difference Between Participants With and Without a History of Self-Harm

Variable[a] (range)		Self-harm			No self-harm			Test of difference		Mean Difference BCa 95% CI		Effect size
	Cronbach's α	*M*	*SD*	N	*M*	*SD*	N	*t*	*p*[b]	Lower	Upper	*r*
Total FFMQ (39-195)	0.913	113.45	21.81	145	124.86	18.26	162	4.94	<.001	6.60	16.23	0.28
Observe (8-40)	0.835	23.01	6.31	149	20.71	6.10	168	-3.30	.001	-3.62	-0.95	0.18
Describe (8-40)	0.906	23.71	7.58	150	27.13	5.91	171	4.46	<.001	1.78	5.02	0.26
Act Aware (8-40)	0.890	26.98	6.38	148	29.37	5.91	170	3.47	.001	1.05	3.78	0.19
Non judge (8-40)	0.921	24.48	8.01	149	30.09	6.35	169	6.87	<.001	4.08	7.36	0.38
Non react (7-35)	0.830	15.24	4.71	149	17.22	4.84	171	3.68	<.001	0.92	3.11	0.20
Total TAS20 (20-100)	0.889	53.87	14.69	147	45.25	11.94	170	-5.68	<.001	-11.61	-5.63	0.33
DIF (7-35)	0.886	20.28	7.24	150	15.34	6.02	173	-6.61	<.001	-6.39	-3.49	0.36
DDF (5-25)	0.843	15.63	5.37	173	12.16	4.23	173	-6.39	<.001	-4.57	-2.31	0.36
EOT (8-40)	0.650	17.87	5.01	149	17.89	4.47	172	0.03	.975	-1.05	1.02	0.00

[a]FFMQ = Five Facet Mindfulness Questionnaire; TAS20 = Toronto Alexithymia Scale; DIF = Difficulty Identifying Feelings; DDF = Difficulty Describing Feelings; EOT = Externally Orientated Thinking.
[b]The *p* values were judged against an adjusted critical value of (0.05/11=) 0.005 to account for multiple tests.

Table 3

Correlations (Pearson's r) for Study Variables

Variable[a]	Age	TAS20 total	DIF	DDF	EOT	FFMQ total	Observe	Describe	Act aware	Non judge	Non react
Age	1	-.198*	-0.160	-.194*	-0.111	0.074	-0.088	0.154	0.097	0.156	-.223**
TAS20 total	-.320**	1	.864**	.899**	.706**	-.743**	-.322**	-.809**	-.363**	-.530**	-.296**
DIF	-.164*	.876**	1	.697**	.327**	-.667**	-0.161	-.630**	-.405**	-.559**	-.320**
DDF	-.310**	.815**	.622**	1	.544**	-.725**	-.341**	-.850**	-.259**	-.505**	-.315**
EOT	-.357**	.715**	.398**	.396**	1	-.426**	-.342**	-.532**	-.176*	-.203*	-0.063
FFMQ total	.268**	-.680**	-.625**	-.620**	-.378**	1	.551**	.735**	.628**	.738**	.628**
Observe	0.055	-0.089	-0.004	-0.043	-.196*	.433**	1	.335**	0.091	0.074	.370**
Describe	.364**	-.708**	-.555**	-.775**	-.398**	.709**	0.150	1	.307**	.349**	.327**
Act Aware	0.150	-.496**	-.509**	-.404**	-.271**	.692**	-0.045	.348**	1	.430**	0.145
Non Judge	.165*	-.496**	-.566**	-.432**	-.168*	.642**	-0.138	.302**	.626**	1	.407**
Non React	0.118	-.323**	-.294**	-.271**	-.166*	.628**	.409**	.414**	.157*	0.102	1

Note. Coefficients above the diagonal are for participants with a history of self-harm. Coefficients below the diagonal are for participants with no history of self-harm.

[a]FFMQ = Five Facet Mindfulness Questionnaire; TAS20 = Toronto Alexithymia Scale; DIF = Difficulty Identifying Feelings; DDF = Difficulty Describing Feelings; EOT = Externally Orientated Thinking.

*Correlation is significant at the 0.05 level (2-tailed) **Correlation is significant at the 0.01 level (2-tailed)

Table 4

Logistic Regression Predicting Self-Harm History

						95% C.I.for EXP (B)	
Predictor Variables	**B**	**S.E.**	**df**	***p***	**Exp (B)**	**Lower**	**Upper**
Age	-.019	.018	1	.279	.981	.947	1.016
Ethnicity (reference white)			4	.029			
Black or black British	-.761	.483	1	.115	.467	.181	1.204
Asian or Asian British	**-1.368**	**.439**	**1**	**.002**	**.255**	**.108**	**.602**
Mixed ethnicity	-.043	.614	1	.944	.958	.287	3.193
Other	-.801	.568	1	.158	.449	.147	1.367
Education (reference no qualifications)			4	.004			
GCSE	-1.115	1.038	1	.283	.328	.043	2.509
A levels	**-2.454**	**.868**	**1**	**.005**	**.086**	**.016**	**.471**
First degree	-1.771	.934	1	.058	.170	.027	1.062
Higher degree	**-2.644**	**.913**	**1**	**.004**	**.071**	**.012**	**.425**
Employment (reference student)			4	.267			
Employed	-.193	.355	1	.587	.825	.411	1.653
Self-employed	-.814	.721	1	.258	.443	.108	1.818
Unemployed	.925	.663	1	.163	2.522	.688	9.254
Retired/home/caring	-.992	.772	1	.199	.371	.082	1.683
Mindfulness experience	**.840**	**.289**	**1**	**.004**	**2.316**	**1.315**	**4.080**
TAS20 total[a]	**.039**	**.015**	**1**	**.008**	**1.040**	**1.010**	**1.071**
FFMQ total[a]	-.011	.010	1	.250	.989	.970	1.008
Constant	2.105	2.041	1	.302	8.209		

Omnibus chi-square = 82.96, df=16, p<0.001. Cox & Snell R^2 = .24. Nagelkerke R^2=.32. *N* = 299

[a]TAS20 = Toronto Alexithymia Scale; FFMQ = Five Facet Mindfulness Questionnaire

Figure 2

Model of Alexithymia (TAS20) as a Predictor of Self-Harm, Mediated by the Five Facets of Mindfulness, Controlling for Age, Education, Ethnicity, Employment Status and Mindfulness Experience (BCa bootstrapped CI based on 5000 samples; N = 299)