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Psychological correlates of self-harm within gay, lesbian and bisexual UK University students

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Abstract

Objective: This study explores the association between Lesbian, Gay or Bisexual (LGB) status and self-harm in UK higher education students. There is currently limited data on this association, and the role psychological variables have in potentially explaining this link, in UK students. We examine whether LGB status is associated with self-harm (both non-suicidal self-injury [NSSI] and suicide attempts [SA]), and whether four psychological variables (depression, anxiety, belongingness, self-esteem) mediate this association. *Design*: Cross-sectional survey. *Method:* UK university students (n=707) completed an online survey including measures of self-harm, affective symptoms, belongingness, and self-esteem. Latent Variable Modelling (LVM) was used to test our hypotheses. *Results:* LGB status remained associated with an elevated risk of NSSI and SA even after accounting for mediating factors. Self-esteem and (in the case of SA but not NSSI) thwarted belongingness, did, however, explain some of this association and were correlated with self-harm risk. *Conclusions:* The findings suggest that psychological factors may account for the association between LGB status and self-harm and, as such, prevention and intervention efforts directed at these psychological mediators may help to reduce self-harm risk in this population.

Psychological correlates of self-harm within gay, lesbian and bisexual UK University students

People who are Lesbian, Gay or Bisexual (LGB), are at considerably elevated risk of self-harm, including both Non-Suicidal Self-Injury (NSSI; Odds Ratio = 3.00; Batejan, Jarvi, & Swenson, 2015), and Suicide Attempts (SA; Odds Ratio = 2.26; Miranda-Mendizábal et al., 2017). LGB young people and students appear particularly at risk (Batejan et al., 2015; Haas et al., 2011; McDermott, Hughes, & Rawlings, 2017). This research has predominantly taken place in the US but a smaller number of studies conducted in the UK population do also suggest greater risk of self-harm for LGB young people or students (Warner et al., 2004; Young, Riordan, & Stark, 2011). Within this population, bisexual individuals appear particularly at risk (Batejan et al., 2015). Further research in UK LGB student populations is still needed. Currently, whilst LGB individuals are known to be a high-risk group, there is less research focused on the psychological variable that may help explain this risk (Batejan et al., 2015; Miranda-Mendizábal et al., 2017). In particular data from UK higher-education students that assesses the association between LGB status, self-harm, and hypothesised psychological mediators, is limited. The current study therefore examines the association between LGB status and self-harm (both NSSI and SA) in students, and investigates the extent to which four psychological variables (depression, anxiety, belongingness, self-esteem) may account for this association. This project is consistent with the UK governments focus on mental health in young people, which emphasises a greater focus on higher-education students (Department of Health & Department of Education, 2017).

Self-harm is an umbrella term covering acts of intentional self-injury irrespective of suicidal intent (Hawton, Rodham, Evans, & Weatherall, 2002; National Collaborating Centre for Mental Health, 2004). Under this umbrella are SAs (acts of self-harm where the intention was to end one's life) and NSSI (acts of self-harm where the intention to end one's life was

absent). Importantly, there is debate about whether it is feasible or meaningful to distinguish between NSSI and SA (Butler & Malone, 2013; Kapur, Cooper, O'Connor, & Hawton, 2013). In the current study we consider both outcomes, allowing us to test whether converging or conflicting findings emerge. Self-harm (both NSSI and SA) is problematic because it is a major predictor of death by suicide (Hawton et al., 2015; Ribeiro et al., 2016), overall mortality (Bergen et al., 2012), and also often a marker of substantial distress and clinical need (Goldman-Mellor et al., 2014; Hasking, Momeni, Swannell, & Chia, 2008; Reinherz et al., 1995). National suicide prevention guidelines emphasise a need to focus on high risk groups, including the LGB population (Department of Health, 2017).

A Minority stress framework (Meyer, 2003) may have theoretical utility in developing an explanation for the high prevalence of self-harm among LGB people. According to minority stress theory, LGB people are stigmatized as a result of their minority status, and consequently experience disproportionately high levels of social and individual stressors (e.g., discrimination, sexuality-related micro-aggression and victimisation, and increased vigilance and expectation of rejection; Lambe, Cerezo, & O'Shaughnessy, 2017; Pitoňák, 2017; Sowe, Taylor, & Brown, 2017; Sue, 2010; Ybarra, Mitchell, Palmer, & Reisner, 2015). Elevated stress, in turn, has a severe negative impact on the health and wellbeing of LGB people (Meyer, 2003), and may account for adverse outcomes such as an increased prevalence of self-harm (Muehlenkamp, Hilt, Ehlinger, & McMillan, 2015). This framework has been extended to consider the importance of psychological mediating variables in explaining the link between minority stress and adverse outcomes like self-harm. (Hatzenbuehler, 2009; Meyer, 2003; Pitoňák, 2017).

We can contrast this framework with recent theoretical models of self-harm, to help identify common psychological process that might help explain how LGB status, and the social adversities associated with this, may result in self-harm. The recent cognitive-

emotional model of self-injury (Hasking, Whitlock, Voon & Rose, 2017) specifies self-schema or self-concept as an important distal process conferring vulnerability to self-injury. This also overlaps with the minority stress theory framework, where self-concept (i.e. discontent or lack of acceptance with who one is) and the internalising of negative perceptions of LGB status is identified as an important mediating process (Hatzenbuehler, 2009). Thus, whilst a range of psychological processes may be relevant here, the way in which LGB individuals feel about themselves seems particularly important. Rejection, discrimination, and exposure to negative attitudes and stereotypes may affect the self-concept and self-esteem of LGB individuals (Hegna & Wichstrøm, 2007; Kashubeck-West, Szymanski, & Meyer, 2008; Pitoňák, 2017; Sowe et al., 2017). Low self-esteem, encompassing the extent to which a person accepts, likes or is satisfied with themselves, is associated with a greater risk of self-harm, both cross-sectionally and longitudinally (Forrester, Slater, Jomar, Mitzman, & Taylor, 2017; Hegna & Wichstrøm, 2007; McGee & Williams, 2000; Tatnell, Kelada, Hasking, & Martin, 2014). In a recent meta-analysis individuals with a history of NSSI reported poorer self-esteem than non-NSSI samples (d = 0.59-0.78; Forrester et al., 2017), with a more pronounced difference for more active and self-critical forms of self-perception. Low self-esteem is associated with suicidal ideation and behaviour in LGB individuals (Hegna & Wichstrøm, 2007; Ybarra et al., 2015). Self-harm may occur as a means of coping with, avoiding or escaping from highly aversive internal states, including chronically low self-esteem (Rasmussen, Hawton, Philpott-Morgan, & O'Connor, 2016; Taylor et al., 2018). For NSSI, more specifically, motives of self-punishment are highly endorsed (41-62% of people who engage in NSSI; Taylor et al., 2018). NSSI with this function may emerge in those with a particularly critical self-perception.

A second influential model of both suicidal behaviour and self-harm broadly, the Interpersonal-Psychological Theory of suicide (IPTS; Van Orden, Witte, Gordon, Bender, &

Joiner, 2008; Van Orden et al., 2010), seems particularly compatible with the minority stress model due to its shared focus on interpersonal factors. The IPTS proposes that the serious desire for death by suicide arises from the co-occurrence of two proximal, causal factors: (1) perceived burdensomeness (an individual's sense that he or she is a liability to others and worth more dead than alive) and (2) thwarted belongingness (an individual's sense that he or she lacks meaningful connections to others). For LGB individuals, the need to belong may be thwarted by experiences of rejection or loss of contact with social groups and communities that a person may have formerly been a part of. This construct of thwarted belongingness also mirrors suggestions that social exclusion, rejection or a general loss of social connections may represent an important facet of minority stress (Hatzenbuehler, 2009). Thus, this sense of thwarted belongingness could be a key modifiable psychological concomitant of the social challenges LGB individuals face. Thwarted belongingness is associated with suicidal thinking and behaviour (Chu et al., 2017; Van Orden et al., 2010; Van Orden, Witte, Gordon, Bender, & Joiner, 2008) as well as NSSI (Assavedo & Anestis, 2016). However, whether this construct accounts for the increased risk of self-harm in LGB individuals is unclear. Fostering belongingness amongst LGB individuals has been suggested as a means of increasing resilience to difficulties including self-harm (Aranmolate, Bogan, Tiffany Hoard, & Mawsomolate, 2017; McLaren, 2016), but studies in LGB individuals, have had mixed results regarding whether belongingness is associated with suicidal ideation (Baams, Grossman, & Russell, 2015; Cramer, Stroud, Fraser, & Graham, 2014; Hill & Pettit, 2012; Woodward, Wingate, Gray, & Pantalone, 2014).

An increased exposure to emotional distress, including symptoms of depression and anxiety, has been observed in LGB individuals. For example, in combined data from 12 national UK surveys LGB status was associated with an increased risk of common mental disorder symptoms (though findings were more mixed when alternate measures of symptoms

were adopted; Semlyen, King, Varney, & Hagger-Johnson, 2016). Greater levels of depression and anxiety are both also risk factors for self-harm (Fox et al., 2015). Hence, the relationship that depressive and anxiety symptoms have with self-harm in LGB students should also be taken into account.

Data regarding the association between LGB status and self-harm in UK students, and the psychological variables that mediate this link, is limited. Whilst measures to tackle the social adversities associated with LGB status are essential, psychological variables, when they can be modified, may also provide a target for therapeutic interventions and preventive strategies. Based on a consideration of the minority stress framework and models of self-harm, self-esteem and thwarted belongingness were identified as two key psychological variables, and so are the focus of this study. The aim of this study was to first examine the association between LGB status and two forms of self-harm in a UK student population, NSSI and SA, and second to explore whether four putative psychological mediators might explain this association. We hypothesised that the association between LGB status and self-harm will be fully accounted for by the psychological mediators, each of which will have an independent association with self-harm.

Method

Sample

Participants were university students aged 18 years or older, recruited from various faculties across two UK universities.

Measures

Sexual orientation. Sexual orientation was assessed using a single item (Haseldon & Joloza, 2009) which asked, "how would you describe your sexual orientation? Response options were: "heterosexual/straight," "gay/lesbian," "bisexual," or "sexual orientation not specified".

Anxiety and Depression. The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) was employed to measure anxiety and depression. The scale consists of 14 questions, of which seven correspond to the anxiety subscale (e.g. "Worrying thoughts go through my mind") and seven correspond to the depression subscale (e.g. "I have lost interest in my appearance"). Items are rated on a 0-3 point ordinal scale indicating strength of agreement with each item. To reduce the risk of a false positive bias, the HADS does not assess symptoms of anxiety and depression related to physical disorder, such as fatigue and insomnia. The measure has been shown to have adequate diagnostic accuracy. A meta-analysis of diagnostic test accuracy studies reported that, using a cut-score of 8 or more, the HADS depression scale gave 82% sensitivity and 74% specificity for detecting major depressive disorder; and the anxiety scale gave 78% sensitivity and 74% specificity for detecting generalised anxiety disorder (Brennan, Worrall-Davies, McMillan, Gilbody, & House, 2010). Internal consistency was good for the anxiety, $\alpha = .83$, and depression subscales , $\alpha = .82$, in the current sample.

Thwarted Belongingness. Thwarted belongingness was assessed with 7-items taken from the Interpersonal Needs Questionnaire (Van Orden, Cukrowicz, Witte, & Joiner, 2012). The scale measures participants' beliefs about the extent to which they feel connected to others in a frequent and caring way. A sample item is "These days other people care about me." Level of agreement on each item is rated with a 7-point scale ranging from 1 ("not at all true of me") to 7 ("very true of me"). Higher scores indicate greater levels of thwarted belongingness. The INQ thwarted belongingness exhibits strong convergent validity with measures of related constructs, such as loneliness, social support and social worth, and demonstrates consistent factor loading across a variety of samples including outpatients, undergraduates, and the elderly (Van Orden et al., 2012). Moreover, a recent study in a large sample of undergraduates found that the factor structure of the scale does not vary between

genders and shows strong internal consistency and construct validity (Freedenthal, Lamis, Osman, Kahlo, & Gutierrez, 2011). Internal consistency was good in the current sample, α = .87.

     Suicide Attempts. Suicide attempts were recorded if a respondent answered 'yes' to the following question taken from The Self-Injurious Thoughts and Behaviours Interview (SITBI; Nock, Holmberg, Photos, & Michel, 2007): "Have you ever made an actual attempt to kill yourself in which you had at least some intent to die?". The SITBI suicide attempt subscale has demonstrated strong inter-rater reliability (average k = 0.99), test–retest reliability (average k = 0.70), and construct validity, as demonstrated by strong relations with other measures of suicide attempt (r = .65; Nock et al., 2007).

     Non-suicidal Self-injury. NSSI behaviour was recorded if a respondent answered 'yes' to the following question taken from the SITBI (Nock et al., 2007): "Have you actually purposely hurt yourself without wanting to die?"

     Self-Esteem. Five items drawn from the Internal Protective subscale of the Suicide Resilience Inventory 25 (SRI-25; Osman et al., 2004) were used to index self-esteem: item 1 ("there are many things that I like about myself"), item 5 ("I like myself"), item 13 (" I am proud of many good things about myself"), item 20 ("Regardless of the problem situation I face, I can be happy with myself"), and item 25 ("I feel cheerful about myself"). These items were selected based on their comparability with the Rosenberg Self-Esteem Scale (Rosenberg, 1965). The Internal Protective subscale was originally developed to assess people's satisfaction with life and positive feelings or beliefs about themselves. The remaining three items from this subscale were not so clearly indicators of self-esteem ("Most of the time I set goals that are reasonable for me to meet"; "I am satisfied with most things in my life", "I feel that I am an emotionally strong person"). Items are rated on a 6-point scale, from 1 ("strongly disagree") to 6 ("strongly agree"). The five-item scale fit the data well as

part of our measurement model (see below). Internal consistency was good in the current

sample, α = .94.

Procedure

The research protocol was reviewed and approved by the institutional ethics panels of

each participating university. Participants were recruited via an email invite to participate in a

study of suicide. Within this email it was made clear to potential participants that they did not

need to have experienced suicidal thoughts and behaviours to take part. The study was also

advertised on the websites of both universities. Participants completed the study online using

Qualtrics, a Web interface that allows for secure remote data collection through the

distribution of anonymous secure links to the protocol. Participants were required to consent

before the survey was presented online. Participation in the current study was voluntary and

no inducements or obligations were used. All participants were debriefed and given phone

numbers for local mental health services.

Statistical Analysis

Latent Variable Modelling (LVM) was used to test our hypotheses. The analysis

featured a single binary outcome (NSSI or SA), one binary predictor (LGB or non-LGB

status), and four latent mediators (anxiety and depressive symptoms, thwarted belongingness,

and self-esteem). Both the anxiety and depressive symptoms scale (HADS) items used a four-

point response format that is better seen as ordered categorical rather than continuous. In

order to simplify the model being estimated, we created item parcels to act as indicators for

these two latent variables, which could then be treated as continuous. Item parcels are

appropriate here since the latent structure of the measures used are well established, and the

focus of the research was not on testing the factor structure of these constructs (Little,

Cunningham, Shahar, & Widaman, 2002; Little, Rhemtulla, Gibson, & Schoemann, 2013). In

this context, item parcelling can reduce error that could otherwise affect model fit without

biasing structural parameters within the model. For both these latent variables, three item parcels were generated via the correlational method (Little et al., 2013). The thwarted belongingness and self-esteem scales used longer item response formats (six and seven-point), which we treated as continuous, and so did not parcel.

The analyses were conducted in Mplus 7.4 (Muthén & Muthén, 1998-2012) and estimated with Robust Maximum Likelihood (RML; Satorra & Bentler, 1994; Yuan & Bentler, 2000) to adjust for the non-normality in the variables. RML can also accommodate binary outcomes via a numerical integration algorithm (Muthén & Muthén, 1998-2012) and allows the estimation of Odds Ratios (ORs) for these associations within a logistic regression framework, which is helpful for judging effect size. Missing data in endogenous variables is handled as part of the RML estimation meaning that incomplete cases can contribute to the analysis.

We ran two separate series of models with either NSSI or SA as the outcome. We chose to do this rather than co-vary for the influence of one of these outcomes upon the other in the same model. This was driven by awareness of the controversy surrounding the distinction between NSSI and SA (Butler & Malone, 2013; Kapur et al., 2013) and a concern about partialling out too much variance in an outcome by including a heavily overlapping covariate in the same model.

The models were developed in an iterative manner. Initially a measurement model was estimated to ensure the four latent variables (anxiety and depressive symptoms, thwarted belongingness, self-esteem) fit the data adequately. In Model 1, the direct association between LGB status (binary variable) and self-harm (NSSI or SA) was analysed, excluding indirect effects. In Model 2, indirect effects mediated via thwarted belongingness and self-esteem were included, and the direct path between LGB status and self-harm was fixed to zero. Model 3 extends Model 2 by freeing the association between LGB status and self-harm,

allowing both direct and indirect effects. Model 4 then extends Model 3 by also including anxiety and depressive symptoms as mediators of the relationship between LGB status and self-harm. The four models are nested, allowing direct comparison.

The fit of the measurement model to the data could be judged with standard criteria including the Confirmatory Fit Index (CFI; adequate fit > .90, good fit > .95), Tucker-Lewis Index (TLI; adequate fit > .90, good fit > .96), the Root Mean Squared Residual (RMSEA; adequate fit < .08, good fit < .06 with the upper confidence interval < .08) and the Standardised Root Mean Square Residual (SRMR; good fit < .09; Byrne, 2001; Hu & Bentler, 1999; Kline, 2011). Because of the inclusion of a binary outcomes variable, standard LVM fit indices could not be generated for Models 1 to 4. Instead the adjusted Akaike's Information Criterion (AICc) and Bayesian Information Criterion (BIC) were used to compare models, with smaller values indicating better fitting models (Burnham & Anderson, 2004; Enders & Tofighi, 2008).

Within the main analysis we combine individuals who report being gay, bisexual or lesbian into a single category, due to the smaller numbers within the sub-categories.

Results

Sample Characteristics

Missing data was minimal (0.1 to 4.9% per variable). There was no missing data for n = 627 participants. The largest pattern of missing data was for participants missing responses for the second thwarted belongingness item only. The sample were aged 18 to 60 years (M = 23.05, SD = 7.15) and was predominantly female (n = 552, 75.2%) and White (n = 609, 83.0%). The remaining participants were Asian (n = 58, 7.9%), Mixed ethnicity (n = 34, 4.6%), Black (n = 24, 3.3%), or other (n = 8, 1.1%; missing for one person). Gay or bisexual orientation was reported for 119 (16.2%) of participants (gay/lesbian = 37; bisexual = 82), and 25 participants chose not to specify their sexual orientation (these individuals were

excluded from analyses). Suicide attempts were reported by $n = 131$ (17.8%) participants and NSSI was reported by 332 (45.2%) participants. LGB individuals had a significantly higher rate of NSSI (65% vs. 41%) and SA (35% vs. 14%) than non-LGB individuals ($ps < .05$). Descriptive statistics for the four mediator variables (anxiety and depressive symptoms, thwarted belongingness, self-esteem) are reported in Table 1.

<p style="text-align:center">TABLE 1 ABOUT HERE</p>

Measurement Model

The measurement model, featuring four correlated latent variables (anxiety and depressive symptoms, thwarted belongingness, self-esteem), initially showed only moderate fit, X^2 (98) = 650.34, RMSEA = .09 (90% CI: .08, .09), CFI = .92, TLI = .90, SRMR = .05. Allowing the error terms associated with two conceptually similar items on the self-esteem scale ("There are many things I like about myself"; "I like myself"), and thwarted belongingness scale ("I feel disconnected from other people", "I often feel like an outsider in social gatherings") to correlate led to good fit with the data, X^2 (96) = 370.87, RMSEA = .06 (90% CI: .06, .07), CFI = .96, TLI = .95, SRMR = .05, with all standardised loadings > .60. Latent correlations between variables are reported in Table 2.

<p style="text-align:center">TABLE 2 HERE</p>

NSSI

Table 3 presents the AIC_c, adjusted BIC, ORs and associated 95% confidence intervals for all Models and predictors. In Model 1, LGB status was associated with a higher risk of NSSI. Model 3, which included both direct and indirect (via thwarted belongingness and self-esteem) associations between LGB status and NSSI, was the best fitting. Thus, LGB status remained associated with NSSI even after mediators were taken into account, though the strength of this association was slightly reduced. Self-esteem, but not thwarted belongingness (where there was also no trend of an effect), was significantly associated with

self-harm, and was also a significant mediator (See Table 4). The addition of anxiety and depressive symptoms to the model (Model 4) led to poorer model fit. Across the models, removal of a single potential outlier based on log likelihood distances made no difference to results.

<div style="text-align:center">TABLE 3 ABOUT HERE</div>

<div style="text-align:center">TABLE 4 ABOUT HERE</div>

SA

The results for SA followed the same pattern. Once again, Model 3, which included both direct and indirect associations (via thwarted belongingness and self-esteem) with SA, showed the best fit to the study data of the three models. Self-esteem was significantly associated with SA, though with a smaller effect size than for NSSI. Thwarted belongingness was also associated with a greater risk of SA. For both thwarted belongingness and self-esteem, the indirect effects did not quite reach significance ($p = .06 - .07$), though the total indirect effect remained significant ($p < .01$). As with NSSI, the addition of anxiety and depressive symptoms to the model (Model 4) led to poorer model fit. Across the models, removal of a single potential outlier based on log likelihood distances made no difference to results.

<div style="text-align:center">

Discussion

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The aim of this study was to examine the association between LGB status and self-harm in a UK student population, and to determine whether a set of four psychological variables mediated this association (depression, anxiety, belongingness, self-esteem). We examined these associations separately for NSSI and SA. In both instances LGB status remained associated with an elevated risk of self-harm even after accounting for mediating factors. This suggests that other variables, not included in this study, may also be important in accounting for the elevated self-harm risk in the LGB population. In particular, it may be that

social factors, such as discrimination or marginalisation remain important even after these psychological factors are accounted for. Psychological factors, namely self-esteem and (in the case of SA but not NSSI) thwarted belongingness, did explain some of this association and were correlated with the risk of self-harm. Notably, including anxiety and depressive symptoms into the model as further mediators worsened fit, suggesting that these variables may have little added explanatory value over and above self-esteem and thwarted belongingness. Self-esteem and depressive symptoms had large latent correlations (see Table 2) which may explain why depressive symptoms added little to the model.

The results for NSSI and SA followed a similar pattern and so suggest that common processes may be operating in both cases. However, some differences were apparent. In particular thwarted belongingness had no relationship with NSSI, but was associated with SA. The concept of thwarted belongingness was initially developed to explain suicidal behaviour (Van Orden et al., 2010), not NSSI, and so these cognitions may be particularly linked to suicidal behaviour rather than self-harm in general. However, other research has supported a positive relationship between belongingness and NSSI (Assavedo & Anestis, 2016), countering this possibility. Further investigation of these constructs with regards to LGB status and self-harm, including both SA and NSSI, would be beneficial.

This research suggests thwarted belongingness may account for the link between LGB status and suicide attempts, providing support for the IPTS. This research also supports the potential to integrate this model within a minority stress framework, in order to explain the heightened risk of suicidal behaviour seen in LGB individuals . Within this study we focused on a single construct from IPTS, belongingness, which we judged was most at threat from minority stress. However, it would be valuable to test a fuller integration of IPTS and minority stress theory (see Muehlenkamp et al., 2015). This research supports the role of self-esteem in understanding both NSSI and suicidal behaviour. Self-esteem, or self-concept more

broadly, appears important from both a minority stress perspective and within recent models of self-injury (Haskings et al., 2017; Hatzenbuehler, 2009). Haskings and colleagues suggest other factors, less clearly linked to minority stress and LGB status, such as the expectations individuals have about self-injury and its consequences, which may potentially moderate the association between self-esteem and self-harm seen in this study. Thus, whilst the psychological variables in this study were chosen a priori on a theoretical basis, a range of other psychological variables known to be linked to self-harm were not included in the current study, but could be considered in future research. It would also be of value to investigation whether these psychological variables help explain elevated self-harm risk seen in other marginalised groups (e.g. Hughes, Knowles, Dhingra, Nicholson, & Taylor, 2018).

Strengths of the study include the large sample, focus on a UK population, and systematic approach to analysis, including the explicit modelling of mediators. However, a number of limitations require mention. The assessment of LGB status was a simple categorical variable that did not allow a more nuanced assessment of sexual orientation, which is better seen as a continuum. Moreover, small numbers in sexual orientation subgroups (i.e. gay, lesbian, bisexual) limited our ability to look at these distinctions, but important differences may exist (Batejan et al., 2014). The study focused on lifetime presence of suicide attempts and NSSI. As such the reported associations are possibly indicative of broad patterns of risk within the student population but are not informative about proximal triggers or predictors of self-harm behaviours, or about determinants of severity. Likewise the cross-sectional nature of associations prevents any inferences around the direction of effect. Though it seems improbable that sexual orientation would be a consequence of a history of self-harm behaviour, it may be that the psychological variables examined are consequences rather than causes of self-harm behaviour. Thus, whilst results were largely consistent with

our theoretical suppositions, longitudinal studies would be beneficial in elucidating the direction of relationships.

It has been argued that minority status can also confer resilience to psychological difficulties (Meyer, 2003). Clearly, not every LGB student experiences low self-esteem, and so the social and psychological factors that might influence whether this occurs are important. It is likely the social attitudes and messages one is exposed to are important here, as well compatibility of sexuality identity with other importance influences in one's life (e.g. religious context; Gibbs & Goldbach, 2015). Whilst the current study assessed self-esteem, more specific constructs related to self-concept are suggested by minority stress theory, including internalised homophobia and perceived stigma, were not assessed. Homophobic and biphobic violence was also not assessed but has been identified in past research as a risk factor for self-harm (e.g. Ferlatte, Dulai, Hottes, Trussler & Marchland, 2015). Future research should consider these additional variables in better understanding self-harm risk in the LGB population.

The current study supports the assertion that UK LGB students are at an elevated risk of self-harm, including both SA and NSSI. This finding mirrors data form US LGB young people and supports the view this population may benefit from focused prevention and intervention efforts (Haas et al., 2011). The findings also lend weight to the idea that psychological factors may account for the association between LGB status and self-harm (Hatzenbuehler, 2009; Meyer, 2003) and, as such, interventions directed at these psychological mediators may help to reduce self-harm risk in this population. In particular, self-esteem emerged as an important variable. Self-esteem may be particularly adversely affected in those who are struggling in accepting or sharing their sexuality with others, or who are exposed to discrimination and negative attitudes. It has been noted that evidence is lacking for self-harm prevention interventions aimed at LGB individuals (Marshall, 2016). A

multifaceted approach to prevention and intervention may be well suited here. At a societal level, working to reduce discrimination and improve acceptance of LGB individuals through public policy and media campaigns may be helpful in reducing any impact on self-esteem (Cook, Purdie-Vaughns, Meyer, & Busch, 2014; Meyer, 2003). Suicide prevention attempts aimed at LGB students have included training and awareness programmes designed to change attitudes and remove the environmental stressors associated with LGB status (e.g. homophobic and biphobic behaviour; Johnson, Oxednine, Taub & Robertson, 2013). Whilst potentially helpful, it has been noted that such programmes can also reinforce the "victim" status of LGB individuals and fail to address the underlying social and culturally factors that drive problems like homophobic bullying (Payne & Smith, 2017). Based on our data, programmes which help promote self-esteem (e.g. gay affirmative approaches; Craig, Austin & Alessi, 2013) may be particularly helpful in preventing self-harm. At an individual level, psychological interventions that help improve self-esteem may be helpful for those particularly at risk (Taylor & Montgomery, 2007). There is evidence that therapies including cognitive behavioural approaches, may help improve self-esteem and prevent self-harm (Slee Garnefski, Leeden, Arensman & Spinhoven, 2008). However, such approaches may require adaption to better work with the challenges faced by LGB individuals (Craig, Austin & Alessi, 2013). A recent UK study of LGBT young people and suicidality found that participants were reluctant to use mainstream services and preferred support provided in a LGBT setting (McDermott, Hughes, & Rawlings, 2018). There is preliminary evidence that more actively self-critical ways of relating to oneself may be particularly problematic with regards to the risk of self-harm (Forrester et al., 2017). As such these individuals may be an important subgroup to further support through specific psychological intervention.

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Table 1

Descriptive Statistics for Psychological Mediator Variables

Variable	Total sample *M* (*SD*)	LGB group *M* (*SD*)	Non-LGB group *M* (*SD*)
Depressive symptoms	12.46 (4.14)	13.83 (4.27)	12.19 (4.06)
Anxiety symptoms	10.06 (4.50)	11.72 (4.26)	9.74 (4.47)
Thwarted Belongingness	18.03 (7.99)	22.06 (6.94)	17.24 (7.95)
Self-esteem	19.59 (6.79)	17.06 (6.92)	20.10 (6.65)

Scores based on simple sum of items; Depressive symptoms scores range from 7 to 26; Anxiety symptoms scores range from 0 to 21; Belongingness scores range from 5 to 35; Self-esteem scores range from 5 to 30.

Table 2

Inter-Correlations between Latent Continuous Variables

Variable	2	3	4
1. Depressive symptoms	.69	.75	-.80
2. Anxiety symptoms		.55	-.65
3. Belongingness			-.73
4. Self-esteem			

All associations significant at *P* < .001

Table 3

AICc, BIS and Odds Ratios for all Estimated Models

	AICc	adjusted BIC	LGB status	Belongingness	Self-esteem	Depressive symptoms	Anxiety symptoms
					OR (95% CI)		
Non-Suicidal Self-Injury							
M1	36457.59	36527.41	2.67 (1.77, 4.03)*	-	-	-	-
M2	36347.84	36420.65	-	1.01 (0.76, 1.35)	0.37 (0.28, 0.50)*	-	-
M3	36341.12	36414.91	2.03 (1.29, 3.19)	0.94 (0.70, 1.26)	0.36 (0.27, 0.49)*	-	-
M4	36355.80	36433.45	1.94 (1.23, 3.07)*	0.93 (0.64, 1.36)	0.45 (0.31, 0.65)*	0.91 (0.56, 1.50)	1.58 (1.16, 2.15)*
Suicide Attempt							
M1	36134.48	36204.30	3.46 (2.21, 5.39)*	-	-	-	-
M2	36096.74	36169.55	-	1.62 (1.14, 2.32)	0.63 (0.45, 0.89)	-	-
M3	36086.01	36159.80	2.46 (1.51, 4.02)*	1.48 (1.03, 2.14)*	0.62 (0.44, 0.88)*	-	-
M4	36109.04	36186.68	2.52 (1.53, 4.16)*	1.30 (0.82, 2.07)	0.79 (0.49, 1.29)	1.41 (0.78, 2.56)	1.07 (0.70, 1.63)

P < .01; To aid interpretations of effect sizes, variances of latent variables have been fixed at 1, rather than fixing a factor loading to enable model identification.

Table 4

Summary of Unstandardised Indirect Effects

	NSSI	SA
Total indirect	0.15 (-0.01, 0.31)	0.22 (0.08, 0.35)
Belongingness	-0.02 (-0.12, 0.08)	0.13 (-0.00, 0.27)
Self-esteem	0.17 (0.02, 0.33)	0.08 (-0.01, 0.17)

* P < .01; Values are unstandardised regression coefficients and associated 95% Confidence

Intervals. Indirect effects taken from Model 3 in both cases, as the best fitting model.